Code No: **R15A0308**

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH___GY
(Autonomous Institution – UGC, Govt. of India)
II B.TechII Semester Supplementary Examinations, October/November 2020
Thermal Engineering
(ME)

Roll No										

Time: 2 hours   Max. Marks: 75

Answer Any **Four** Questions
All Questions carries equal marks.
******

1   Discuss in detail, i) pumping losses and ii) rubbing friction losses in IC engines.

2   With the help of a neat sketches, explain Forced circulation cooling system

3   Bring out clearly the process of combustion in CI engines and also explain the various stages of combustion

4   What is meant by abnormal combustion? Explain the phenomena of knock in SI engines

5   A 4 cylinder engine running at 1200rpm delivers 20kW. The average torque when one cylinder was cut is 110Nm. Find the indicated thermal efficiency if the calorific value of the fuel is 43MJ/kg and the engine uses 360grams of gasoline per kWh.

6   Find the brake specific fuel consumption in kg/kWh of a diesel engine whose fuel consumption is 5grams per second when the power output is 80kW. If the mechanical efficiency is 75%, calculate the indicated specific fuel consumption

7   What is a rotary compressor? How are rotary compressors classified? Explain any one with neat sketch

8   Explain the working principle of axial flow compressor with a neat sketch.

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH▭▭GY
(Autonomous Institution – UGC, Govt. of India)
II B.TechII Semester Supplementary Examinations, October/November 2020
Dynamics of Machinery
(ME)

Roll No										

Time: 2 hours   **Max. Marks: 75**

Answer Any **Four** Questions
All Questions carries equal marks.
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1. The rotor of a marine turbine has a mass of 900 kg rotates at 2000 rpm in clock wise direction while looking from the stern. The radius of gyration of the rotor is 350 mm. Discuss the gyroscopic effect , when marine steers to the right along a curve of 50 m radius at a speed of 20 knots (I knot-1860 m/hr) Marine pitches 5^0 above and below about the normal position and the bow is ascending with its maximum velocity. Assume the pitching motion is SHM with a time period of 20 seconds.

2. A 2.4 tonne racing car has a wheel base of 2.4 m and a track of 1.4 m. The centre of mass of the car lies at 0.65 m above the ground and 1.4 m from the rear axle. Equivalent mass of engine parts is 150 kg with radius of gyration of 155 mm. The back axle ratio is 5. The engine shaft and flywheel rotate clockwise when viewed from front. Each wheel has a diameter of 0.8 m and moment of inertia of 0.75 kg-m^2. Determine the load distribution on the wheel when the car is rounding a curve of 100 m radius at a speed of 75 km/hr to the left.

3. a) In a thrust bearing, the external and the internal diameters of the contacting surfaces are 320mm and 200mm respectively. The total axial load is 80 kN and the intensity of pressure is 350kN/m^2.The shaft rotates at 400rpm. Taking the coefficient of friction as 0.06, calculate the power lost in overcoming the friction.
   b) The inner and outer radii of a single plate clutch of 40mm and 80mm respectively determine the maximum, minimum and the average pressure when the axial force is 3kN.

4. A horizontal gas engine running at 210 r.p.m. has a bore of 220mm and a stroke of 440mm. The connecting rod is 924mm long the reciprocating parts weight 20kg.When the crank has turned through an angle of 30° from IDC, the gas pressure on the cover and the crank sides are 500 KN/m^2 and 60 KN/m^2 respectively. Diameter of the piston rod is 40 mm. Determine:a)Turning moment on the crank shaft b) Thrust on bearing c) Acceleration of the flywheel which has a mass of 8kg and radius of gyration of 600mm while the power of the engine is 22KW.

5. a. Explain the working of a single plate clutch
   b. A shaft has a number of collars integral with it. The external diameter of the collars is 400mm and the shaft diameter is 250mm. If the uniform intensity of pressure is 0.35N/mm^2 and it's coefficient of friction is 0.05, estimate i) power

absorbed in overcoming friction when the shaft runs at 105 rpm and carries a load of 150KN and ii) number of collars required

6   During forward stroke of piston of double acting steam engine , the turning moment has the   maximum value of 1960 Nm when the crank makes an angle of 80° with the IDC. During the   backward stroke, the maximum turning moment is 1470 Nm when the crank makes 80° with the   outer dead centre. The turning moment diagram for the engine may be assumed to be represented   by two triangles. If the crank moves at 100 r.p.m. and radius of gyration of flywheel is 1.75 m, find   the coefficient of fluctuation of energy and mass of flywheel to keep the speed ± 0.75% of mean   speed. Also determine the crank angles at which the speed has its minimum and maximum values

7   A, B, C and D are four masses carried by a rotating shaft at radii 100 mm,150 mm, 150 mm and   200 mm respectively. The planes in which the masses revolve are spaced 500 mm apart and the   masses of B, C and D are 9 kg, 5 kg and 4 kg respectively. Find the required mass A and relative   angular setting of the four masses so that the shaft be in complete balance

8   Three rotors A,B and C having moment of inertia of 2000, 6000 and 3500 kg-m^2 respectively are   carried on a uniform shaft of 0.35 m diameter. The length of the shaft between the rotors A and B is   6 m and between B and C is 32 m. Find the natural frequency of the torsional vibrations. The   modulus of rigidity for the shaft material is 80 GN/m^2

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Code No: **R15A0309**

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH̲̲̲̲GY
(Autonomous Institution – UGC, Govt. of India)
II B.TechII Semester Supplementary Examinations, October/November 2020
Fluid Mechanics and Hydraulic Machinery
(ME)

Roll No										

Time: 2 hours   **Max. Marks: 75**

Answer Any **Four** Questions
All Questions carries equal marks.
****

1   Differentiate between: a) Liquids and Gases b) Cohesion and Adhesion c) Real fluid and Ideal fluid d) Compressible and Incompressible fluids.

2   Enunciate Newton's law of viscosity. Explain the importance of viscosity in fluid motion. What is the effect of temperature on viscosity of water and that of air?
An oil of viscosity 5 poise is used for lubrication between a shaft and sleeve. The diameter of shaft is 0.5 m and it rotates at 200 rpm. Calculate the power lost in the oil for a sleeve length of 100 mm. The thickness of the oil film is 1.0 mm

3.A   Derive an expression for minor losses due to sudden contraction

B   At a sudden enlargement of a water main from 240 mm to 480 mm diameter, the hydraulic gradient rises by 10 mm. estimate rate of flow

4   Derive Bernoulli's equation from Euler's equation of motion

5   With the help of line diagram explain the concept of pumped storage plants,

6   With the help of line diagram explain the working of hydro electric power station

7.A   By means of a neat sketch, explain the governing mechanism of Francis Turbine.

B   How are turbines classified? Explain the working of Pelton wheel turbine with a neat sketch.

8   Explain the principle and working of a Centrifugal pump with a neat sketch.
Derive the expression for power required to run a double acting reciprocating pump.

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLO
(Autonomous Institution – UGC, Govt. of India)
II B.TechII Semester Supplementary Examinations, October/November 2020
Industrial Engineering
(ME)

Roll No									

Time: 2 hours   **Max. Marks: 75**

Answer Any **Four** Questions
All Questions carries equal marks.
***

1   Explain about Taylor's Scientific Management.

2   Discuss in detail about Line and staff organization.

3   What is method study? Write its procedures (steps) and explain any two steps in
     detail.

4   Explain various factors affecting plant location.

5   Explain the following :

     i) T.Q.M.   ii) Operating Characteristics curves

6   Explain the concept of 'ABC' analysis with graphical representation.

7   Define and explain (a) pessimistic time (b) Optimistic time (c) Most Probable
     time.

8   Describe the following methods of Job evaluation:

     i) Ranking method   ii) Job classification method.

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.TechII Semester Supplementary Examinations, October/November 2020
Machine Drawing
(ME)

Roll No										

Time: 2 hours   **Max. Marks: 75**

Part- A
Answer any one of the following

1. Draw the conventional representation of various materials used for machine components

2. What are the general rules for sizes and placement of dimensions for holes, centers curved and tapered features.

Part-B
Answer the following
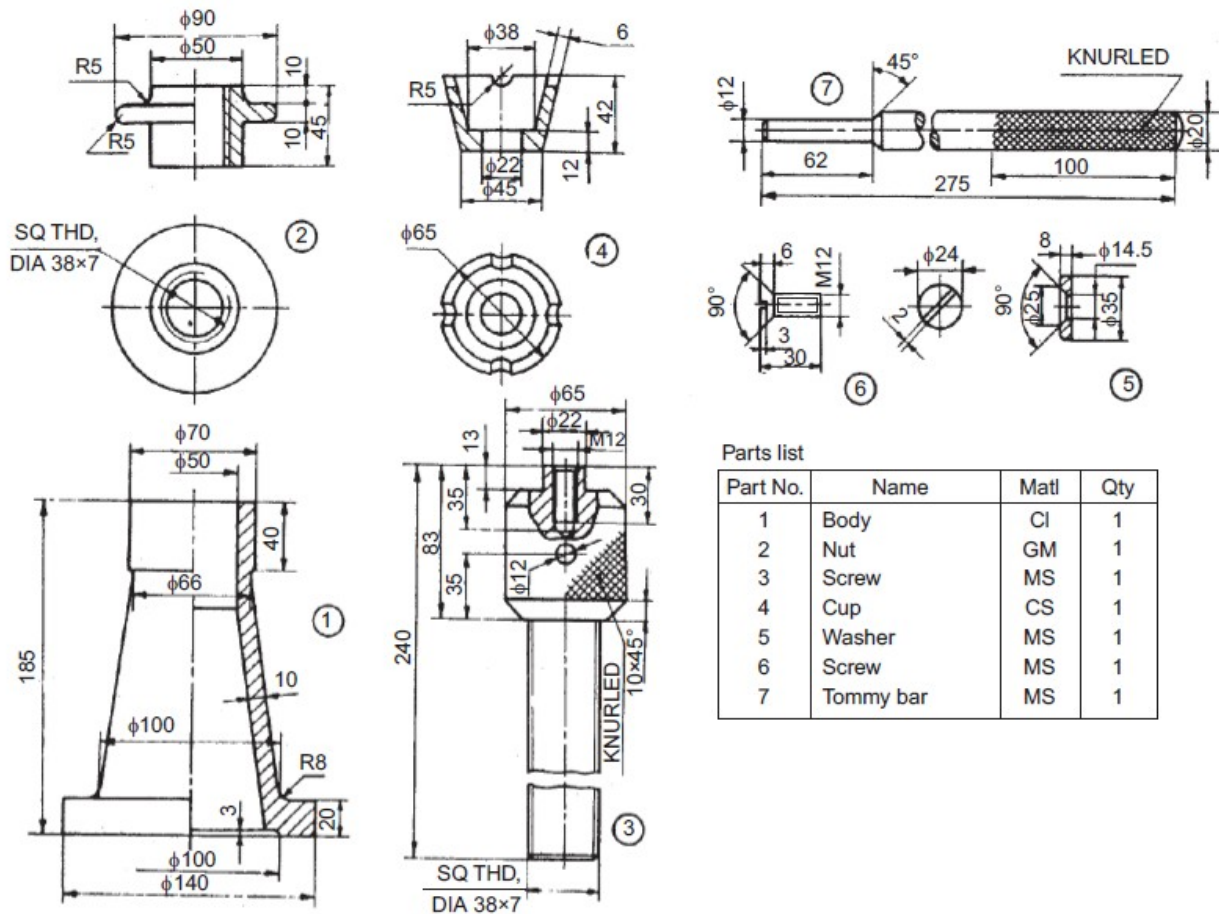
3. Assemble all parts of the screw jack, shown in Fig. and draw the following views:

   i) Half sectional view from the front, and

   ii) Top View

Parts list

Part No.	Name	Matl	Qty
1	Body	CI	1
2	Nut	GM	1
3	Screw	MS	1
4	Cup	CS	1
5	Washer	MS	1
6	Screw	MS	1
7	Tommy bar	MS	1

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOL

(Autonomous Institution – UGC, Govt. of India)

II B.TechII Semester Supplementary Examinations, October/November 2020

Manufacturing Science

(ME)

Roll No									

Time: 2 hours **Max. Marks: 75**

Answer Any **Four** Questions
All Questions carries equal marks.
******

1   State the properties of moulding sand and explain the importance of any four properties for the production of sound castings.

2   Explain principle of centrifugal casting process, its capabilities and applications. How the impurities are taken care of?

3   Discuss with neat sketch TIG welding process. State its advantages, limitations and applications.

4   Describe explosive welding process with its advantages and limitations.

5   Explain hot rolling process with a neat sketch.

6   What types of product forms that are produced by rolling? Sketch each of them.

7   Differentiate between Hot extrusion and cold extrusion

8   Compare main features, limitations and applications of open die forging and closed die forging.

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular Examinations, April/May 2017

Dynamics of Machinery

(ME)

Roll No			N	3					

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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PART – A   (25 Marks)

</div>

1. (a) What do you mean by gyroscopic couple? Derive a relation for its magnitude. (3)

   (b) Explain what is meant by applied torque and reaction torque.   (2)

   (c) In what way are the expressions for the friction torque of a conical collar changed f from that for a flat collar? (2)

   (d) Distinguish static and dynamic force analysis. (2)

   (e) What is vibration isolation? (3)

   (f) What is meant by a self-locking and a self-energised brake. (3)

   (g) Distinguish Absorption dynamometer and transmission dynamometer (2)

   (h) What is meant by static and dynamic unbalance in machinery? How can the balancing be done? (3)

   (i) What are centrifugal governors? How do they differ from inertia governors? (3)

   (j) Describe the function of a simple Watt governor. What are its limitations? (2)

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PART – B   (50 Marks)

SECTION – I

</div>

2. A ship is propelled by a turbine rotor having a mass of 6 tonnes and a speed of 2400 rpm. The direction of rotation of the rotor is clockwise when viewed from the stern. The radius of gyration of the rotor is 450 mm. Determine the gyroscopic effect when the

(i) ship steers to the left in a curve of 60 m radius at a speed of 18 knots (1 knot = 1860 m/h)

(ii) ship pitches 7.5 degrees above and 7.5 degrees below the normal position and the bow is descending with its maximum velocity; the pitching motion is simple harmonic with a periodic time of 18 seconds

(iii) ship rolls and at the instant, its angular velocity is 0.035 rad/s counterclockwise when viewed from the stern Also, find the maximum angular acceleration during pitching. (10)

<div align="center">

(OR)

</div>

3(a) What is the effect of the gyroscopic couple on the stability of a ship? Explain? (5)

(b) How do the effects of gyroscopic couple and of centrifugal force make the rider of a two-wheeler tilt on one side. Derive a relation for the limiting speed of the vehicle. (5)

SECTION – II

4(a) Determine the required input torque on the crank of a slider crank mechanism for the static equilibrium when applied piston load is 1500 N. The lengths of the crank and the connecting rod are 40 mm and 100 mm respectively and the crank has turned through 45^0 from inner dead center. (5)

(b) A screw jack is used to raise a load of 5 tonnes . The pitch of single start square threads used for the screw is 24 mm. The mean diameter is 72 mm. Determine the force to be applied at the end of 1.2 m long handle when the load is lifted with constant velocity and rotate with the spindle. Take coefficient of friction is 0.2. Also find the mechanical efficiency of the jack.

(5)

(OR)

5(a) Find the torque required to be applied to link AB of the linkage as shown in figure to maintain the static equilibrium(5)
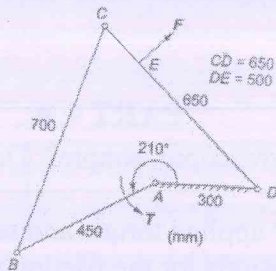
(b) The shaft of a collar thrust bearing rotates at 200 rpm and carries an end thrust of 10 tonnes. The outer and the inner diameters of the bearing are 480 mm and 280 mm respectively. If the power lost in friction is not to exceed 8 kW, determine the coefficient of friction of the lubricant of the bearing.

(5)

SECTION – III

6. For the shoe brake shown Figure, the diameter of the brake drum is 400 mm and the angle of contact is 96°. The applied force is 3 kN on each arm and the coefficient of friction between the drum and the lining is 0.35. Determine the maximum torque transmitted by the brake. (10)
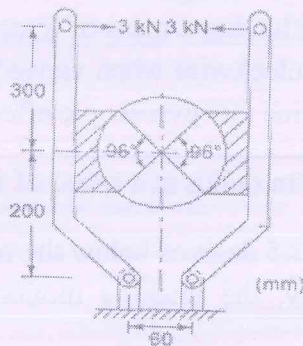
(OR)

7(a). Derive the expression for the torque transmitting capacity of a single plate clutch by considering uniform pressure. (4)

(b) A friction clutch is required to transmitt 34.5 kW at 2000rpm. It is to be single plate disk type with both sides of the plate effective, the pressure is being applied axially by means of springs and limited to 70kPa on the plate. If the outer diameter of the friction limit is 1.5 times the internal diameter, find the required dimensions d1 and d2 of the clutch ring and the total force exerted by the springs. Assume uniform wear condition (coefficient of friction=0.3).(6)

SECTION – IV

8(a) Explain the method of finding the counter masses in two planes to balance the dynamic unbalance of rotating masses. (4)

(b) Circular disc mounted on a shaft carries three attached masses of 4kg, 3kg and 2.5 kg at radial distances of 75mm, 85 mm and 50 mm and at the angular positions of 45^0, 135^0 and 240^0 respectively. The angular positions are measured counter clockwise from the reference line along the x-axis. Determine the amount of the counter mass at a radial distance of 75 mm required for the static balance. (6)

(OR)

9. The measurements on a mechanical vibration system shows that the mass is 10 kg and the springs can be combined to give an equivalent spring of stiffness 5.5 kg/cm. If the vibrating system have a dashpot attached which exerts a force of 0.05 kg when the mass has a velocity of 10 mm/sec.. Find
    (a) critical damping coefficient
    (b) damping factor
    (c) logarithmic decrement and
    (d) ratio of two consecutive amplitudes. (10)

SECTION – V

10(a). What are spring-controlled governors? Describe the function of any one of them. [4M]

(b). Sketch a Hartnell governor. Describe its function and deduce a relation to find the stiffness of the spring. (6)

(OR)

11(a). Explain the principle of working of an inertia governor with the help of neat sketches. (5)

(b) Each arm of a Porter governor is 400 mm long. The upper arms are pivoted on the axis of the sleeve and the lower arms are attached to the sleeve at a distance of 40 mm from the axis. Each ball has a mass of 6 kg and the weight on the sleeve is 50 kg. Find the range of speed of the governor if the extreme radii of rotation of the balls are 260 mm ad 300 mm.(5)

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular Examinations, April/May 2017

Thermal Engineering

(ME)

Roll No			N	3					

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART – A   (25 Marks)

1. (a) What is heat loss factor in actual cycles of IC Engines?
    (b) What is battery ignition system?
    (c) What is the importance of flame speed on combustion in SI engines?
    (d) What are four stages of combustion in CI engines.
    (e) Define brake power.
    (f) Define indicated thermal efficiency.
    (g) What are the types of compressors?
    (h) Define isothermal efficiency of a compressor.
    (i) Define power input factor of dynamic compressor.
    (j) Define isentropic efficiency of axial flow compressor.

PART – B   (50 Marks)

SECTION – I

2. (a) Compare Actual and Fuel-Air Cycles of CI Engines
    (b) Explain operation of four stroke CI engine with neat sketch.

(OR)

3. (a) Explain the major losses in actual engine.
    (b)Compare relative advantages and disadvantages of four stroke and two stroke cycle engines.

SECTION – II

4. (a) Explain the phenomenon of auto ignition.
    (b) What do you mean by octane number. How is it determined?

(OR)

5. (a) Explain the stages of combustion in CI engines.
    (b) What do you mean by Cetane number? How is it determined?

SECTION – III

6. A 2 cylinder C.I. engine with a compression ratio 13: 1 and cylinder dimensions of 200 mm x 250 mm works on two stroke cycle and consumes 14 kg/h of fuel while running at 300 r.p.m. The relative and mechanical efficiencies of engine are 65% and 76% respectively. The fuel injection is effected up to 5% of stroke. If the calorific value of fuel used is 41800 k J/kg, Calculate the mean effective pressure developed.

7. During the trial of a single acting oil engine, cylinder diameter 200 mm, stroke 280 mm, working on two stroke cycle and firing every cycle, the following observations were made :

Duration of trial	=	1 hour
Total fuel used	=	4.22 kg
Calorific value	=	44670 k J/kg
Proportion of hydrogen in fuel	=	15%
Total number of revolutions	=	21000
Mean effective pressure	=	2.74 bar
Net brake load applied to a		
Drum of 1 m diameter	=	600 N
Total mass of cooling water circulated	=	495 kg
Inlet temperature of cooling water	=	13^0C
Outlet temperature of cooling water	=	38^0C
Air used	=	135 kg
Temperature of air in test room	=	20^0C
Temperature of exhaust gases	=	370^0C

Assume C_p(gases) = 1.005 k J/kg.K.,

C_p(Steam) at atmospheric pressure = 2.093 k J/ kg.K.

Calculate the thermal efficiency and draw up the heat balance.

SECTION – IV

8. (a) Describe with a neat sketch the construction and working of a single stage single acting reciprocating air compressor.

(b) Prove that the work done/kg of air in a compressor is given by

$$W = R\,T_1\,\frac{n}{n-1}\left[r_p^{\frac{n-1}{n}} - 1\right]$$

Where r_p is pressure ratio.

(OR)

9. In a single acting two stage reciprocating air compressor, 4.5 kg of air per min is compressed from 1.013 bar and 15^0C through a pressure ratio of 9 to 1. Both stages have the same pressure ratio, and the law of compression and expansion in both stages is p v $^{1.3}$ = constant. If the intercooling is complete, calculate : (i) The indicated powr (ii) The cylinder swept volumes required. Assune that the clearance volumes of both stages are 5% of their respective swept volumes and that the compressor runs at 300 r.p.m.

SECTION – V

10. (a) Draw the velocity diagrams and explain the theory of operation of centrifugal compressors.

(b) Explain slip factor, power input factor, pressure coefficient and adiabatic coefficient in Centrifugal compressors.

(OR)

11. (a) Derive the relation for degree of reaction of axial flow compressor.

(b) Explain the concepts of surging, choking, stalling and performance of axial flow compressors.

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Regular Examinations, April/May 2017
Fluid Mechanics and Hydraulic Machinery
(ME,MIE)

Roll No									

Time: 3 hours   Max. Marks: 75

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART – A   (25 Marks)

1. (a) What are manometers?   2M

   (b) What is the significance of path lines? 3M

   (c) What is the significance of streak line? 2M

   (d) What is the use of orificemeter? 3M

   (e) What is meant by NPSH?   2M

   (f) List two examples of reaction turbines. 3M

   (g) Write the significance of Characteristic curves. 2M

   (h) Define specific speed and unit speed of a turbine. 3M

   (i) What is the role of surge tank in Hydraulic turbine? 2M

   (j) Define specific speed of centrifugal pump. 3M

PART – B   (50 Marks)
SECTION – I

2. (a) Define surface tension. Discuss the factors affecting surface tension. **5M**

   (b) A piston 9.95 cm diameter works in a cylinder 10 cm diameter, 12 cm long. The space between the two is filled with a lubricating oil of viscosity 0.65 poise. Calculate the speed of the piston through the cylinder under the action of an axial force of 5.0 N.
   5M

(OR)

3. Define and distinguish between steady flow and uniform flow. Give two examples of each flow.
   10M

SECTION – II

4. Explain how velocity of fluid flow is measured with the help of a Pitot tube?   **10M**

(OR)

5. What is Euler's equation of motion? Derive Bernoulli's equation from Euler's equation. Discuss the assumptions made.   **10M**

SECTION – III

6. Show that when a jet of water impinges on a series of curved vanes, maximum efficiency is obtained when the vane is semi-circular in section and the velocity of vane is half that of jet.   **10M**

(OR)

7. Describe different types of pumped storage plants what are the relative merits of them.   **10M**

SECTION – IV

8. Define the terms `unit power', `unit speed' and `unit discharge' with reference   to a hydraulic turbine. Also derive expressions for these terms. **10M**

(OR)

9. A Pelton wheel is to be designed for the following specifications. Power= 735.75 kW S.P head= 200m, Speed=800rpm, overall efficiency=0.86 and jet diameter is not to exceed one-tenth the wheel diameter. Determine: (i) Wheel diameter, (ii) the no of jets required and (iii) diameter of the jet. Take Cv=0.98 and speed ratio=0.45. **10M**

SECTION – V

10. Explain about the performance characteristics of centrifugal pumps?   **10M**

(OR)

11. With the help of a neat sketch discuss the main parts of reciprocating pump. **10M**

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Regular Examinations, April/May 2017
Manufacturing Science
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

<div align="center">

PART – A   **(25 Marks)**

</div>

1)

a)	Mention some products made of (i) Sand Casting and (ii) Investment casting	2M
b)	What are the advantages and limitations of casting process.	3M
c)	Mention the names of some non-destructive tests.	2M
d)	Distinguish between Edge joint and Corner joint in weld joints.	3M
e)	Mention the manufacturing methods for (i) Thermoplastics and (ii) Thermosettings	2M
f)	Discuss about five types of patterns used in casting	3M
g)	What is extrusion and define hot extrusion process	2M
h)	What are the various types of bending?	3M
i)	What are the tools used in smith forging?	2M
j)	Mention the principle and applications of impact forging.	3M

<div align="center">

PART – B   **(50 Marks)**
SECTION – I

</div>

2. Explain the procedure for the design of gating system.

<div align="center">

(OR)

</div>

3. Describe the principle and operation of cupola with a neat sketch.

<div align="center">

SECTION – II

</div>

4. a) Classify the various welding processes.

b) Distinguish between water plasma and air plasma welding techniques

<div align="center">

(OR)

</div>

5. Explain various defects in welding. State their causes and remedies.

SECTION – III

6. a) What is the difference between blanking and piercing.

   b) Explain the process of wire drawing with figure

(OR)

7. What are the products of metal spinning? Explain the tools used to perform spinning operation. Distinguish between hot and cold spinning.

SECTION – IV

8. Explain the various types of rolling mills and their specific uses.

(OR)

9. Explain the Injection molding process with a line diagram. Mention some products made by this process.

SECTION – V

10. What is Hydrostatic extrusion? How is the process performed? What are the advantages of the process?

(OR)

11   a) How do you compare forged components with cast components?

     b) How is upsetting different from fullering in forging?

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3|5|7

Code No: R15A0312

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Regular Examinations, April/May 2017
Industrial Engineering
(ME)

Roll No | | | | | | | | | |

Time: 3 hours   Max. Marks: 75

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each SECTION). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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PART – A   (25 Marks)

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1. (a) What are the functions of management?
   (b) State any four principles of organization.
   (c) Write any four objectives of good plant layout.
   (d) Define time study.
   (e) What is ABC analysis?
   (f) Write a note on 'Total productive maintenance'.
   (g) List out any four engineering applications of PERT.
   (h) Explain the following terms: a) Event b) Slack and c) Critical path
   (i) What is a control chart?
   (j) State the various functions of marketing.

<div align="center">

PART – B   (50 Marks)

Section -I

</div>

2. Discuss critically Taylor and Fayol theory of management and their validity in present
   day management practices.   10 M

<div align="center">

(OR)

</div>

3. a) Discuss the features of functional organization.   5M
   b) What do you understand by matrix organization? Under what situations this
   organization structure would be appropriate?   5M

<div align="center">

Section - II

</div>

4. a) Compare and contrast product layout vs process layout.   5M
   b) Explain in briefly the factors affecting the location of an industrial plant. 5M

5. Define 'method study' and 'motion study' and bring out the relationship between them. Discuss the role of method engineer in raising the industrial productivity.   10M

Section – III

6. a) State the functions of purchase department in any factory.   5M

   b) What are the objectives of inventory control? Discuss periodic inventory and continuous inventory control   5M

(OR)

7. What do you understand by total quality and total quality management?   10M
   What relationship do you establish between TQM and Indian scriptures? State the characteristics of quality leaders.

Section- IV

8. What are the three time estimates needed for PERT analysis and what do they represent? How do you use these estimates to compute the expected activity time and the variance in activity time?   10M

(OR)

9. The following table gives information about various activities of a project network: 10M

Activity	Normal duration (days)	Normal cost (Rs)	Crash duration (days)	Crash cost (Rs)
1-2	9	8000	7	10000
1-3	5	5000	3	8000
2-3	7	7000	5	8600
2-4	8	6000	6	7000
3-4	6	9000	4	11400

The overhead costs are Rs.1300 per day.

Determine: (a) The cost without crashing and (b) Optimum cost under crashing.

Section –V

10. Define- attributed and variable inspections. State the advantages of using statistical methods of quality control. What is meant by assignable cause?   10M

(OR)

11. a) What is marketing mix? Explain   5M

    b) Discuss in detail the objectives and functions of Human Resource Management? 5M

****

5/5/17. F.

Code No: R15A0310

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Regular Examinations, April/May 2017
Machine Drawing
(ME)

Roll No										

Max. Marks: 75

Time: 3 hours

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 15 marks.

SECTION-I

1. Draw a full size three views in orthographic projection of a 25mm diameter hexagonal bolt , 100mm long fitted with a hexagonal nut and lock nut.

(OR)

15M

2. Draw a journal bearing for shaft of 50 mm diameter

SECTION-II

3. Draw a double riveted double strap chain type butt joint to connect plates of 20 mm size

(OR)

4. Draw sectional front view and side view of a socket and spigot type of cotter Joint to connect to rods of 30mm diameter each.

15M

SECTION-III

5. Draw at least five types of thread profiles taking pitch as 20 mm.

(OR)

6. Draw half sectional view from the front, with left half in section and view from above of a collar bearing with 60 mm diameter shaft.

15M

SECTION-IV

7. Draw two views of knuckle joint with properties to connect two shafts of 30mm diameter

(OR)

8. Draw two views of cotter joint with a sleeve to connect two circular rods of diameter 30 mm with proper dimensions

15M

SECTION-V

9. Details of Old-ham coupling are shown in fig.9.1 Draw the following views

   i. Sectional front view
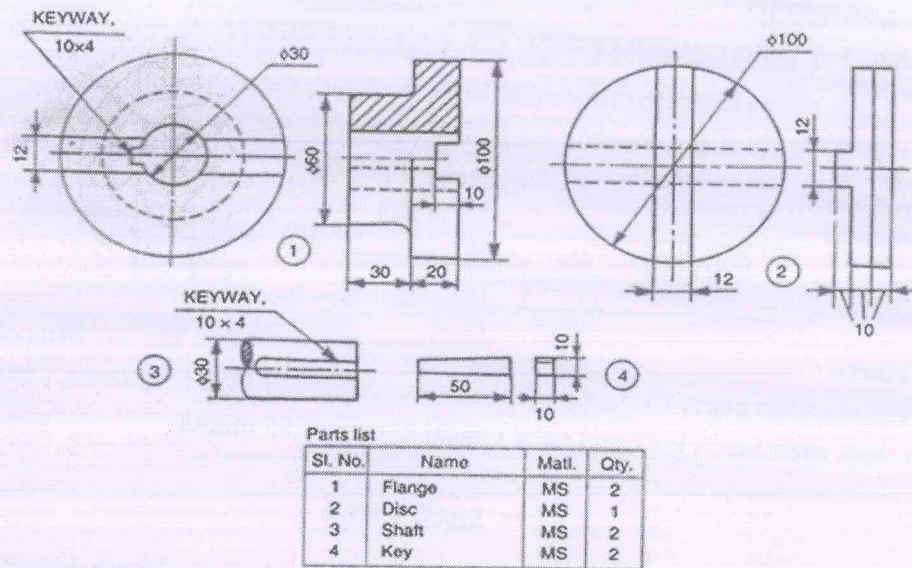 ii. Right side view

Fig.9.1

(OR)

10. Details of eccentric are shown in fig 10.1. Draw the following views
    i. Sectional front view
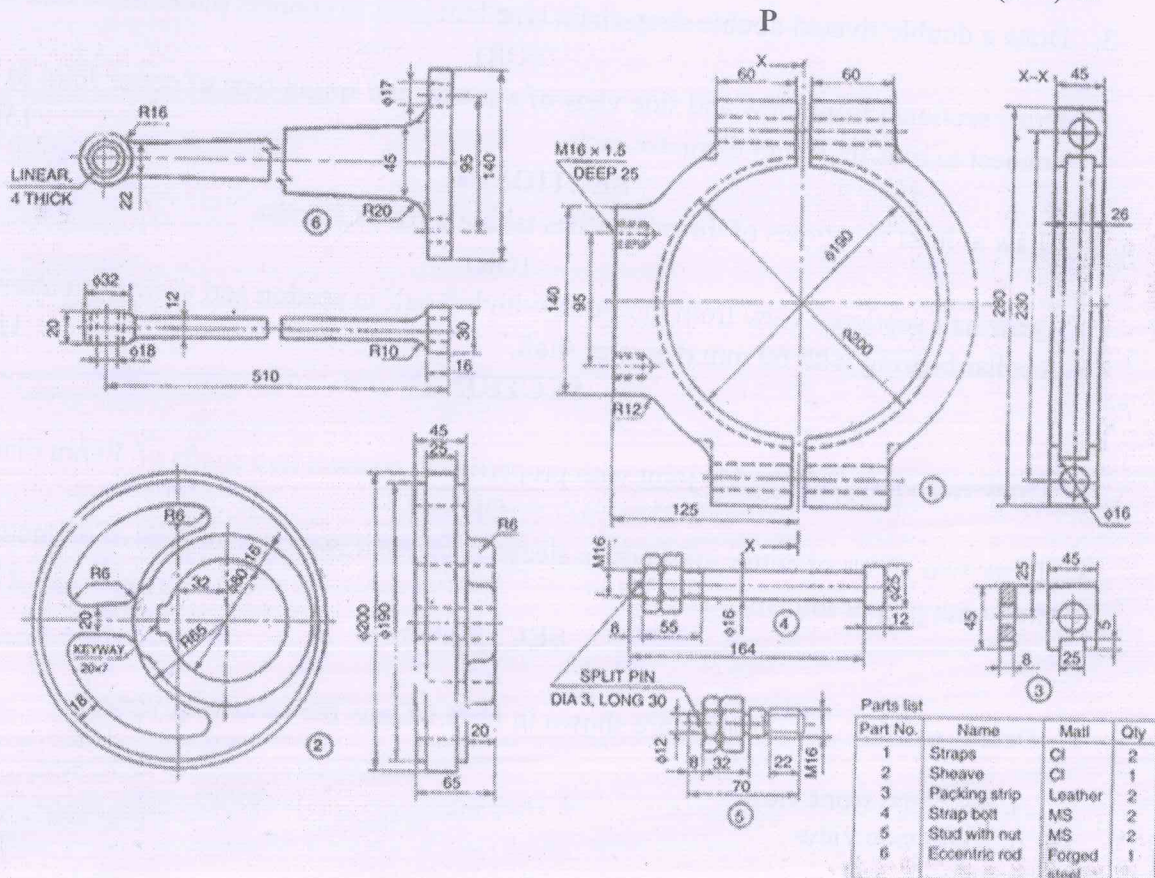   ii. Right side view.   (8+7) M

Fig.10.1

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Regular/Supplementary Examinations, April/May 2018
Fluid Mechanics and Hydraulic Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question   from each SECTION and each Question carries 10 marks.

*****

PART – A   (25 Marks)

1. (a) Define the terms: Specific weight and specific gravity.   [2M]
   (b) Explain steady and unsteady flow.   [3M]
   (c) Why the hydraulic gradient line is always below the energy gradient line?   [2M]
   (d) Differentiate between venturi meter and orifice meter   [3M]
   (e) What do you mean by hydrodynamic force?   [2M]
   (f) What are the assumptions made while deriving the force exerted by a jet on a vane?
                                                                                   [3M]
   (g) What is a surge tank?   [2M]
   (h) What are the functions of a draft tube?   [3M]
   (i) Define specific speed of a centrifugal pump.   [2M]
   (j) Define slip, percentage slip and negative slip of a reciprocating pump.   [3M]

PART – B   (50 Marks)

SECTION – I

2. What are differential Manometers? Explain how they could be used for measuring the pressure difference.   [10M]

(OR)

3. a) Explain atmospheric, gauge and vacuum pressure with the help of a neat sketch. [5M]
   b) Differentiate between Stream line, path line and streak lines and stream tube. [5M]

SECTION – II

4. A pipe line ABC 200m long is laid on an upward slope of 1 in 40. The length of the portion AB is 100m and its diameter is 100mm. At B the pipe section suddenly enlarges to 200mm diameter and remains so for the remainder of its length BC, 100m. A flow of 0.02m^3/s is pumped into the pipe at its lower end A and is discharged at the upper end C into a closed tank. The pressure at the supply end is 200kN/m^2
   (i) What is the pressure at C?
   (ii) Draw the energy gradient and hydraulic gradient lines. Assume coefficient of friction f=0.008.
                                                                                   [10M]

(OR)

5. Describe an orifice meter and find an expression for measuring discharge of fluid through a pipe with this device. [10M]

SECTION – III

6. a) Explain with neat sketch working of hydro- electric power plant.   [10M]

(OR)

7. a) Derive an expression for force exerted by a moving flat plane held inclined to the direction of jet.
                                                                                [5M]

   b) A 75mm jet having a velocity of 30m/s strikes a flat plate, the normal of which is inclined at 45 degrees to the axis of the jet. Find the normal pressure on the plate
   (i) When the plate is stationary
   (ii) When the plate is moving with a velocity of 15m/s in the direction of jet, away from the jet.
                                                                                [5M]

SECTION – IV

8. A Pelton wheel is required to develop 9000KW at the shaft, when working under a head of 300m. Assuming, the values of coefficient of velocity, speed ratio and ratio of diameter of wheel to the diameter of jet as 0.98; 0.45 and 12 respectively. Determine:
   i. The number of jets.
   ii. The diameter of the wheel.
   iii. The discharge required. and,
   iv. The diameter of the jet.
   Take the speed of the wheel as 500rpm and the overall efficiency as 85%. [10M]

(OR)

9. Explain what you understand by governing of hydraulic turbines with neat sketches. [10M]

SECTION – V

10. Explain with neat sketches the working of a single stage centrifugal pump. [10M]

(OR)

11. Describe the principle and working of a single acting reciprocating pump with a neat sketch. [10M]

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B. Tech II Semester Regular/Supplementary Examinations, April/May 2018
Industrial Engineering
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE
Questions, Choosing ONE Question from each SECTION and each Question carries
10 marks.

****
PART – A   (25 Marks)

1. (a) Write short notes on Taylor's principles of scientific management.   **2M**
   (b) Write the salient features of functional organization   **3M**
   (c) State the advantages of plant location.   **2M**
   (d) Define work sampling? State its applications.   **3M**
   (e) Write a short notes inventories.   **2M**
   (f) Write short notes on bench marking.   **3M**
   (g) Define ABC analysis.   **2M**
   (h) Define TQM.   **3M**
   (i) Write short notes on OC curves.   **2M**
   (j) Compare Job Evaluation & Merit Rating in their objectives.   **3M**

PART – B   (50 Marks)
SECTION – I
2. a) Discuss Maslow's concept of hierarchy of needs.   **5M**
   b) Discuss Hertzberg's Two Factor Theory of Motivation.   **5M**
(OR)
3. Discuss about matrix organization and its limitations.   **10M**
SECTION – II
4. Write and explain the principles and types of plant layout?   **10M**
(OR)
5. Explain the different steps involved in method study.   **10M**
SECTION – III
6. Explain the various types of records maintained in stores.   **10M**
(OR)
7. Describe the importance of Total Quality Management. (TQM)   **10M**
SECTION – IV
8. The table below gives precedence relationships and the durations of various activities. Draw the PERT network, identify the critical path if the scheduled project duration is 57 days and also calculate the variance of each activity.   **10M**

Predecessor Activity	Successor Activity	Duration (days)		
		Optimistic time	Most likely time	Pessimistic time
A	-----	6	10	12
B	-----	7	10	12
C	A	20	22	25
D	B	14	15	17
E	A	10	12	15
F	C, D	10	12	14
G	B	12	14	18
H	E	16	18	21
I	C, D, G	12	14	17
J	E	1	2	3
K	F, H, I	7	9	11
L	C, D, J	17	19	22
M	J	7	8	10

(OR)

9. What is critical path method? State the objectives, advantages and steps involved in this method. **10M**

SECTION – V

10. What is control? Explain the concepts of Quality Control Charts. **10M**

(OR)

11. (a) Discuss the functions of marketing . **5M**

(b) Difference between marketing and selling **5M**

*****

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B. Tech II Semester Regular/Supplementary Examinations, April/May 2018
Manufacturing Science
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

******

PART – A   (25 Marks)

1. (a) State the various defects in casting processes. [2M]
   (b) What are expendable patterns and why they are used? [3M]
   (c) Why do residual stresses get developed in weldments? [2M]
   (d) What are the advantages of AC equipment over DC equipment in arc welding? [3M]
   (e) Give list of some cold working processes. [2M]
   (f) Explain role of friction and strip tensions in rolling load and process. [3M]
   (g) Discuss the functions of die angle in wire drawing. [2M]
   (h) Distinguish between blanking and piercing. [3M]
   (i) What is fullering and edging in forging operation? [2M]
   (j) Write any three differences between forward and backward hot extrusion process. [3M]

PART – B   (50 Marks)

SECTION – I

2. a) Define the following terms as related to casting
      i) cope   ii) drag   iii) bottom board
   b) Briefly explain the procedure to be followed for making a sand mould.
   c) Briefly discuss the importance of draft allowance for patterns.   [3+3+4]

(OR)

3. a) What are the materials that are generally used for making patterns? Explain the reasons for their choice.
   b) What are the common allowances provided on patterns? Why and how they are provided? Give suitable examples.   [5+5]

SECTION – II

4. a) Explain with neat sketch of Gas welding process.
   b) Explain with neat sketch of arc welding process. [5+5]

(OR)

5. a) What are the various methods of brazing? Describe them in brief.
   b) Briefly explain explosive welding process.   [5+5]

SECTION – III

6. a) Write short notes on rolling stand arrangement.
   b) With suitable sketches, explain the stages involved in shape rolling of structural sections
                                                                    [5+5]

(OR)

7. What is plastic deformation? What are the advantages and limitations of hot working over cold working.   [10]

SECTION – IV

8. a) A 10 mm deep cylindrical cup with diameter of 15 mm is drawn from a circular blank.
       Neglect the variation in the sheet thickness, what is the diameter of the blank in mm?
   b) How is tube drawing carried out? Explain with suitable sketch.   [5+5]

(OR)

9. a) Explain the basic nomenclature of Tube bending with a simple sketch.
   b) What are the various bending operations? Explain any four.   [5+5]

SECTION – V

10. a) Write comparison between forward and backward extrusion processes.
    b) Explain various forging operations.   [5+5]

(OR)

11.a) Write advantages and limitations of extrusion processes.
   b) Explain in brief the following processes
         i) Impact extrusion
         ii) Hydrostatic extrusion   [5+5]

******

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R15

(Autonomous Institution – UGC, Govt. of India)

II B. Tech II Semester Regular/Supplementary Examinations, April/May 2018

Machine Drawing
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A consists of three Questions, answer any two questions. Each question carries 15 marks.
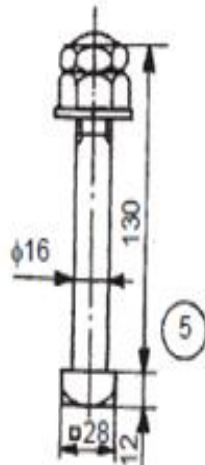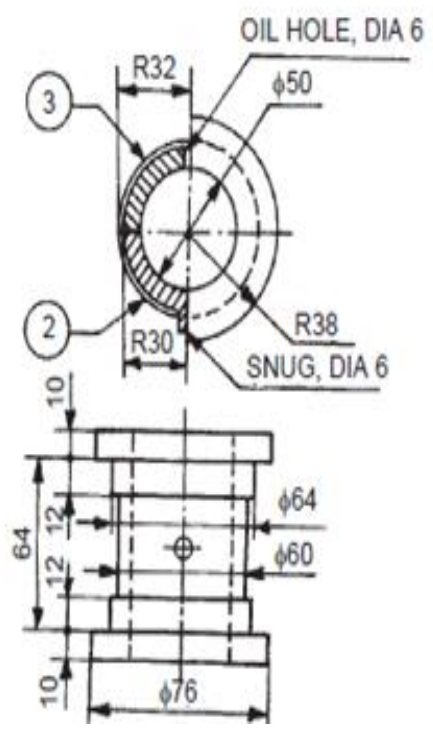
Part B consists of one question which is compulsory. Which carriers 45 marks.

✸✸✸✸

Part-A(30Marks)
Answer any two of the following (2x15=30M)

1. Draw the following conventions
   (a) Steel (b) glass (c) petrol (d) wood (e) concrete
2. Draw the front view and top view of double riveted double strap chain butt joint of plate thickness 10mm.
3. Draw the sectional view from the front and view from the top of a cotter joint with sleeve used to connect two rods of 30 mm diameter each.

Part-B (45Marks) (1x45=45M)

4. Assemble the parts of machine vice for the parts shown in the figure and draw
   a) Sectional front view
   b) Top view

105

36

25

12

R32

R34

2

63

22

12

2

□30

6

25

210

25

①

22

16

40

64

φ64

φ68

2 HOLES,
DIA 19

105

3

R58

20

R32

36

④

OIL HOLE, DIA 3

CSK DIA 6
DEEP 20

φ64

φ68

2 HOLES,
DIA 19

OIL HOLE, DIA 6

R32

φ50

③

②

R30

R38

SNUG, DIA 6

10

64

12

12

φ64

φ60

10

φ76

φ16

130

⑤

□28

12
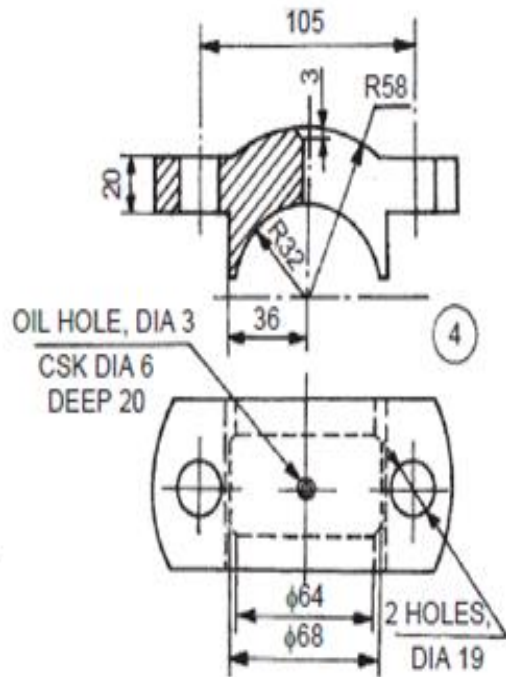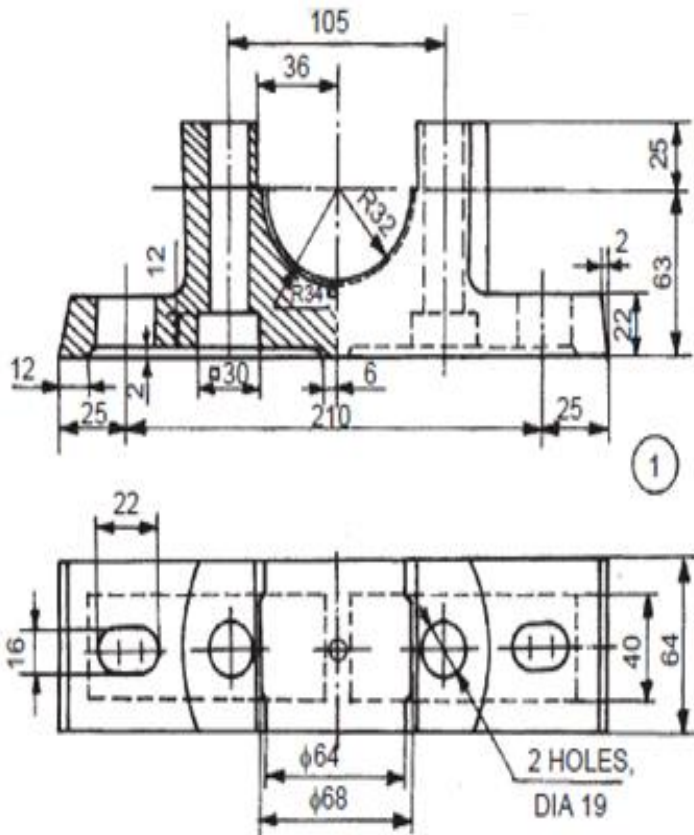
Parts list

Sl. No.	Name	Matl.	Qty.
1	Base	CI	1
2	Bearing brass	Bronze	1
3	Bearing brass	Bronze	1
4	Cap	CI	1
5	Bolt with nuts	MS	2

Code No: **R15A0308**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Regular/Supplementary Examinations, April/May 2018
Thermal Engineering
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
   Part A is compulsory which carriers 25 marks and Answer all questions.
   Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

******

PART – A   (25 Marks)

1. (a) Draw the valve timing diagram of 4-stroke petrol engine   [2]
   (b) Differentiate between air standard cycle and actual cycle   [3]
   (c) Define combustion? List out the types of combustion   [2]
   (d) What are the basic requirements of a good S.I Engine combustion chamber?   [3]
   (e) What is the importance of specific fuel consumption?   [2]
   (f) Distinguish between power and specific output of I.C engine   [3]
   (g) What are the advantages of rotary air compressors over reciprocating air compressor
                                                                                      [2]
   (h) What is the effect of atmospheric conditions on the output of compressor   [3]
   (i) Define degree of reaction   [2]
   (j) Compare axial flow and centrifugal compressors   [3]

PART – B   (50 Marks)

SECTION – I

2. A. with the help of line diagram explain the working splash lubricating system   [5]
   B. what are the advantages and disadvantages of water cooling system over air cooling system   [5]

(OR)

3. A).Explain the working of simple carburetor with neat sketch   [5]
   B). Explain the working of common rail direct injection (CRDI) wit neat sketch   [5]

SECTION – II

4. A). Explain the effect of various engine variables on S.I engine knock   [5]
   B). Briefly explain the stages of combustion in C.I engine with P-θ (Pressure Vs crank angle) diagram   [5]

(OR)

5. A). How are S.I and C.I engine fuels rated   [5]
   B). what is delay period what are the factors that affect the delay period   [5]

SECTION – III

6. Explain the effect of following factors on the performance of an S.I engine   [10]
   A. Compression Ratio
   B. Engine speed
   C. Air fuel ratio
   D. Spark timing

(OR)

7. The following details were noted in a test on a 4-cylinder, 4-stroke engine, bore=100mm, stroke=120mm, speed=1600 Rpm, fuel consumption=0.2 kg/min, calorific value of fuel=44MJ/Kg, difference in tension on either side of the break pulley is 40 kg, brake circumference=300cm. if the mechanical efficiency is 80% calculate
   A. Brake thermal efficiency
   B. Indicated thermal efficiency
   C. Indicated mean effective pressure
   D. Brake specific fuel consumption   [10]

SECTION – IV

8. With the help of P-V Diagram derive the expression for work in single stage reciprocating air compressor with clearance volume and without clearance volume   [10]

(OR)

9. Following date related to a performance test of single acting 14cm X 10cm reciprocating compressor, suction pressure=1 bar, suction temperature is 20^0 C, discharge pressure =6bar, discharge temperature =180^0 C compressor Speed =1200 RPM, shaft power=6.25KW, mass of air delivered=1.7kg/Min, calculate the following:
   A. The actual volumetric efficiency?
   B. The indicated power?
   C. The isothermal efficiency?
   D. Mechanical efficiency?   [10]

SECTION – V

10. With the help of neat sketch explain the working of centrifugal compressor   [10]

(OR)

11. An axial flow compressor having 8 stages and with 50% reaction design, compresses air in the pressure ratio of 4:1, the air enters the compressor at 20^0 C and flows through it through a constant speed of 19 m/s. the rotating blades of compressor rotate with a mean speed of 180m/s, isentropic efficiency of the compressor may be taken as 82% calculate
I). Work done by the machine, II). Blade angles   [10]

****

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Regular/Supplementary Examinations, April/May 2018
Dynamics of Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

<div align="center">

PART – A   (25 Marks)

</div>

1. (a) What is a Gyroscope?   2M
    (b) What are the Engineering applications of a Gyroscope?   3M
    (c) What are the Conditions for equilibrium   2M
    (d) Define D'Alembert's Principle.   3M
    (e) Differentiate Between Clutch and Brake.   2M
    (f) Why the weight of the wheel for single cylinder engines is heavier than
        that of same powered multi cylinder engine?   3M
    (g) What is hammer blow in locomotives?   2M
    (h) Classify vibrations.   3M
    (i) Define Sensitivity of a governor.   2M
    (j) Derive expression for height of Watt governor.   3M

<div align="center">

PART – B   (50 Marks)
SECTION – I

</div>

2. The turbine rotor of a ship has mass of 2.2 tonnes and rotates at 1800 rpm in clockwise when viewed from the stern. The radius of gyration of rotor is 320mm. Determine the gyroscopic couple and its effect when
    a) The ship turns right at a radius of 250m with a speed of 25km/hr   4M
    b) The ship pitches with the bow rising at an angular velocity of 0.8 rad/sec 4M
    c) The ship rolls at an angular velocity of 0.1 rad/sec   2M

<div align="center">

(OR)

</div>

3. Find the angle of inclination with respect to the vertical for a two wheeler having the following details negotiating a turn of radius of 50m.

    Combined mass of the vehicle & rider : 25kg

    Centre of gravity with rider in vertical position:0.6.m

    Moment of Inertia of the flywheel: $0.3kg\text{-}m^2$

   Moment of Inertia of the road wheel: $1kg\text{-}m^2$

    Vehicle speed: 90 kmph

    Wheel diameter: 600mm

    Speed of the engine is five times that of the road wheel and in same direction. [10M]

SECTION – II

4. For the given four bar mechanism AB: 500mm, BC: 660mm, CD:560mm, AD:1000mm.Determine the torque on the input liknk AB for static equilibrium of the mechanism. Also find the forces on the bearings A,B, C, &D. [10M]
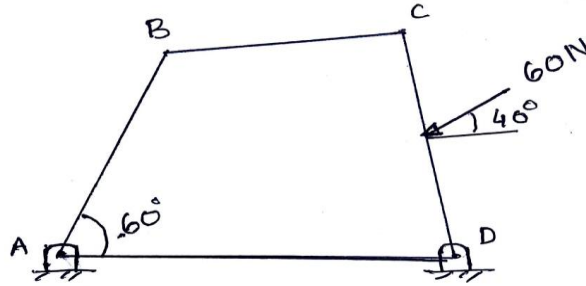
(OR)

5. a) An electric motor driven power screw moves a nut in horizontal plane against a force of 75kN at a speed of 300mm/min. The screw has a single square thread of 6mm of pitch on a major diameter of 40mm. The coefficient of friction at the screw thread is 0.1. Estimate the power of the motor.[5M]

b) A conical pivot supports a load of 20 kN, the cone angle is 120° and the intensity of normal pressure is not to exceed 0.3 N/mm^2. The external diameter is twice the internal diameter. Find the outer and inner radii of the bearing surface. If the shaft rotates at 200 r.p.m. and the coefficient of friction is 0.1, find the power absorbed in friction. Assume uniform pressure. [5M]

SECTION – III

6. A multi-plate disc clutch transmits 55kW of power at 1800 rpm. Coefficient of friction for the friction surfaces is 0.1. Axial intensity of pressure is not to exceed 160kN/m^2. The internal radius is 0.7 times the external radius. Find the number of plates needed to transmit the required torque. [10M]

(OR)

7. The turning moment diagram for a petrol engine is drawn to the following scales Turning moment, 1 mm = 5 N-m ; crank angle, 1 mm = 1°. The turning moment diagram repeats itself at every half revolution of the engine and the areas above and below the mean turning moment line taken in order are 295, 685, 40, 340, 960, 270 mm2. The rotating parts are equivalent to a mass of 36 kg at a radius of gyration of 150 mm. Determine the coefficient of fluctuation of speed when the engine runs at 1800 r.p.m.. [10M]

SECTION – IV

8. Data of three unbalanced masses A, B and C are given below. M_a=4kg, M_b=3kg, M_c=2.5kg, R_a=75mm, R_b=85mm, R_c=50mm, θ_a=45°, θ_b=135°, θ_c=240°. The shaft length is 800mm between bearings. These three masses are completely balanced by two counter masses located 75mm from each bearing. The axial distance of 3 unbalanced masses are L_a= 150mm, L_b= 350mm, and L_c= 525mm, from the right hand side of counter mass plane. Determine the masses and angular positions of counter masses, if the radial location of counter masses are R_{b1} =75mm and R_{b2} =40mm. [10M]

(OR)

9. A shaft carries four masses A, B, C and D of magnitude 200 kg, 300 kg,400 kg and 200 kg respectively and revolving at radii 80 mm, 70 mm, 60 mm and 80 mm in planes measured from A at 300 mm, 400 mm and 700 mm. The angles between the cranks measured anticlockwise are A to B 45°, B to C 70° and C to D 120°. The balancing masses are to be placed in planes X and Y. The distance between the planes A and X is 100 mm, between X and Y is 400 mm and between Y and D is 200 mm. If the balancing masses revolve at a radius of 100 mm, find their magnitudes and angular positions.   [10M]

SECTION – V

10. The arms of a proel governor are 27.5cm long and are pivoted on the axis of rotation. The extension of lower arm on which ball is carried is 10cm long and the mass of each ball is 5 kg. the central mass on the sleeve is 75kg. If the ball centers are vertical above the pin joint connecting the upper and lower arms, when the radius of radius of rotation is 18.75cm. Determine the range of speed. [10M]

(OR)

11. In a spring loaded governor, the controlling force curve is a straight line. The balls are 400mm apart, when the controlling force is 1500N and 240mm when it is 800N, the mass of each ball is 10kg. Determine the speed at which the governor runs, when the balls are 300mm apart. By how much should the initial tension be increased to make the governor isochronous? Also find the isochronous speed. [10M]

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Code No: R15A0308

MALLA REDDY COLLEGE OF ENGINEERING & TECH[R15]GY

R15

(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, April 2023
Thermal Engineering
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.

***

PART-A (25 Marks)

1). a   Define Heat engine   **[2M]**
   b   Explain difference between 4-stroke & 2storke engine.   **[3M]**
   c   Name the fuel used by IC engines   **[2M]**
   d   Define the following the terms: (a) Clearance volume;   (b) Swept volume   **[3M]**
   e   What will be the indicated power for a four-cylinder, two-stoke cycle petrol   **[2M]**
       engine, if the brake power is 30kW and the mechanical efficiency is 0.8.
   f   Define Brake-specific fuel consumption (BSFC)   **[3M]**
   g   What is meant by perfect inter-cooling?   **[2M]**
   h   What factors limit the delivery pressure in a reciprocating compressor?   **[3M]**
   i   Describe briefly about surging   **[2M]**
   j   Define the terms i) Pressure coefficient ii) Diffuser efficiency in case of Axial   **[3M]**
       flow compressor

PART-B (50 MARKS)
SECTION-I

2   Explain the following losses associated with actual engine: **[10M]**
    i) Time loss ii) Direct heat loss iii) Exhaust blow down loss iv) Pumping loss v)
    Rubbing friction loss

                                          OR

3   Draw a valve timing diagram of 4 stroke diesel engine and explain.   **[10M]**

SECTION-II

4   How the knock can be detected in SI engine? What are the methods to control   **[10M]**
    knocking in SI engine? What are its harmful effects?

                                          OR

5   Explain the working of fuel injector / automatic fuel injector with the help of neat   **[10M]**
    sketch.

SECTION-III

6   What is the necessity of I.C. engine testing? What are the basic measurements   **[10M]**
    carried out for I.C. engine testing?

                                          OR

7   A four cylinder four stroke SI engine develops a maximum brake torque of 160 N-   **[10M]**

m at 3000 rpm. Calculate the engine displacement, bore and stroke. The brake mean effective pressure at the maximum engine torque is 960 kPa. Assume bore is equal to stroke

SECTION-IV

8. Draw P-V and T-S diagram for a single stage reciprocating air compressor, without clearance. Derive the expression for work done when compression is isothermal and isentropic. **[10M]**

OR

9. Explain any one type of rotary compressor with neat sketch. **[10M]**

SECTION-V

10. Explain with a neat diagram about the working of centrifugal air compressor. **[10M]**

OR

11. An axial flow compressor with an overall isentropic efficiency of 85% draws air at 20°C and compresses it in the pressure ratio of 4:1. The mean blade speed and flow velocity are constant throughout the compressor. Assuming 50% reaction and taking blade velocity as 180m/s and work input factor as 0.82, calculate i) Flow velocity ii) Number of stages take $\alpha_1=12^0$ and $\beta_1=42^0$ **[10M]**

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Code No: **R15A0307**

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, April 2023
Dynamics of Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.

***
PART-A (25 Marks)

1). a	Write any two applications of gyroscope	**[2M]**
b	Define the terms axis of spin and axis of precession. How do they differ from each other	**[3M]**
c	State D-Alembert's principle	**[2M]**
d	Write the conditions of equilibrium	**[3M]**
e	What are the difference between brakes and dynamometers	**[2M]**
f	Define the terms co-efficient of fluctuation of energy and co-efficient of fluctuation of speed.	**[3M]**
g	What do you mean by balancing of reciprocating of engine	**[2M]**
h	Define the terms variation of tractive force, swaying couple	**[3M]**
i	What is the difference between a governor and flywheel	**[2M]**
j	Explain the terms sensitiveness and isochronism	**[3M]**

PART-B (50 MARKS)
SECTION-I

2   The turbine rotor of a ship has a mass of 8 tonnes and a radius of gyration 0.6m. It **[10M]**
rotates at 1800 r.p.m clockwise, when looking from the stern. Determine the
gyroscopic couple and state its effect. If the ship travels at 100 km/hr and steer to
the left in a curve of 75m radius

OR

3   Explain the effect of gyroscopic couple on the reaction of four wheeler of a **[10M]**
vehicle negotiating a curve.

SECTION-II

4   From the first principles, deduce an expression for the torque due to friction of a **[10M]**
collar thrust bearing. Stating clearly the assumptions made.

OR

5   A load of 25kN is supported by a conical pivot with angle of cone as 120^0. The **[10M]**
intensity of pressure is not to exceed 350kN/m^2. The external radius is 2times the
internal radius. The shaft is rotating at 180 r.p.m and coefficient of friction is 0.05.
Find the power absorbed in friction assuming uniform pressure.

SECTION-III

6. The external and internal radii of a friction plate of a single clutch are 120mm and 60mm .The total axial thrust with which the friction surfaces are held together is 1500N. For uniform wear, find the maximum, minimum and average pressure on the contact surfaces. **[10M]**

OR

7. A simple band brake is applied to a rotating drum of diameter 500mm. The angle of lap of the band on the drum is 270^0. One end of the band is attached to a fulcrum pi of the lever and other end is to a pin 100mm from the fulcrum. If the coefficient of friction is 0.25 and a braking force of 90N is applied at a distance of 600mm from the fulcrum, find the braking torque when the drum rotates in the i) anticlock wise direction ii) clock wise direction. **[10M]**

SECTION-IV

8. A four cylinder vertical engine has cranks 300mm long. The planes of rotation of the first, third and fourth cranks are 750mm,1050mm and 1650mm from that of the second crank and their reciprocating masses are 150 kg, 400kg, and 250 kg respectively. Find the mass of the reciprocating parts for the second cylinder and the relative angular positions of the cranks in order that the engine may be in complete primary balance. **[10M]**

OR

9. A spring of stiffness 0.3 N/mm is attached to a mass which has viscous damping device. When the mass was displaced and released, the period of vibration was 1.8 second and the ratio of consecutive amplitudes was 4.2:1 Determine i) amplitude ii) phase angle when a force F=2sin(3t) N acts on the system. **[10M]**

SECTION-V

10. Calculate the minimum speed, maximum speed and range of the speed of a porter governor which has equal arms each 200 mm long and pivoted on the axis of rotation. The mass of each ball is 4 kg and the central mass on the sleeve is 20 kg. The radius of rotation of the ball is 100 mm when the governor begins to lift and 130mm when the governor is at maximum speed. **[10M]**

OR

11. A Hartnell governor having a central sleeve spring and two right angled bell crank levers operates between 290rpm and 310rpm for a sleeve lift of 15mm. The sleeve arms and the ball arms are 80mm and 120mm respectively. The levers are pivoted at 120mm from the governor axis and mass of each ball is 2.5 kg. The ball arms are parallel to the governor axis at the lowest equilibrium speed. Determine i) loads on the spring at the lowest and highest equilibrium speeds ii) stiffness of the spring. **[10M]**

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Code No: **R15A0309**
MALLA REDDY COLLEGE OF ENGINEERING & TECH **R15** GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, April 2023
Fluid Mechanics and Hydraulic Machinery
(ME)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.
***
PART-A (25 Marks)

1). a	Write down the classification of differential manometer	**[2M]**
b	Define the terms (a) specific weight (b) mass density (c) specific gravity	**[3M]**
c	Define momentum equation	**[2M]**
d	Explain the working of Pitot tube	**[3M]**
e	What are the requirement of pumped store plants?	**[2M]**
f	Derive expression for Force exerted by the jet on a stationery vertical plate.	**[3M]**
g	Define specific speed of a turbine.	**[2M]**
h	Derive equation for unit speed.	**[3M]**
i	Define Mechanical efficiency in centrifugal pumps	**[2M]**
j	Describe the function of the air vessel for reciprocating pump.	**[3M]**

PART-B (50 MARKS)
SECTION-I

2   a. Classify types of fluid flow.   **[4M]**
b. Find the kinematic viscosity of oil having density 981 kg/m^3. The shear stress at **[6M]**
a point in oil is 0.2452 N/m^2 and velocity gradient at that point is 0.2 per second.
OR
3   Water is flowing through two different pipes to which an inverted differential **[10M]**
manometer having an oil of sp.gr.0.8 is connected. The pressure head in the pipe
A is 2m find the pressure in the pipe B for the manometer readings as shown in
figure.
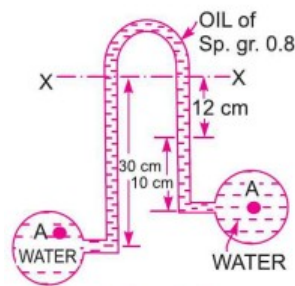
SECTION-II

4   20 liters/sec of water is flowing in a pipe having a diameter of 300mm. If the pipe **[10M]**
     is bent by 135^0 (that is change from initial to final direction is 135^0), find the
     magnitude and direction of the resultant force on bend. The pressure of water is
     39.94 N/cm^2.

                                        OR

5   A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is **[10M]**
     used to measure the flow of water. The pressure at inlet is 17.658 N/cm^2 and the
     vacuum pressure at throat is 30 cm of mercury. Find the discharge of water
     through venturimeter. Take Coefficient of discharge for venturimeter as 0.98.

SECTION-III

6   A 7.5 cm diameter jet having a velocity of 30 m/s strikes a flat plate, the normal of **[10M]**
     which is inclined at 45^0 to the axis of the jet. Find the normal force on the plate
     when the plate is moving with a velocity of 15 m/s and away from the jet. Also
     determine the power and efficiency of the jet when the plate is moving.

                                        OR

7   A jet of water having a velocity of 35 m/s impinges on a series of vanes moving **[10M]**
     with a velocity of 20 m/s. The jet makes an angle of 30^0 to the direction of motion
     of vanes when entering and leaving at an angle of 120^0. Draw the triangles of
     velocities at inlet and outlet and find;
         i)   The angles of vanes tips so that water enters and leaves without shock
         ii)   The work done per unit weight of water entering the vanes and
         iii)   Efficiency.

SECTION-IV

8   A Pelton wheel has a mean bucket speed of 10 meters per second with a jet of **[10M]**
     water flowing at the rate of 700 lit/sec under a head of 30m. the buckets deflect the
     jet through an angle of 160^0. Calculate the power given by water to the runner and
     the hydraulic efficiency of the turbine. Assume co-efficient of velocity as 0.98

                                        OR

9   A reaction turbine work at 450 r.p.m. under a head of 120 m. Its diameter at inlet **[10M]**
     is 120 cm and the flow area is 0.4m^2. The angles made by absolute and relative
     velocities at inlet are 20^0 and 60^0 respectively with the tangential velocity.
     Determine the volume flow rate, the power developed and hydraulic efficiency.
     Assume whirl at outlet to be Zero.

SECTION-V

10   a. Draw and discuss the operating characteristics of a centrifugal pump.   **[4M]**
     b. A centrifugal pump is to discharge 0.118 m^3/s at a speed of 1450 r.p.m. against **[6M]**
     a head of 25m. the impeller diameter is 250mm, its width at outlet is 50mm and
     manometric efficiency is 75%. Determine the vane angle at the outer periphery of
     the impeller.

                                        OR

11   Explain with neat sketch effect of acceleration and friction in suction and delivery **[10M]**
     pipes on indicator diagram.

                                        ***

Code No: **R15A0308**
MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, April/May 2019
Thermal Engineering
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.
***
PART-A (25 Marks)

1). a	What are the functions of cooling system	[2M]
b	Discuss pumping and rubbing friction losses	[3M]
c	What is homogeneous mixture? In which engine this mixture are used?	[2M]
d	What are the factors influence the flame speed? explain	[3M]
e	State the limitations experienced in the evaluation of friction power using Willan's line method.	[2M]
f	The bore and stroke of single cylinder four-stroke diesel engine are 80 mm, 110 mm and the torque is 23Nm. Calculate the brake mean effective pressure of the engine	[3M]
g	Write the Classification of the compressors	[2M]
h	Explain the effect of clearance volume in a reciprocating compressor	[3M]
i	Define pressure coefficient of Dynamic Compressors	[2M]
j	Explain the principle of operation of axial compressors	[3M]

PART-B (50 MARKS)
SECTION-I

2a)	Describe the various losses in actual cycles.	[5M]
b)	Explain the working of battery ignition system with the neat sketch	[5M]

OR

3 a)	Explain the working of Multi point Fuel Injection System	[5M]
b)	Explain the working of pressurised lubricating system	[5M]

SECTION-II

4 a)	With the help of P-θ diagram explain the stages of combustion in SI engines elaborating the flame front propagation.	[7M]
b)	Write about different combustion chambers used in CI engines	[3M]

OR

5 a)	Discuss the Importance of flame speed and effect of engine variables in SI engine	[6M]
b)	What is combustion induced turbulence explain in detail?	[4M]

SECTION-III

6   During a test on a diesel engine the following observations were made: [10M]
The power developed by the engine is used for driving a D.C. generator. The output of the generator was 210 A at 200V; the efficiency of generator being 82%.The quantity of fuel supplied to the engine was 11.2 kg/h; calorific value of fuel being 42600kJ/kg. The air-fuel ratio was 18:1. The exhaust gases were passed through a exhaust gas calorimeter for which the observations were as follows: Water circulated through exhaust gas calorimeter = 580 liters/hr. Temperature rise of water through calorimeter=36_0C. Temperature of exhaust gases at exit from calorimeter=98^0C. Ambient temperature=20^0C. Heat lost to jacket cooling water is 32% of the total heat supplied. If the specific heat of exhaust gases be 1.05kJ/kg K. Draw up the heat balance sheet on minute basis.

OR

7 a)   A diesel engine has a compression ratio of 14 to 1 and the fuel supply is cut off at 0.08 of the stroke. If the mass of the fuel is 0.26 kg/kWh, having calorific value of 43700 kJ/kg. Determine the relative efficiency of the engine.   [7M]

b)   What is the use of heat balance sheet of an engine?   [3M]

SECTION-IV

8 a)   Derive the condition for minimum work in multistage compression.   [6M]

b)   A single acting, two stage reciprocating air compressor with complete inter-cooling delivers 10.5kg per min of air at 16bar. The compressor takes in air at 1bar and 27^0C. The compression and expansion follow the law $pV^{1.3}$ =constant, calculate (a) power required to drive the compressor (b)isothermal efficiency (c) free air delivery (d) Heat transferred in intercooler. If the compressor runs at 440 rpm, the clearance ratios for LP and HP cylinders are 0.04 and 0.06 respectively. Calculate the swept and clearance volumes for each cylinder   [4M]

OR

9 a)   Derive the work required, power required and volumetric efficiency of a single cylinder reciprocating air compressor with clearance volume   [4M]

b)   Draw mechanical details of Roots blower and explain the principle of operation   [6M]

SECTION-V

10   Define and explain the terms pressure coefficient and adiabatic coefficient of a centrifugal compressor   [10M]

OR

11   Draw the schematic diagram of axial flow air compressor and explain its working along with velocity triangles.   [10M]

******

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, April/May 2019
Dynamics of Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

1). a	What do you understand by gyroscopic couple?	**[2M]**
b	Describe the gyroscopic effect on ship with all possible ways.	**[3M]**
c	What are the conditions for equilibrium?	**[2M]**
d	Write an expressions for torque of a conical pivot assuming uniform pressure and uniform wear.	**[3M]**
e	Which of the two assumptions- uniform intensity of pressure or uniform rate of wear, would you make use of in designing friction clutch and why?	**[2M]**
f	Discuss the various types of brakes.	**[3M]**
g	How the different masses rotating in different planes are balanced.	**[2M]**
h	What are the causes and effects of vibrations	**[3M]**
i	What is the function of governor? How does it differ from that of a flywheel.	**[2M]**
j	Write short note on coefficient of insensitiveness of governors.	**[3M]**

PART-B (50 MARKS)
<u>SECTION-I</u>

2	A rear engine automobile is travelling along a track of 100 metres mean radius. Each of the four road wheels has a moment of inertia of 2.5 kg-m² and an effective diameter of 0.6 m. The rotating parts of the engine have a moment of inertia of 1.2 kg-m². The engine axis is parallel to the rear axle and the crankshaft rotates in the same sense as the road wheels. The ratio of engine speed to back axle speed is 3 : 1. The automobile has a mass of 1600 kg and has its centre of gravity 0.5 m above road level. The width of the track of the vehicle is 1.5 m. Determine the limiting speed of the vehicle around the curve for all four wheels to maintain contact with the road surface. Assume that the road surface is not cambered and centre of gravity of the automobile lies centrally with respect to the four wheels.	**[10M]**

OR

3	A ship propelled by a turbine rotor which has a mass of 5 tonnes and a speed of 2100 r.p.m. The rotor has a radius of gyration of 0.5 m and rotates in a clockwise direction when viewed from the stern. Find the gyroscopic effects in the following conditions: (a) The ship sails at a speed of 30 km/h and steers to the left in a curve having 60 m radius.(b) The ship pitches 6 degree above and 6 degree below the horizontal position. The bow is descending with its maximum velocity. The	**[10M]**

motion due to pitching is simple harmonic and the periodic time is 20 seconds. (c) The ship rolls and at a certain instant it has an angular velocity of 0.03 rad/s clockwise when viewed from stern. Determine also the maximum angular acceleration during pitching. Explain how the direction of motion due to gyroscopic effect is determined in each case.

SECTION-II

4   A vertical petrol engine 100 mm diameter and 120 mm stroke has a connecting rod 250 mm long. The mass of the piston is 1.1 kg. The speed is 2000 r.p.m. On the expansion stroke with a crank 20° from top dead centre, the gas pressure is 700 kN/m^2. Determine: (a) Net force on the piston, (b) Resultant load on the gudgeon pin,(c) Thrust on the cylinder walls, and (d) Speed above which, other things remaining same, the gudgeon pin load would be reversed in direction.   **[10M]**

OR

5   A thrust shaft of a ship has 6 collars of 600 mm external diameter and 300 mm internal diameter. The total thrust from the propeller is 100 kN. If the coefficient of friction is 0.12 and speed of the engine 90 r.p.m., find the power absorbed in friction at the thrust block, assuming l. uniform pressure; and 2. Uniform wear.   **[10M]**

SECTION-III

6   A rotor is driven by a co-axial motor through a single plate clutch, both sides of the plate being effective. The external and internal diameters of the plate are respectively 220 mm and 160 mm and the total spring load pressing the plates together is 570 N. The motor armature and shaft has a mass of 800 kg with an effective radius of gyration of 200 mm. The rotor has a mass of 1300 kg with an effective radius of gyration of 180 mm. The coefficient of friction for the clutch is 0.35. The driving motor is brought up to a speed of 1250 r.p.m. when the current is switched off and the clutch suddenly engaged. Determine (a) The final speed of motor and rotor, (b) The time to reach this speed, and (c) The kinetic energy lost during the period of slipping. How long would slipping continue if it is assumed that a constant resisting torque of 60 N-m were present? If instead of a resisting torque, it is assumed that a constant driving torque of 60 N-m is maintained on the armature shaft, what would then be slipping time?   **[10M]**

OR

7   The turning moment diagram for a petrol engine is drawn to the following scales : Turning moment, 1 mm = 5 N-m ; crank angle, 1 mm = 1°. The turning moment diagram repeats itself at every half revolution of the engine and the areas above and below the mean turning moment line taken in order are 295, 685, 40, 340, 960, 270 mm2. The rotating parts are equivalent to a mass of 36 kg at a radius of gyration of 150 mm. Determine the coefficient of fluctuation of speed when the engine runs at 1800 r.p.m.   **[10M]**

SECTION-IV

8   An inside cylinder locomotive has its cylinder centre lines 0.7 m apart and has a stroke of 0.6 m.The rotating masses per cylinder are equivalent to 150 kg at the crank pin, and the reciprocatingmasses per cylinder to 180 kg. The wheel centre lines are 1.5 m apart. The cranks are at rightangles. The whole of the rotating and 2/3 of the reciprocating masses are to be balanced bymasses placed at a radius of   **[10M]**

0.6 m. Find the magnitude and direction of the balancing masses.Find the fluctuation in rail pressure under one wheel, variation of Tractive effort and the magnitude of swaying couple at a crank speed of 300 r.p.m

<div align="center">OR</div>

9   (a) The following data are given for a vibratory system with viscous damping: **[10M]** Mass = 2.5 kg ; spring constant = 3 N/mm and the amplitude decreases to 0.25 of the initial value after five consecutive cycles. Determine the damping coefficient of the damper in the system.

(b) A shaft of 100 mm diameter and 1 metre long has one of its end fixed and the other end carries a disc of mass 500 kg at a radius of gyration of 450 mm. The modulus of rigidity for the shaft material is 80 GN/m^2. Determine the frequency of torsional vibrations.

<div align="center">

SECTION-V

</div>

10   The following particulars refer to a Proell governor with open arms : Length of all **[10M]** arms = 200 mm, distance of pivot of arms from the axis of rotation = 40 mm, length of extension of lower arms to which the ball is attached = 100 mm, mass of each ball = 6 kg and mass of the central load = 150 kg. If the radius of rotation of the balls is 180 mm when the arms are inclined at 40° to the axis of rotation, find : 1. the equilibrium speed for the above configuration, 2. the coefficient of insensitiveness if the friction of the governor mechanism is equivalent to a force of 20 N at the sleeve, and 3. the range of speed between which the governor is inoperative.

<div align="center">OR</div>

11   In a spring controlled governor, the curve of controlling force is a straight line. **[10M]** When balls are 400 mm apart, the controlling force is 1200 N and when 200 mm apart, the controlling force is 450 N. At what speed will the governor run when the balls are 250 mm apart? What initial tension on the spring would be required for isochronism and what would then be the speed ? The mass of each ball is 9 kg.

<div align="center">******</div>

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, April/May 2019
Fluid Mechanics and Hydraulic Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.
****

PART-A (25 Marks)

1). a   Define the terms surface tension and capillarity.   **[2M]**

 b   What is a liquid? Calculate the specific weight, specific mass, specific volume and   **[3M]**
     specific gravity of a liquid having a volume of 10 m^3 and weight of 50 kN.

 c   How do you classify the fluid flows?   **[2M]**
 d   Derive the continuity equation for one dimensional flow?   **[3M]**
 e   Find the force exerted by a jet of water of diameter 70mm on a stationary flat   **[2M]**
     plate, normally with a velocity of 25m/s?
 f   Derive an expression for the force exerted by a jet on stationary flat plate?   **[3M]**
 g   What is a surge tank? What is the prominence of surge tank?   **[2M]**
 h   Define cavitation.   **[3M]**
 i   Define specific speed of a centrifugal pump?   **[2M]**
 j   When do you connect centrifugal pumps in series?   **[3M]**

PART-B (50 MARKS)
SECTION-I

2   A) What is surface tension? Define an expression for soap bubble.   **[6M]**
.
     B) A mercury column is used to measure atmospheric pressure. The height of the   **[4M]**
         column above the mercury well surface is 762 mm. The tube is 3 mm in dia.
         The contact angle is 140°. Determine the true pressure in mm of mercury if
         surface tension is 0.51 N/m. The space above the column may be considered
         as vacuum

OR

3   Derive friction factor for the flow through the circular pipe by Darcy Weisbach   **[10M]**
     Equation?

SECTION-II

4   A) What are the losses in pipes? How it is playing important role.   **[4M]**
     Two pipes one of 10cm diameter, 200 m long and another 15cm diameter, 400 m long   **[6M]**
     are connected in parallel. The friction factors are 0.0075 for the smaller pipe and
     0.006 for the large pipe. The total discharge through the system is 50 lit/sec. Find the
     discharge and head loss in each pipe. Neglect minor losses. Calculate the equivalent

length of a 20 cm diameter having f=0.005

<div align="center">OR</div>

5   A) State the momentum equation and mention some of its engineering applications   **[5M]**

    B) Describe a venturimeter and find an expression for measuring discharge of fluid through a pipe with this device.   **[5M]**

<div align="center">

SECTION-III
</div>

6   A 75 mm diameter jet having a velocity of 30 m/s strikes a flat plate, the normal of which is inclined at 45^0 to the axis of the jet. Find the normal pressure on the plate, i) When the plate is stationary ii) When the plate is moving with a velocity of 15 m/s in the direction of the jet, away from the jet. Also determine the power and efficiency of the jet when the plate is moving.   **[10M]**

<div align="center">OR</div>

7   Define the following   **[10M]**
- I.   mass curve
- II.   catchment area
- III. storage and pondage

<div align="center">

SECTION-IV
</div>

8   A turbine is designed to operate under a head of 30m at 100 rpm with a discharge of 10m3/sec and 90% efficiency. Calculate the (i) specific speed (ii) Power generated (iii) type of turbine.   **[10M]**

<div align="center">OR</div>

9   A) How are turbines classified? Explain the working of Pelton wheel turbine with a neat sketch.   **[5M]**

    B) Differentiate between impulse turbine and reaction turbine.   **[5M]**

<div align="center">

SECTION-V
</div>

10   Derive the equation of discharge in a single acting reciprocating pump. What is slip, percentage slip and negative slip.   **[10M]**

<div align="center">OR</div>

11   Centrifugal pump whose efficiency is 74% is required to handle a liquid of specific gravity 1.2. The quantity of liquid to be pumped is 12m3/min against a total head of 17m. Find (i) the pressure developed in kg /cm2. (ii) HP required by the pump.   **[10M]**

<div align="center">******</div>

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, April/May 2019
Industrial Engineering
(ME)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
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****
PART-A (25 Marks)

1). a	Brief about nature of Management.	**[2M]**
b	State any one principle of Taylor's Scientific Management theory and give suitable example.	**[3M]**
c	Discuss about work Study.	**[2M]**
d	Give one example each for the adoption of job, batch and mass production methods.	**[3M]**
e	Discuss about quality management in India.	**[2M]**
f	List out duties of purchase manager.	**[3M]**
g	What is crash time?	**[2M]**
h	Define Float, Free Float and Total Float for a project activity.	**[3M]**
i	What do you mean by marketing mix?	**[2M]**
j	Discuss the importance of HRM in any organisation.	**[3M]**

PART-B (50 MARKS)
SECTION-I

2)	Explain Fayol's principles of management.	**[10M]**
	OR	
3)	Discuss about matrix organization and its limitations.	**[10M]**

SECTION-II

4)	Explain various methods of Production.	**[10M]**
	OR	
5)	Explain about ABC Analysis and its impotance.	**[10M]**

SECTION-III

6) a.	What are various steps in purchase procedure?	**[5M]**
b.	How would you deal with the costs associated with effective inventory control in modern management?	**[5M]**
	OR	
7)	What do you mean by Bench mark? Why is it required.	**[10M]**

SECTION-IV

8) a	Briefly explain various steps in Programme Evaluation and Review Technique.	**[5M]**
b	How do you identify critical path?	**[5M]**

9) A small project is composed of 7 activities whose time estimates are listed below. **[10M]**

	Estimated time duration in weeks		
Activity	Optimistic	Most likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

Draw PERT diagram and represent the project completion time.

SECTION-V

10) Explain the different marketing strategies that can be adopted based on product life cycle. **[10M]**

OR

11) Discuss about Total Quality management and its importance. **[10M]**

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Code No: R15A0311

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLO | R15

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester supplementary Examinations, April/May 2019
Manufacturing Science
(ME)

Roll No | | | | | | | | | | |

Time: 3 hours   Max. Marks: 75

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.

***
PART-A (25 Marks)

1).	a	Write the requirements of good pattern.	**[2M]**
	b	State any four functions of risers.	**[3M]**
	c	Why is flux used in soldering and brazing?	**[2M]**
	d	Explain about welding joints.	**[3M]**
	e	List out any four parts that can be manufactured by shape rolling operations.	**[2M]**
	f	Discuss about strain hardening.	**[3M]**
	g	Discuss about blanking process.	**[2M]**
	h	Briefly about the coining process.	**[3M]**
	i	List few forging defects and remedies.	**[2M]**
	j	How are forging processes classified?	**[3M]**

PART-B (50 MARKS)
SECTION-I

2)   With the help of neat diagrams, explain investment casting process.   **[10M]**

OR

3)   How are patterns classified? Enumerate any two types with the help of neat   **[10M]**
diagrams and state the use of each of them.

SECTION-II

4)   What is Gas welding? Explain about various types of flames in gas welding with   **[10M]**
its advantages, disadvantages and limitations.

OR

5) a   Explain any two important defects in welding process.   **[5M]**
   b   List out the steps involved in forge welding. Use neat sketches if necessary. **[5M]**

SECTION-III

6) a   Differentiate between hot working and cold working.   **[5M]**
   b   Discuss about recovery, recrystallisation and grain growth.   **[5M]**

OR

7)   Sketch and explain various types of rolling mill arrangements used in a rolling   **[10M]**
process.

SECTION-IV

8)   With the help of a neat diagram explain the process of tube drawing.   **[10M]**

<div align="center">OR</div>

9) Explain the basic nomenclature of tube bending with a simple sketch. **[10M]**

<div align="center">**<u>SECTION-V</u>**</div>

10) Compare cold and hot extrusion processes. Use neat diagrams at appropriate **[10M]** locations.

<div align="center">OR</div>

11) Distinguish between open die and closed die forging processes. **[10M]**

<div align="center">******</div>

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, April/May 2019
Machine Drawing
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A consists of three Questions, answer any two questions. Each question carries 15 marks.

Part B consists of one question which is compulsory. Which carriers 45 marks.

****

Part-A (30Marks)
Answer any two of the following (2x15=30M)

1. Draw the conventional representation of following materials
   (a) Porcelain   (b) Fiber   (c) Lead   (d) Petrol   (e) Copper
2. Draw the single riveted single strap Butt joint of plate thickness as 12 mm .
3. Draw the half-sectional front view and side view of journal bearing which can accommodate 40 mm diameter shaft.

Part-B (45Marks) (1x45=45M)
4. Assemble the parts of spring loaded safety valve as shown in the figure and draw
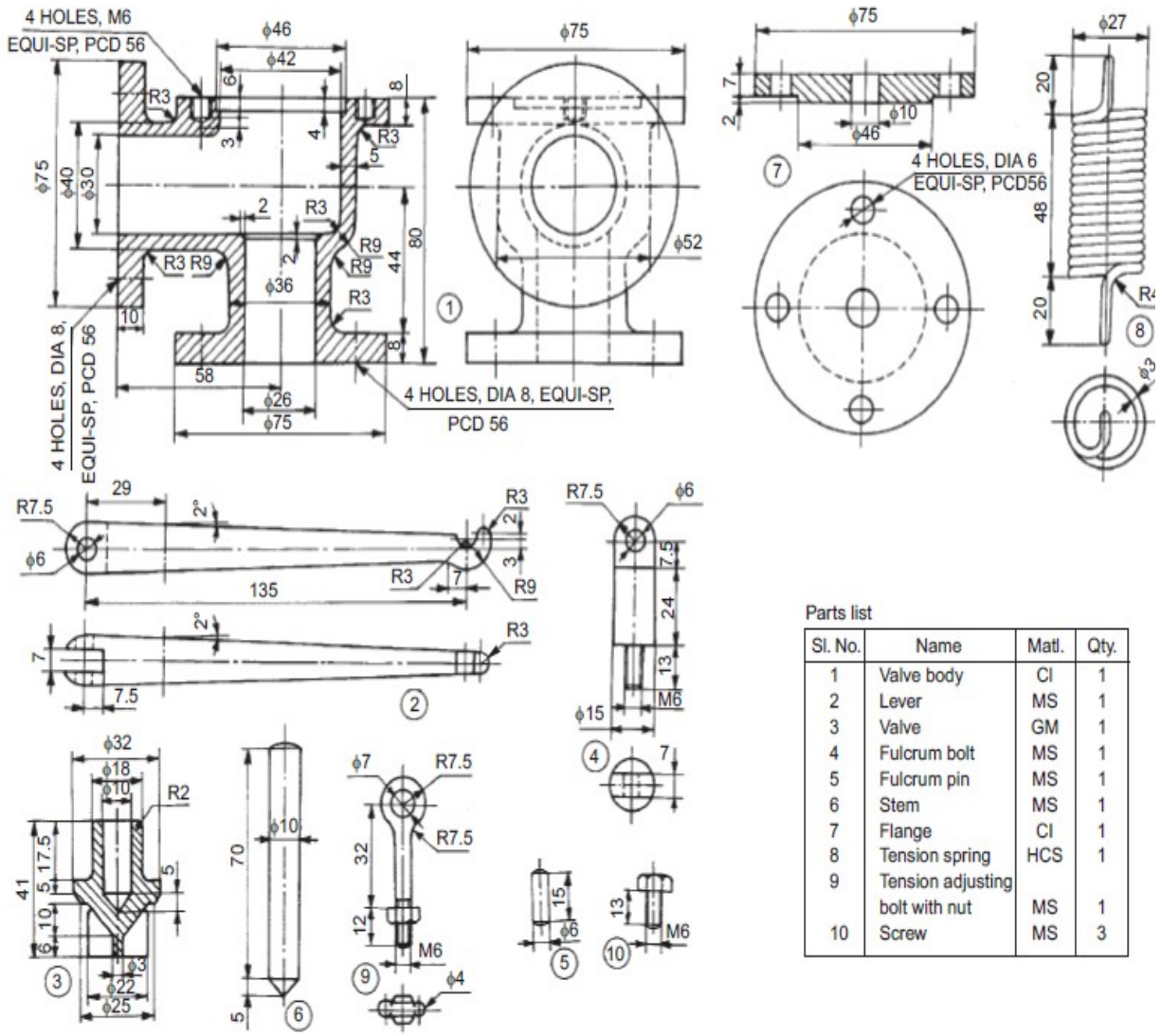   a) Sectional front view
   b) Top view

Fig. Spring loaded safety valve

Parts list

Sl. No.	Name	Matl.	Qty.
1	Valve body	CI	1
2	Lever	MS	1
3	Valve	GM	1
4	Fulcrum bolt	MS	1
5	Fulcrum pin	MS	1
6	Stem	MS	1
7	Flange	CI	1
8	Tension spring	HCS	1
9	Tension adjusting bolt with nut	MS	1
10	Screw	MS	3

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, December 2019
Thermal Engineering
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.
****

PART-A (25 Marks)

1). a	What are the functions of lubricating system	[2M]
b	Discuss the loss due to gas exchange process	[3M]
c	What is heterogeneous mixture? In which engine this mixture are used?	[2M]
d	Explain the effect of various engine variables on SI Engine knock	[3M]
e	Explain why Morse test is not suitable for single cylinder engine?	[2M]
f	Find the brake specific fuel consumption in kg/kW h of a diesel engine whose fuel consumption is 5gram per second when the power output is 80kW.	[3M]
g	List out the functions of compressors	[2M]
h	Derive the expression for work done in a single stage reciprocating air compressor neglecting clearance volume	[3M]
i	Explain the importance of slip factor in compressor	[2M]
j	Define adiabatic coefficient of Dynamic Compressors	[3M]

PART-B (50 MARKS)
SECTION-I

2	a.	A four-stroke cycle automobile engine tested while running at 3600 rpm. Inlet air temperature is 16^0C and the pressure is 101.36 kN/m². The engine has eight in-line cylinders with a total piston displacement of 4066 cc. The air fuel ratio is 14 and the bsfc is 0.377 kg/Wh. Dynamometer readings show a power output of 86 kW. Find the volumetric efficiency	[6M]
	b.	What are the difficulties of a simple Carburetor. Explain?	[4 M]

OR

3	a.	Compare actual and theoretical Valve Timing Diagrams of SI engine	[5M]
	b.	Compare different cooling systems and write the merits of one over the other	[5M]

SECTION-II

4	a.	Explain the importance of Delay period in CI engine?	[5M]
	b.	Explain the fuel rating for SI and CI fuels	[5M]

OR

5	a.	What is meant by abnormal combustion? Briefly discuss how it is effected by engine variables	[5M]
	b.	Define pre-ignition and knocking. Explain how it is different in SI and CI engine	[5M]

SECTION-III

6   The following data refers to a test on a single cylinder oil engine working on Four   [10M]
     Stroke Cycle. Diameter of brake wheel and rope diameter: 60 cm and 3 cm
     Dead load and spring balance reading: 250 N and 50 N
     Bore and piston stroke: 10 cm and 15 cm
     Speed of Engine: 400 rev/min
     Length and area of indicator diagram: 6 cm and 4 cm^2
     Spring stiffness: 12 N/cm^2 per cm
     Fuel consumption: 0.32 kg/kwh
     Calorific value of fuel: 43950 kJ/kg
     Determine brake power, indicated power, mechanical efficiency and indicated thermal
     efficiency of the engine

                                     OR

7   A turbo-charged six-cylinder diesel engine has the following details   [10M]
     Work done during compression and expansion = 720 W
     Work done during intake and exhaust = 45 kW
     Rubbing friction in the engine is 140 kW
     Net work done by turbine = 35 kW
     If the brake mean effective pressure is 0.6 MPa, determine the bore and stroke of
     engine, taking the ratio of bore to stroke as 1 and engine speed as 1000 rpm.

SECTION-IV

8   a. A two stage air compressor with perfect intercooling takes in air at 1 bar pressure   [6M]
         and 27°C. The law of compression in both the stages is $pv^{1.3}$=constant. The
         compressed air is delivered at 9 bar from the HP cylinder to an air receiver.
         Calculate per kilogram of air, (a) the minimum work done and (b) the heat
         rejected to the intercooler
     b. State and explain the characteristics of rotary vane type compressor   [4M]

                                     OR

9   a) Describe the working of a single stage reciprocating air compressor with a   [5M]
         neat sketch.
     b) Derive the efficiency of a multi stage reciprocating air compressor.   [5M]

SECTION-V

10   A centrifugal compressor running at 8000 rpm delivers 660m3/min of free air. The air   [10M]
     is compressed from 1.01 bar and 15^{0}C to a pressure of 3 with an isentropic efficiency
     of 80%. Blades are radial at outlet of impeller and flow velocity of 60 m/s may be
     assume throughout constant. The outer radius of impeller is thrice the inner and the
     slip factor may be assumed as 0.8.The blade area coefficient may be assumed 0.8 at
     inlet. Calculate:
     a) Final temperature of air b) Theoretical power c) Impeller diameters at inlet and
     outlet d) Breadth of impeller at inlet e) Impeller blade angle at inlet f) Diffuser blade
     angle at inlet.

                                     OR

11   Draw the velocity triangles for the centrifugal compressor and derive the equation   [10M]
     for the estimation of power required to compress the air.

                                   ******

MALLA REDDY COLLEGE OF ENGINEERING & TECH[R15]GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, December 2019
Dynamics of Machinery
(ME)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
       Part A is compulsory which carriers 25 marks and Answer all questions.
       Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
       Choosing ONE Question from each SECTION and each Question carries 10 marks.

****

PART-A (25 Marks)

1 . a	Explain the application of gyroscopic principles to aircrafts.		**[2M]**
b	Discuss the effect of the gyroscopic couple on a two wheeled vehicle when taking a turn.		**[3M]**
c	What is the difference between piston effort, crank effort and crank-pin effort?		**[2M]**
d	What is meant by the expression 'friction circle'?		**[3M]**
e	Draw the turning moment diagram of a single cylinder double acting steam engine.		**[2M]**
f	Distinguish between brakes and dynamometers.		**[3M]**
g	Write a short note on primary and secondary balancing.		**[2M]**
h	What do you understand by transmissibility?		**[3M]**
i	What is stability of a governor?		**[2M]**
j	Prove that the sensitiveness of a Proell governor is greater than that of a Porter governor.		**[3M]**

PART-B (50 MARKS)
<u>SECTION-I</u>

2   An aero plane makes a complete half circle of 50 metres radius, towards left, **[10M]** when flying at 200 km per hr. The rotary engine and the propeller of the plane has a mass of 400 kg and a radius of gyration of 0.3 m. The engine rotates at 2400 r.p.m. clockwise when viewed from the rear. Find the gyroscopic couple on the aircraft and state its effect on it.

OR

3   A four-wheeled trolley car of mass 2500 kg runs on rails, which are 1.5 m apart **[10M]** and travels around a curve of 30 m radius at 24 km / hr. The rails are at the same level. Each wheel of the trolley is 0.75 m in diameter and each of the two axles is driven by a motor running in a direction opposite to that of the wheels at a speed of five times the speed of rotation of the wheels. The moment of inertia of each axle with gear and wheels is 18 kg-m^2. Each motor with shaft and gear pinion has a moment of inertia of 12 kg-m^2. The centre of gravity of the car is 0.9 m above the rail level. Determine the vertical force exerted by each wheel on the rails taking into consideration the centrifugal and gyroscopic effects. State the

centrifugal and gyroscopic effects on the trolley.

SECTION-II

4 The crank-pin circle radius of a horizontal engine is 300 mm. The mass of the **[10M]** reciprocating parts is 250 kg. When the crank has travelled 60° from I.D.C., the difference between the driving and the back pressures is 0.35 N/mm^2. The connecting rod length between centres is 1.2 m and the cylinder bore is 0.5 m. If the engine runs at 250 r.p.m. and if the effect of piston rod diameter is neglected, calculate : 1. pressure on slide bars, 2. thrust in the connecting rod, 3. tangential force on the crank-pin, and 4. turning moment on the crank shaft.

OR

5 A vertical petrol engine 100 mm diameter and 120 mm stroke has a connecting **[10M]** rod 250 mm long. The mass of the piston is 1.1 kg. The speed is 2000 r.p.m. On the expansion stroke with a crank 20° from top dead centre, the gas pressure is 700 kN/m^2. Determine: 1. Net force on the piston, 2. Resultant load on the gudgeon pin, 3. Thrust on the cylinder walls, and 4. Speed above which, other things remaining same, the gudgeon pin load would be reversed in direction.

SECTION-III

6 A band brake acts on the 3/4th of circumference of a drum of 450 mm diameter **[10M]** which is keyed to the shaft. The band brake provides a braking torque of 225 N-m. One end of the band is attached to a fulcrum pin of the lever and the other end to a pin 100 mm from the fulcrum. If the operating force is applied at 500 mm from the fulcrum and the coefficient of friction is 0.25, find the operating force when the drum rotates in the (a) anticlockwise direction, and (b) clockwise direction.

OR

7 A multi-cylinder engine is to run at a speed of 600 r.p.m. On drawing the turning **[10M]** moment diagram to a scale of 1 mm = 250 N-m and 1 mm = 3°, the areas above and below the mean torque line in mm2 are : + 160, – 172, + 168, – 191, + 197, – 162. The speed is to be kept within ± 1% of the mean speed of the engine. Calculate the necessary moment of inertia of the flywheel. Determine the suitable dimensions of a rectangular flywheel rim if the breadth is twice its thickness. The density of the cast iron is 7250 kg/m3 and its hoop stress is 6 MPa. Assume that the rim contributes 92% of the flywheel effect.

SECTION-IV

8 A five cylinder in-line engine running at 750 r.p.m. has successive cranks 144° **[10M]** apart, the distance between the cylinder centre lines being 375 mm. The piston stroke is 225 mm and the ratio of the connecting rod to the crank is 4. Examine the engine for balance of primary and secondary forces and couples. Find the maximum values of these and the position of the central crank at which these maximum values occur. The reciprocating mass for each cylinder is 15 kg.

OR

9 A shaft 50 mm diameter and 3 metres long is simply supported at the ends and **[10M]** carries three loads of 1000 N, 1500 N and 750 N at 1 m, 2 m and 2.5 m from the left support. The Young's modulus for shaft material is 200 GN/m^2. Find the frequency of transverse vibration.

SECTION-V

10 A Porter governor has equal arms each 250 mm long and pivoted on the axis of **[10M]** rotation. Each ball has a mass of 5 kg and the mass of the central load on the

sleeve is 25 kg. The radius of rotation of the ball is 150 mm when the governor begins to lift and 200 mm when the governor is at maximum speed. Find the minimum and maximum speeds and range of speed of the governor.

<div align="center">OR</div>

11   A Hartnell governor having a central sleeve spring and two right-angled bell crank   **[10M]**
levers moves between 290 r.p.m. and 310 r.p.m. for a sleeve lift of 15 mm. The sleeve arms and the ball arms are 80 mm and 120 mm respectively. The levers are pivoted at 120 mm from the governor axis and mass of each ball is 2.5 kg. The ball arms are parallel to the governor axis at the lowest equilibrium speed. Determine: 1. loads on the spring at the lowest and the highest equilibrium speeds, and 2. stiffness of the spring.

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Code No: **R15A0309**
MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, December 2019
Fluid Mechanics and Hydraulic Machinery
(ME)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
    Part A is compulsory which carriers 25 marks and Answer all questions.
    Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
    Choosing ONE Question from each SECTION and each Question carries 10 marks.
<div align="center">***</div>
<div align="center">PART-A (25 Marks)</div>

1). a	Explain atmospheric, gauge and vacuum pressure	**[2M]**
b	Differentiate between dynamic viscosity and kinematic viscosity. What are their units of measurement?	**[3M]**
c	Define TEL and HGL?	**[2M]**
d	What is venturi meter?	**[3M]**
e	Name the Elements of hydro electric power station	**[2M]**
f	Derive an expression for the force exerted by a jet on fixed flat plate?	**[3M]**
g	Requirements for selection of turbine.	**[2M]**
h	Draw inlet and outlet velocity triangles for a Pelton wheel	**[3M]**
i	Define slip and percentage slip?	**[2M]**
j	Explain NPSH in centrifugal pump?	**[3M]**

<div align="center">PART-B (50 MARKS)</div>
<div align="center"><u>SECTION-I</u></div>

2 A	Explain the phenomenon of surface tension on the top surface of liquids.	**[4M]**
2 B	A glass tube of internal diameter 4 mm is immersed in a liquid of specific gravity 12.2 and surface tension 0.55 N/m. The angle of contact with the glass is 120_0. Calculate capillary rise or depression in the tube.	**[6M]**

<div align="center">OR</div>

3 A	Define the terms (i) Specific gravity (ii) density(iii) surface tension (iv) capillarity	**[4M]**
3 B	Explain in detail classification of flows.	**[6M]**

<div align="center"><u>SECTION-II</u></div>

4	Derive the Bernoulli's equation from the Euler's equation.	**[10M]**

<div align="center">OR</div>

5 A	Derive the Darcy - Weisbach equation for friction head loss in a pipe?	**[5M]**
5 B	A 60 cm diameter pipeline carries oil (specific gravity= 0.85) at 82500 m_3 per day. The friction head loss is 8.5 m per 1000m of pipe run. It is planned to place pumping stations every 20 km along the pipe. Make calculations for the pressure drop in kN/m_2 between pumping stations.	**[5M]**

<div align="center"><u>SECTION-III</u></div>

6	A jet of oil of specific gravity strikes a fixed curved symmetrical plate at its center and leaves at the outlet tips. The diameter of the jet is 62 mm and the velocity of the	**[10M]**

jet is 45 m/sec. If the jet is deflected by 100 degrees, calculate the force exerted on the curved plate

<div align="center">OR</div>

7	With the help of neat diagram explain the concept of pumped storage plants	**[10M]**

<div align="center">

SECTION-IV

</div>

8 A	Why is the end of a draft tube immersed below the tail water level? Explain with a neat sketch. Define draft tube efficiency and derive its equation.	**[6M]**
8 B	What is governing of turbines? How is it achieved?	**[4M]**

<div align="center">OR</div>

9 A	Define (i) unit speed (ii) unit discharge (iii) unit power of a turbine.	**[6M]**
9 B	Write about characteristic curves of hydraulic turbines	**[4M]**

<div align="center">

SECTION-V

</div>

10	A single acting reciprocating pump running at 50 r.p.m delivers 0.01 m3/sec. the diameter of the piston is 20cm and stroke length is 40cm.Find the (i) coefficient of discharge (ii) slip and percentage of slip of the pump.	**[10M]**

<div align="center">OR</div>

11	A centrifugal pump whose efficiency is 72% delivers 1500 lits/min through a pipe of 10cm.diameter and 90m long. Find out the pressure required to drive the pump if it lifts water to a height 20m.Assume the coefficient of friction in the pipe to be 0.01.	**[10M]**

<div align="center">******</div>

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, December 2019
Industrial Engineering
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.

***

PART-A (25 Marks)

1). a   Why are the management principles important for the success of any business organization? **[2M]**

b   Compare and contrast departmentation and decentralization in a business organization. **[3M]**

c   What are the various production types. **[2M]**

d   Discuss about the procedure of Method Study **[3M]**

e   Define the concept TQM. **[2M]**

f   List out various functions of stores management. **[3M]**

g   Brief about project Management. **[2M]**

h   What are the requirements for selecting which activity to crash in any project? **[3M]**

i   Differentiate between marketing and selling **[2M]**

j   What is product life cycle. **[3M]**

PART-B (50 MARKS)
SECTION-I

2) a.   Describe Maslow's theory of motivation. **[5M]**

b.   Describe functions of management. **[5M]**

OR

3)   Discuss the different types of organization structure **[10M]**

SECTION-II

4) a.   What are the objectives of plant layout? **[5M]**

b.   Explain the factors influencing the plant layout. **[5M]**

OR

5) a.   What is work study and explain its benefits? **[5M]**

b.   Define Method study. How do you carry it out? **[5M]**

SECTION-III

6) a.   What are the costs associated with effective inventory control? **[5M]**

b.   What are the objectives of Inventory Control? **[5M]**

OR

7)   Discuss about Total Quality management. **[10M]**

SECTION-IV

8) a.   What are the differences between PERT and CPM? **[5M]**

b   What is critical path? How do you calculate it?   **[5M]**

OR

9)   A project has the following time schedule: **[10M]**

Activity	Time in months	Activity	Time in months
1-2	2	3-7	5
1-3	2	4-6	3
1-4	1	5-8	1
2-5	4	6-9	5
3-6	8	7-8	4
--	--	8-9	3

Construct PERT network and compute critical path and its duration.

SECTION-V

10)   What are the key functions of a human resource manager?   **[10M]**

OR

11) a.   Evaluate various methods of job evaluation.   **[5M]**

    b.   What is merit rating and explain any three methods of merit rating   **[5M]**

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Code No: R15A0311

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH͞GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, December 2019
Manufacturing Science
(ME)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.
***
PART-A (25 Marks)

1). a	Mention any two advantages and disadvantages of die casting.	**[2M]**
b	Briefly discuss the steps involved in the solidification of pure metal.	**[3M]**
c	What are the various types of joints used in welding?	**[2M]**
d	Write short notes on transferred and non transferred arc in plasma arc welding.	**[3M]**
e	What is meant by recrystallisation temperature?	**[2M]**
f	Sketch different types of rolling mills.	**[3M]**
g	Discuss about piercing process.	**[2M]**
h	Briefly explain about cold spinning process.	**[3M]**
i	What do you mean by rotary forging?	**[2M]**
j	Discuss about impact extrusion	**[3M]**

PART-B (50 MARKS)
SECTION-I

2)	With the help of neat diagrams, explain centrifugal casting process.	**[10M]**

OR

3)	With the help a neat sketch, explain the cupola operation.	**[10M]**

SECTION-II

4) a	Discuss principle of adhesive bonding. List out any four types of adhesives.	**[5M]**
b	Describe with a neat sketch the components of oxyacetylene gas welding equipment.	**[5M]**

OR

5)	What are the non destructive tests used in welding process? With the help of neat diagrams explain any two methods.	**[10M]**

SECTION-III

6)	Explain the mechanism of rolling process with the help of a neat diagram.	**[10M]**

OR

7)	With the help of a neat diagram explain injection moulding process.	**[10M]**

SECTION-IV

8)	Discuss different types of bending processes.	**[10M]**

<div align="center">OR</div>

9)   With the help of a neat diagram explain the process of wire drawing.   **[10M]**

<div align="center">**SECTION-V**</div>

10) With the help of neat sketches explain the principle of hydrostatic extrusion.   **[10M]**

<div align="center">OR</div>

11) Explain the steps involved in drop forging process.   **[10M]**

<div align="center">******</div>

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, December 2019
Machine Drawing
(ME)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Note: This question paper consists of 2 parts. Answer any two questions from Part-A, which carries of30Marks and Part-B consists of one question which carries 45 marks

****

Part-A (30Marks)
Answer any two of the following (2x15=30M)

1. Draw the conventional representation of following machine components
   (a) Wood   (b) External threads   (c) Stud   (d) Hexagonal nut   (e) Liquids
2. Sketch the sectional view from the front and view from the side of a butt-muff coupling; indicating proportions for connecting two shafts, each of diameter 30 mm.
3. Draw the sectional front, top and side view of a knuckle joint to join two rods of diameter 30mm each.

Part-B (45Marks) (1x45=45M)

4. Assemble the parts of stuffing box valve as shown in the figure and draw
   a) Sectional front view
   b) Top view
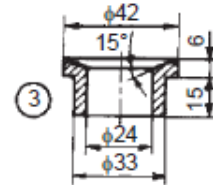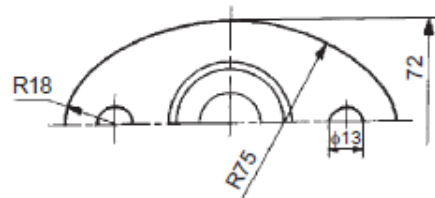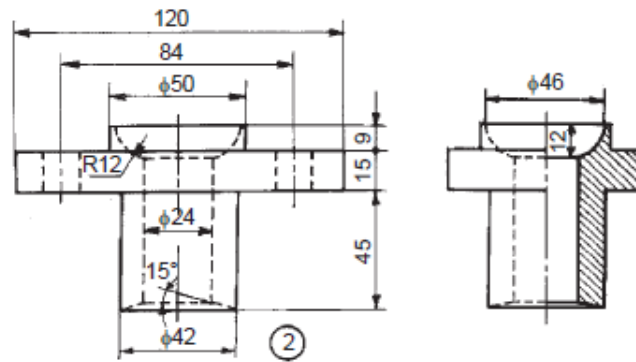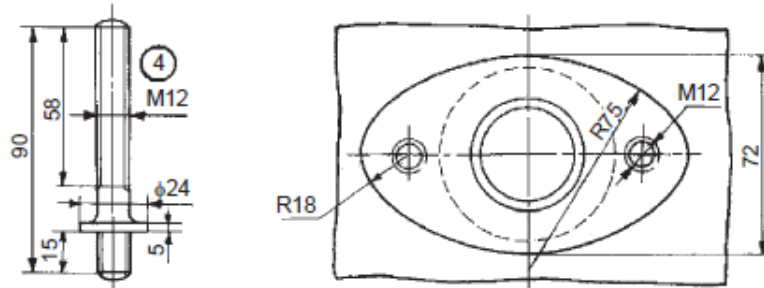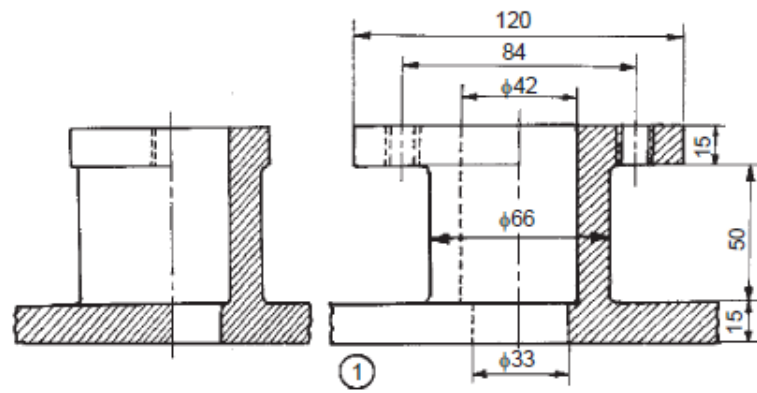
Parts list			
Part No.	Name	Matl	Qty
1	Body	CI	1
2	Gland	Brass	1
3	Bush	Brass	1
4	Stud	MS	2
5	Nut, M12	MS	2

Fig. Stuffing Box

Code No: **R15A0308**

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH____GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, December 2022
Thermal Engineering
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.
***
PART-A (25 Marks)

1). a   Differentiate two stroke and four stroke engines.   **[2M]**
   b   How the fuel injection system function in CI Engine?   **[3M]**
   c   Draw the valve time diagram of a 4-stroke diesel engine.   **[2M]**
   d   What is the need of providing lubrication to the IC engine?   **[3M]**
   e   Explain Mean effective pressure importance in the performance test?   **[2M]**
   f   Explain the significance of Sankey diagram in engine performance parameters.   **[3M]**
   g   What are the advantages of multi compression in the reciprocating compressor   **[2M]**
   h   Write the applications of air compressor.   **[3M]**
   i   Define degree of reaction for the axial flow compressor?   **[2M]**
   j   What is dynamic compressors? Explain the significance.   **[3M]**

PART-B (50 MARKS)
SECTION-I

2   a) With the help of a neat sketch explain the working of fuel supply system of an   **[5M]**
     IC engine.
     b) In an ideal diesel cycle, the temperature at the beginning of compression, at the   **[5M]**
     end of compression and at the end of the heat addition are 97^0C, 789^0C and
     1839^0C. Find the efficiency of the cycle?
                                               OR
3   Define volumetric efficiency and discuss the effect of various factors affecting the   **[10M]**
      volumetric efficiency.

SECTION-II

4   Discuss about direct and indirect injection combustion chambers   **[10M]**
                                               OR
5   a) What is delay period and what are the various factors that affect the delay   **[5M]**
     period?
     b) Explain the various stages of combustion in CI Engine.   **[5M]**

SECTION-III

6   a) Discuss the effect of turbulence and compression ratio on the combustion characteristics in S.I. Engine.   **[5M]**

b) Explain the influence of operating parameters on knocking in S.I. Engine   **[5M]**

OR

7   The following data was recorded during testing of a 4-stroke cycle gas engine. Diameter= 10 cm, Stroke= 10 cm, Speed= 1200 rpm, Area of the positive loop of the indicator diagram=5.75 cm^2, Area of the negative loop of the indicator diagram=0.25 cm^2, Length of the indicator diagram= 55 mm, Spring constant= 3.5 bar/cm. Find the indicated power of the engine.   **[10M]**

SECTION-IV

8   Explain the working and mechanical details of centrifugal compressors with the help of h-s chart.   **[10M]**

OR

9   A centrifugal compressor delivers 50 kg of air per minute at a pressure of 2 bar and 97^0 C. The intake pressure and temperature of air is 1 bar and 15^{0}C. If no heat is lost to the surrounding, find: i) index of compression ii) Power required, if the compression is isothermal, Take R=287 J/KgK.   **[10M]**

SECTION-V

10   Compare the work inputs required for roots blower and a vane type compressor having the same induced volume of 0.03 m^3 per revolution, the inlet pressure being 1.013 bar and the pressure ratio 1.5 to 1. For vane type, assume the initial compression takes place through half the pressure range.   **[10M]**

OR

11   Air at a temperature of 29^0 K flows in a centrifugal compressor running at 20000 rpm. The other data is as follows: **[10M]**

Slip factor= 0.80 ; Isentropic total head efficiency =0.75 ; Outer diameter of blade tip = 500 mm

Determine :

(i) The temperature rise of air passing through the compressor

(ii) The static pressure ratio.

(iii) Assume that the velocities of air at inlet and exit of the compressor are same

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH~~NOLO~~GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, December 2022
Dynamics of Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

***
PART-A (25 Marks)

1). a   How does the gyroscopic couple influence the stability of four wheeler when it is taking a turn?   **[2M]**

   b   What will be the effect of the gyroscopic couple on a disc fixed at a certain angle to a rotating shaft?   **[3M]**

   c   Write brief notes on Friction, Limiting force of friction, co-efficient of friction and angle of friction   **[2M]**

   d   Explain briefly the 'friction circle'?   **[3M]**

   e   What is the difference between a brake and a clutch?   **[2M]**

   f   How does differential band brake works, write the condition for self locking when drum rotates clockwise   **[3M]**

   g   Distinguish primary and secondary balancing.   **[2M]**

   h   What are different forces needs to be balanced in the locomotive.   **[3M]**

   i   What is the difference between centrifugal governors and inertia governors?   **[2M]**

   j   Explain the terms isochronous and hunting.   **[3M]**

PART-B (50 MARKS)
SECTION-I

2   The rotor of the turbine of a ship has a mass of 2500 kg and rotates at a speed of 3200 rpm counter-clockwise when viewed from stern. The rotor has radius of gyration of 0.4m. Determine the gyroscopic couple and its effect when   **[10M]**

a) The ship steers to the left in a curve of 80m radius at a speed of 15 knots (1 knot = 1860 m/h)

b) The ship pitches 5 degrees above and 5 degrees below the normal position and the bow is descending with its maximum velocity. The pitching motion is simple harmonic with a periodic time of 40 seconds.

OR

3   The length of connecting rod of a gas engine is 500 mm, and its C.G. lies at 165 mm from the crank pin center. The rod has a mass of 80 kg and a radius of gyration of 180 mm about an axis passing through the centre of the mass. The stroke of piston is 225 mm, and the crank speed is 300 rpm. Determine the inertia force on the crankshaft when the crank has turned through 125^0 from the inner dead centre.   **[10M]**

4   In a four-link mechanism ABCD, AB= 350 mm, BC = 500 mm, CD = 400 mm, **[10M]**
    AD = 700 mm, DE = 150 mm, angle DAB = 60^0 (AD is the fixed link). A force of
    35 N acts at E on link DC. Determine the force on the link AB required at the
    midpoint in the direction shown in the diagram for the static equilibrium of the
    mechanism. The coefficient of friction is 0.4 for each revolving pair. Assume
    impending motion of AB to be counter–clockwise. Radius of each journal is 50
    mm. Also, find the torque on AB for its impending clockwise motion

OR

5   Derive an expression for the efficiency of an inclined plane when a body moves
    a) up a plane,   **[5M]**
    b) down a plane.   **[5M]**

SECTION-III

6   A thrust bearing has contact surfaces of 40 cm and 30 cm external and internal   **[10M]**
    diameters respectively. Calculate the number of collars required for an end thrust
    of 16 tonnes. The coefficient of friction is 0.04 and the maximum intensity of
    allowable pressure is 0.35 MPa. What is the HP lost in friction at a speed of 120
    rpm?

OR

7   Sketch an internal expanding shoe brake and derive the expression for friction   **[10M]**
    torque of such a brake.

SECTION-IV

8   A shaft carries five masses A, B, C, D and E which revolve at the same radius in   **[10M]**
    equidistant planes. The masses in planes A, C and D weigh respectively 500, 400
    and 800 N. The angle between A and C is 90^0 and that between C and D is 135^0.
    Find the weights in planes B and E and their angular positions so that the shaft
    may be completely balanced.

OR

9   a) Explain the Dunkerley's method for finding the frequency of natural transverse   **[10M]**
    vibrations of a simply supported shaft carrying several concentrated loads.
    b) A shaft supported freely at its ends has a load of 1.2 kN placed at the centre of
    the shaft. The diameter of shaft is 40 mm and its length is 700 mm. Find the
    frequency of its natural transverse vibrations, if $E = 200$ GN/m^2.

SECTION-V

10 Derive the governing equation of a Porter governor, taking into account the   **[10M]**
    friction at the sleeve. Also discuss the effect of friction on the functioning of the
    governor.

OR

11 In an engine governor of the Porter type, the upper and lower arms are 150 mm   **[10M]**
    and 200 mm respectively and pivoted on the axis of rotation. The mass of the
    central load is 15 kg, the mass of each ball is 3 kg and friction of the sleeve
    together with the resistance of the operating gear is equal to a load of 25 N at the
    sleeve. If the limiting inclinations of the upper arms to the vertical are 30^0 and 45^0,
    find, taking friction into account, range of speed of the governor.

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Code No: **R15A0309**

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH~~NOLO~~GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, December 2022
Fluid Mechanics and Hydraulic Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

1). a	Differentiate U-tube manometer and Differential manometer	**[2M]**
b	Explain what is manometer. How is it classified?	**[3M]**
c	What do you mean by rotational and irrotational flows?	**[2M]**
d	Distinguish between Orifice meter and venturi meter.	**[3M]**
e	What is difference between radial flow and axial flow in turbo machinery?	**[2M]**
f	Distinguish between major and minor losses	**[3M]**
g	What is the difference between turbine and pump?	**[2M]**
h	Draw inlet and outlet velocity triangles for a Pelton wheel.	**[3M]**
i	What is cavitation in centrifugal pump?	**[2M]**
j	What is NPSH? Explain.	**[3M]**

PART-B (50 MARKS)
<u>SECTION-I</u>

2	Distinguish between:	**[3M]**
	i) standard and local atmospheric pressures,	**[3M]**
	ii) barometric pressure and absolute pressure and	**[4M]**
	iii) absolute pressure and gauge pressure.	

OR

3	A U- tube is made up of two capillaries of bores 1.2 mm and 2.4 mm respectively. The tube is held vertical and partially filled with liquid of surface tension 0.06 N/m and zero contact angle. If the estimated difference in the level of two menisci is 15 mm. Determine the mass density of the liquid.	**[10M]**

<u>SECTION-II</u>

4	a) Derive Bermoullis equation from Euler's equation.	**[5M]**
	b) A 22cm diameter pipe carries water under a head of 10 metres with a velocity of 7m/s. If the axis of the pipe turns through 45°, find the magnitude and direction of the resultant force at the bend.	**[5M]**

OR

5	Water is flowing through a pipe having diameters 600 mm and 400 mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is	**[10M]**

350 kN/m^2 and the pressure at the upper end is 100 kN/m^2. Determine the difference in datum head if the rate of flow through the pipe is 60 litres/s.

SECTION-III

6. How do you estimate the impact of a jet striking a moving normal plate in the direction of the jet. **[10M]**

OR

7. A jet of water of diameter 100 mm strikes a curved plate at its center with a velocity of 15 m/s. The curved plate is moving with a velocity of 7 m/s in the direction of the jet. The jet is deflected through an angle of 150° Assuming the plate smooth find: (i) Force exerted on the plate in the direction of the jet, (ii) power of the jet. **[10M]**

SECTION-IV

8. Explain the concepts of velocity triangles by considering a jet striking an unsymmetrical moving curved vane tangentially at one of the tips. **[10M]**

OR

9. Design a single jet Pelton wheel to develop a power of 500 KW under a head of 160 m while running at 300 rpm. Assume Ku = 0.45, Cv = 0.985 and overall efficiency = 80%. Calculate the jet diameter, wheel diameter and number of buckets. Give a fully dimensional sketch of a bucket **[10M]**

SECTION-V

10. a) List out necessary precautions against cavitation in centrifugal pumps. **[5M]**
    b) Explain the working of reciprocating pump with neat sketch. **[5M]**

OR

11. a) Draw and discuss characteristic curves of a pump. **[5M]**
    b) A double acting reciprocating pump having piston area 0.1m has a stroke of 0.30m long. The pump is discharging 2.4 m^3 of water per minute at 45 rpm through a height of 10 m. Find the slip of the pump and power required to drive the pump. **[5M]**

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, December 2022
Machine Drawing
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carries 30 marks. Answer any two in Part A.
Part B consists of one question which carries 45 marks

***

Part- A (30 Marks)
Answer any two of the following (15*2=30)

Q. No. 1. Draw two views of a single riveted butt joint with a double cover plate for a plate
thickness of 18 mm.

Q. No. 2. Draw the front, top and left hand side view of a 30mm diameter square headed bolt

Q. No. 3. Draw the sectional front, top and side view of a socket and spigot joint to join two
pipes of diameter 35mm each

Part-B (45 Marks)

Q. No.4   The details of all parts of the screw jack are shown in the following Figure. Assemble
the parts and draw
a) half sectional view from the front,
b) the view from above
c) the view from side.
All dimensions are in mm.   (1*45=45M)
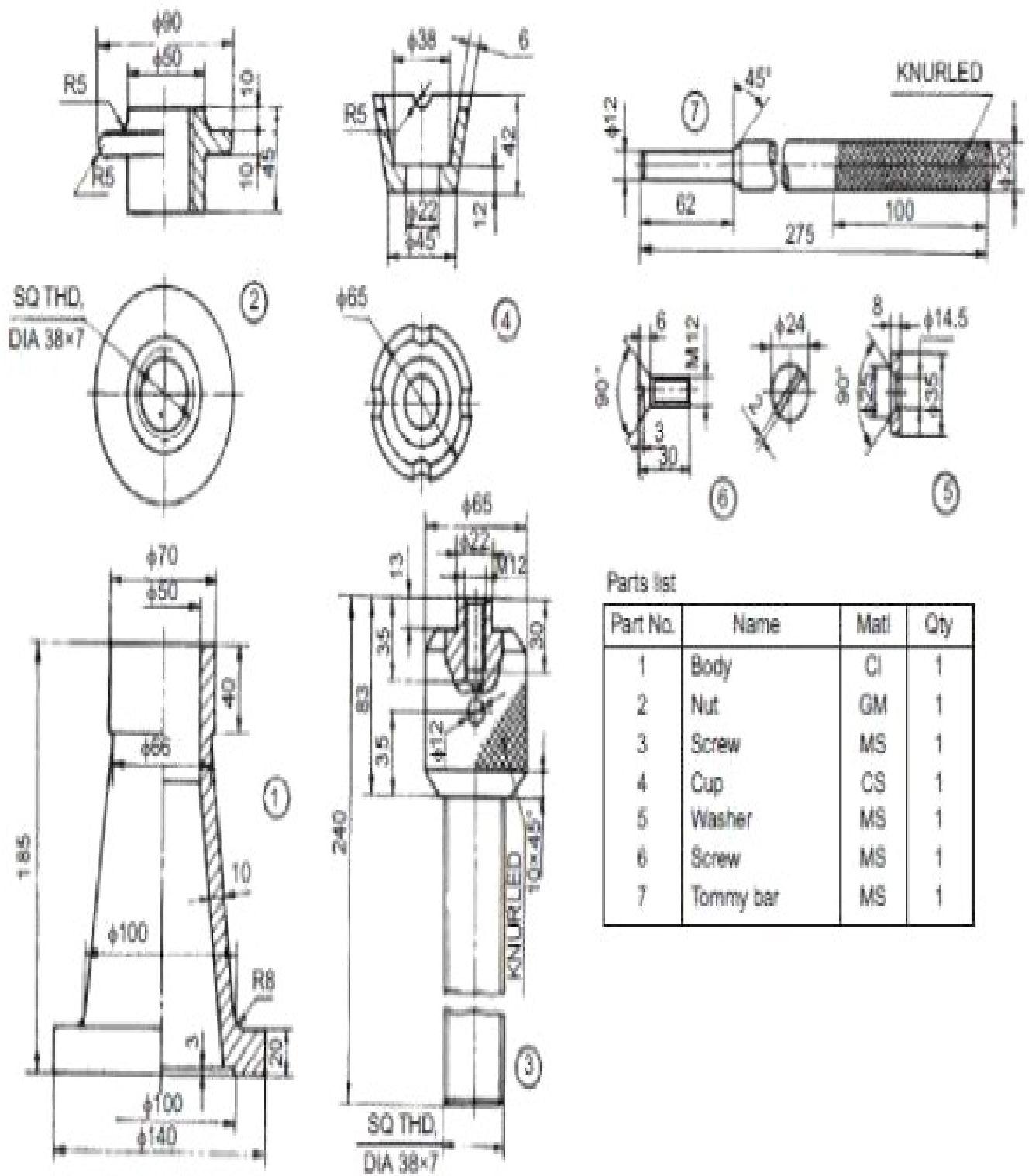
Parts list

Part No.	Name	Matl	Qty
1	Body	CI	1
2	Nut	GM	1
3	Screw	MS	1
4	Cup	CS	1
5	Washer	MS	1
6	Screw	MS	1
7	Tommy bar	MS	1

Fig: The details of all parts of the screw jack

***

Code No: **R15A0308**
R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH────GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, February 2021
Thermal Engineering
(ME)

Roll No										

Time: 2 hours 30 min   **Max. Marks: 75**

Answer Any **Five** Questions
All Questions carries equal marks.
****

1	Explain the working of simple carburetor with neat sketch	**[15M]**
2	Discuss about Exhaust Blowdown and Loss due to Gas exchange process.	**[15M]**
3	Explain in detail the process of pre-ignition and knocking in SI engine with the help of P-Ө diagram	**[15M]**
4	Explain with figures the various types of combustion chambers used in CI engines.	**[15M]**
5	A single cylinder engine running at 1800 rpm develops a torque of 8 Nm. The indicated power of the engine is 1.8 kW. Find the loss due to friction power as the percentage of brake power	**[15M]**
6	Determine the process of evaluating indicated power of an IC engine.	**[15M]**
7	Explain the working of Root's blower with a neat sketch and derive the expression its efficiency	**[15M]**
8	Draw the velocity diagrams of an axial-flow compressor? Explain the various parameters?	**[15M]**

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Code No: **R15A0307**

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH___GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, February 2021
Dynamics of Machinery
(ME)

Roll No										

Time: 2 hours 30 min   **Max. Marks: 75**

Answer Any **Five** Questions
All Questions carries equal marks.
***

1   A four wheeled motor car of mass 3000kg as a wheel based 2.5m, track width   **[15M]**
      1.5m and height of Centre of gravity 600mm above the ground level and lies at
      1metre from the front axle. Each wheel has an effective diameter of 0.8m and a
      moment of inertia of 0.8kg-m². The drive shaft, engine flywheel and transmission
      are rotating at 4 times the speed of road wheel, in a clockwise direction when view
      from the front, and is equivalent to a mass of 75kg having a radius of gyration of
      100mm.If the car is taking a right turn of 60m radius at 60km/h, find the load on
      each wheel

2   A racing car weighs 20 kN. It has a wheel base of 2m, track width 1m and height   **[15M]**
      of C.G. 300mm above the ground level and lies midway between the front and
      rear axle. The engine flywheel rotates at 3000 rpm clockwise when viewed from
      the front. The moment of inertia of the flywheel is 4 kg-m² and moment of inertia
      of each wheel is 3kgm². Find the reactions between the wheels and the ground
      when the car takes a curve of 15 m radius towards right at 30 km/hr, taking into
      consideration the gyroscopic and the centrifugal effects. Each wheel radius is
      400mm.

3   a) Derive an expression for maximum efficiency of screw jack.   **[5M]**
      b) A square threaded bolt of root diameter 22.5 mm and pitch of 5 mm is tightened
      by screwing a nut of whose mean diameter of bearing surface is 50 mm. If the   **[10M]**
      coefficient of friction for nut and bolt is 0.1 and for nut and bearing surface is
      0.16. Find the force required at the end of the spanner 500 mm long and the load
      on the bolt is 10 kN.

4   a)Derive the expression for friction torque by using uniform wear theory for a flat   **[5M]**
      collar.
      b)The shaft of a collar thrust bearing rotates at 200 rpm and carries an end thrust   **[10M**
      of 10 tonnes. The outer and the inner diameters of the bearing are 480mm and 280
      mm respectively. If the power lost in friction is not to exceed 8 kW, find the co-
      efficient of friction of lubricant of the bearing.

5   A cone clutch with cone angle 20° is to transmit 7.5 kW at 750 r.p.m. The normal   **[15M]**
      intensity of pressure between the contact faces is not to exceed 0.12 N/mm². The
      coefficient of friction is 0.2. If face width is 1/5 th of mean diameter, find: 1.
      The main dimensions of the clutch, and 2. Axial force required while running.

6   The turning moment diagram for a petrol engine is drawn to a vertical scale of   **[15M]**

1mm=1500 N-m and a horizontal scale of 1mm = 5°. The turning-moment diagram repeats itself after every half revolution of the crankshaft. The areas above and below the mean torque line are 260, -580, 80, -380, 870 and -250mm². The rotating parts have a mass of 60 Kg and radius of gyration of 2.5m. If the engine speed is 1600rpm, determine the coefficient of fluctuation of speed

7   (a) Explain the direct and reverse crank method for balancing of radial engines.   **[5M]**

   (b) The connecting rods of a three-cylinder air compressor are coupled to a single   **[10M**
      crank and the axes are at 120° to one another. Each connecting rod is 180 mm
      long and the stroke is 120 mm. The reciprocating parts have a mass of 1.8kg
      per cylinder. Find the magnitude of the primary and secondary forces when the
      engine runs at 1200 rpm.

8   A porter governor has equal arms each 250mm long and pivoted on the axis of   **[15M]**
      rotation. Each ball has a mass of 5kg and the mass of the central load on the
      sleeve is 25kg. The radius of rotation of the ball is 150mm when the governor
      begins to lift and 200mm when the governor is at maximum speed. Find the range
      of speed, sleeve lift, governor effort and power of the governor in the following
      cases:
      a) When the friction at the sleeve is neglected.
      b) When the friction at the sleeve is equivalent to 10N.
                                          ******

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, February 2021
Fluid Mechanics and Hydraulic Machinery
(ME)

Roll No										

Time: 2 hours 30 min   **Max. Marks: 75**

Answer Any **Five** Questions
All Questions carries equal marks.
***

1.A	Explain how vacuum pressure can be measured with the help of a U-tube manometer.	**[8M]**
B	In a mercury differential manometer the mercury deflection is 20 cm. Find the difference of pressure in 'kpa' if the liquid flowing in the pipe is oil of sp. gr. 0.8.	**[7M]**
2A.	Define and distinguish between:	**[8+7M]**
B.	(i) uniform flow and non- uniform flow (ii) laminar and turbulent flow	
	Define the terms stream lines, path lines, streak lines and stream tube	
3.	What is a Venturimeter? Derive an expression for the discharge through a Venturimeter using line diagram	**[15M]**
4.A	Derive an expression for head loss due to friction.	**[8M]**
B	The rate of flow of water through a horizontal pipe is 0.5 m 3 /sec. The diameter of the pipe is suddenly enlarged from 30 cm to 60 cm. The pressure intensity in the smaller pipe is 1.5kgf/cm2 . Determine loss of head due to sudden enlargement, pressure intensity in the large pipe and power lost due to enlargement.	**[7M]**
5	Draw the layout of hydroelectric power station and explain it in detail	**[15M]**
6	How do you estimate the impact of a jet striking a moving normal plate in the direction of the jet.	**[15M]**
7.A	Sketch the different types of draft tubes? Give the formula for efficiency of it.	**[8M]**
B	Differentiate between Impulse turbine and Reaction turbine.	**[7M]**
8.A	Derive an expression for specific speed of a centrifugal pump.	**[8M]**
B	The cylinder bore diameter of a single acting reciprocating pump is 150 mm and its stroke length is 300 mm. The pump runs at 50 rpm and lifts water through a height of 25m. The delivery pipe is 22 m long and 100mm in diameter. Find the theoretical discharge. If the actual discharge is 4.2 liters/s, find the % Slip	**[7M]**

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, February 2021
Manufacturing Science
(ME)

Roll No										

Time: 2 hours 30 min   **Max. Marks: 75**

Answer Any **Five** Questions
All Questions carries equal marks.
***

1   Explain what is a 'pattern'. Explain the advantages and limitations of plasters over   **[15M]**

plastics as pattern materials.

2   What is gating ratio? What is pressurized and non-pressurized gating system?   **[15M]**

What type of gating ratio should be chosen for Aluminum alloys? For steels?

Why?

3   With the help of a neat diagram explain the friction welding process. What are its   **[15M]**

merits and demerits?

4   List out various welding defects. Discuss their causes and remedies.   **[15M]**

5   List the factors influencing rolling process. Explain the effect of roller diameter   **[15M]**

and metal friction on rolling process.

6   Explain injection moulding process.   **[15M]**

7   Explain forward and backward extrusion process with suitable sketch.   **[15M]**

8   Discuss the defects, causes and remedies of forging defects.   **[15M]**

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH   GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, February 2022
Thermal Engineering
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question From each SECTION and each Question carries 10 marks.
***
PART-A (25 Marks)

1). a	What is a cycle? What is the difference between an ideal and actual cycle?	**[2M]**
b	What are assumptions made in air standard cycles?	**[3M]**
c	What is meant by abnormal combustion?	**[2M]**
d	Write the differences between the SI engine and CI engine.	**[3M]**
e	Define the break power and indicated power.	**[2M]**
f	Explain about anti knock additives.	**[3M]**
g	Write the applications of air compressor.	**[2M]**
h	Why multi stage compression is required? Explain.	**[3M]**
i	Draw the velocity diagram of a centrifugal blower.	**[2M]**
j	Evaluate the necessity of clearance in reciprocating compressors.	**[3M]**

PART-B (50 MARKS)
SECTION-I

2	Why the actual cycle efficiency is much lower than the air standard cycle efficiency? List the major losses in the actual engine	**[10M]**

OR

3	a) Briefly discuss the various factors which affect the ignition timing in SI engine.	**[5M]**
	b) Explain Magneto ignition system with a neat sketch	**[5M]**

SECTION-II

4	Explain the different stages of combustion in SI engine with pressure- crank angle diagram.	**[10M]**

OR

5	What are the types of combustion chambers used in C.I. engines and explain their role in generating turbulence	**[10M]**

SECTION-III

6	a) Develop an expression for the calculation of indicated power of an engine	**[5M]**
	b) Schematically explain the use of the study of heat balance of an engine?	**[5M]**

OR

7	A 4 cylinder, 4 stroke gasoline engine having a bore of 80 mm and stroke of 90 mm has a compression ratio of 8. The relative efficiency is 65% when indicated fuel specific consumption (ifsc) is 200 g/KWh. Estimate: i) Calorific value of fuel	**[10M]**

ii) Corresponding fuel consumption, given that indicated mean effective pressure (imep) is 7.5 bar and speed is 2000 ORPRM .

SECTION-IV

8   How will you classify the compressors? Differentiate between the working   **[10M]**
     principles of positive displacement and dynamic compressors.

OR

9   A two stage air compressor takes in air at a pressure of 1.013bar and temperature   **[10M]**
     16^0C. The inter-cooling is perfect. The delivery pressure is 19 bar. Find the
     condition for minimum work of compression and also the work input required to
     compress 1kg of air. Take n=1.3

SECTION-V

10   a) Derive the expression for the efficiency of an centrifugal flow compressor with   **[8M]**
     velocity diagram.
     b) What is meant by degree of reaction.   **[2M]**

OR

11   An axial flow compressor draws air at 20^0C and delivers it at 50^0C. Assuming   **[10M]**
     50% reaction, calculate the velocity of flow, if blade velocity is 100 m/s, work
     factor is 0.85. Take Cp=1kJ/kg.K. Assume α=100, and β=400, Find the number of
     stages.

******

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH____GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, February 2022
Dynamics of Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
   Part A is compulsory which carriers 25 marks and Answer all questions.
   Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
   Choosing ONE Question From each SECTION and each Question carries 10 marks.
***
PART-A (25 Marks)

1). a   What is the effect of gyroscopic couple on ships and explain   **[2M]**
    b   What do you understand by spin, precession and gyroscopic planes? Explain briefl   **[3M]**

    c   Define the following terms: Friction, Limiting force of friction, co-efficient of   **[2M]**
        friction and angle of friction
    d   What is meant by the expression 'friction circle'?   **[3M]**
    e   Distinguish between brakes and dynamometers.   **[2M]**
    f   Define the terms 'coefficient of fluctuation of energy' and 'coefficient of   **[3M]**
        fluctuation of speed', in the case of flywheels.
    g   Define the terms static balancing and dynamic balance   **[2M]**
    h   Write about the terms "free vibrations", "forced vibrations" and damped   **[3M]**
        vibrations.
    i   Define the term "sensitiveness" in governors.   **[2M]**
    j   Explain the terms isochronous and hunting.   **[3M]**

PART-B (50 MARKS)
SECTION-I

2   A four-wheeled trolley car of total mass 2000 kg running on rails of 1.6 m gauge,   **[10M]**
    rounds a curve of 30 m radius at 54 km/h. The track is banked at 80. The wheels
    have an external diameter of 0.7 m and each pair with axle has a mass of 200 kg.
    The radius of gyration for each pair is 0.3 m. The height of centre of gravity of the
    car above the wheel base is 1 m. Determine, allowing for centrifugal force and
    gyroscopic couple actions, the pressure on each rail.

OR

3   How do the effects of gyroscopic couple and of the centrifugal force make the   **[10M]**
    rider of a two – wheeler to tilt on one side? Derive a relation for the limiting speed
    of the vehicle.

SECTION-II

4   A turnbuckle is used to tighten a wire rope. The threads are right – hand and left –   **[10M]**
    hand on the turnbuckle, and are square in section. The pitch is 6 cm, and the mean
    diameter of the screw is 2 cm. Assuming the coefficient of friction between the
    screw and nut is 0.15, determine the turning moment necessary (a) to tighten the
    wire, (b) to slacken the wire. The wire rope is assumed not to twist.

5   A conical pivot with angle of cone as 100^0 supports a load of 18 KN. The external **[10M]** radius is 2.5 times the internal radius. The shaft rotates at 150 rpm. If the intensity of pressure is to be 300 KN/m2 and coefficient of friction as 0.05, what is the power lost in working against the friction?

SECTION-III

6   The turning moment diagram for a multi-cylinder engine has been drawn to a scale of **[10M]** 1 mm = 325 Nm vertically and 1 mm = 3^0 horizontally. The areas above and below the mean torque line are -26, +378, -256, +306, -302, +244, -380, +261 and -225 mm². The engine is running at a mean speed of 600 r.p.m. The total fluctuation of speed is not to exceed +1.8% of the mean speed. If the radius of flywheel is 0.7 m, find the mass of the flywheel.

OR

7   Explain turning moment diagram for a multi cylinder engine with a neat sketch.   **[10M]**

SECTION-IV

8   A shaft carries four rotating masses A, B, C and D which are completely balanced. **[10M]** The masses B, C and D are 50 kg, 80 kg and 70 kg respectively. The masses C and D make angles of 90^0 and 195^0 respectively with mass B in the same sense. The masses A, B, C and D are concentrated at radius 75 mm, 100mm, 50 mm and 90 mm respectively. The plane of rotation of masses B and C are 250 mm apart. Determine: (a) the mass A and its angular position (b) the position of planes of A and D.

OR

9   Find the frequency of transverse vibrations of a shaft which is simply supported at **[10M]** the ends and is of 40 mm in diameter. The length of the shaft is 5 m. The shaft carries three point loads of masses 15 kg, 35 kg and 22.5 kg at 1 m, 2 m and 3.4 m respectively from the left support. The Young's modulus for the material of the shaft is 200 GN/m2. The weight of the shaft is 18.394 N per meter length.

SECTION-V

10   Calculate the minimum speed, maximum speed and range of the speed of a Porter **[10M]** governor, which has equal arms each 200 mm long and pivoted on the axis of rotation. The mass of each ball is 4 kg and the central mass on the sleeve is 20 kg. The radius of rotation of the ball is 100 mm when the governor begins to lift and 130 mm when the governor is at maximum speed.

OR

11   The upper and lower ends of the links of a Proell governor are pivoted on the axis **[10M]** of rotation of the governor. Each of the upper and lower links are each 25 cm long between centers, and the lower links carry extension arms each 10 cm long and parallel to the governor axis when the radius of the ball path is 15 cm. Determine the equilibrium speed of the governor for this configuration, if each ball weighs 60 N and the central load weighs 390 N.

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Code No: **R15A0309**

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, February 2022
Fluid Mechanics and Hydraulic Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question From each SECTION and each Question carries 10 marks.
***
PART-A (25 Marks)

1). a	Explain what is vapour pressure.	**[2M]**
b	What is atmospheric pressure, gauge pressure and absolute pressure? Write relationship between them.	**[3M]**
c	Distinguish Eularian and Lagrangian method of representing fluid motion	**[2M]**
d	What is meant by laminar and turbulent boundary layer?	**[3M]**
e	What do you mean by rotational and irrotational flows?	**[2M]**
f	What is meant by thickness of boundary layer?	**[3M]**
g	Summarize the classification of turbines.	**[2M]**
h	What is difference between radial flow and axial flow in turbo machinery?	**[3M]**
i	Explain about characteristics curves of pumps.	**[2M]**
j	Differentiate positive displacement and rotodynamic pumps	**[3M]**

PART-B (50 MARKS)
SECTION-I

2   a) The relative density of a fluid is 1.26 and its dynamic viscosity is 1.5 Pa.s.   **[5M]**
Calculate its: i) Specific Weight ii) Kinematic viscosity.

b) A 90 mm diameter shaft rotates at 1200 rpm in a 100 mm long journal bearing   **[5M]**
of 90.5 mm internal diameter. The annular space in the bearing filled with oil
having a dynamic viscosity of 0.12 Pa.s. Estimate the power dissipated as heat.

OR

3   Explain with neat sketch of the following:
i) Simple manometers   **[3M]**
ii) U tube manometers   **[4M]**
iii) Single column manometers.   **[3M]**

SECTION-II

4   State Bernoulli's theorem for steady flow of an incompressible fluid. Derive an   **[10M]**
expression for Bernoulli's theorem from first principle and state the assumptions
made for such a Derivation.

OR

5   a) Water is flowing through a pipe having diameters 600 mm and 400 mm at the   **[5M]**
bottom and upper end respectively. The intensity of pressure at the bottom end is
350 kN/m^2 and the pressure at the upper end is 100 kN/m^2. Determine the
difference in datum head if the rate of flow through the pipe is 60 litres/s.

[5M]

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, February 2022
Machine Drawing
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B.
       Part A is compulsory which carries 30 marks. Answer any two in Part A.
       Part B consists of I section which carries 45 marks
***
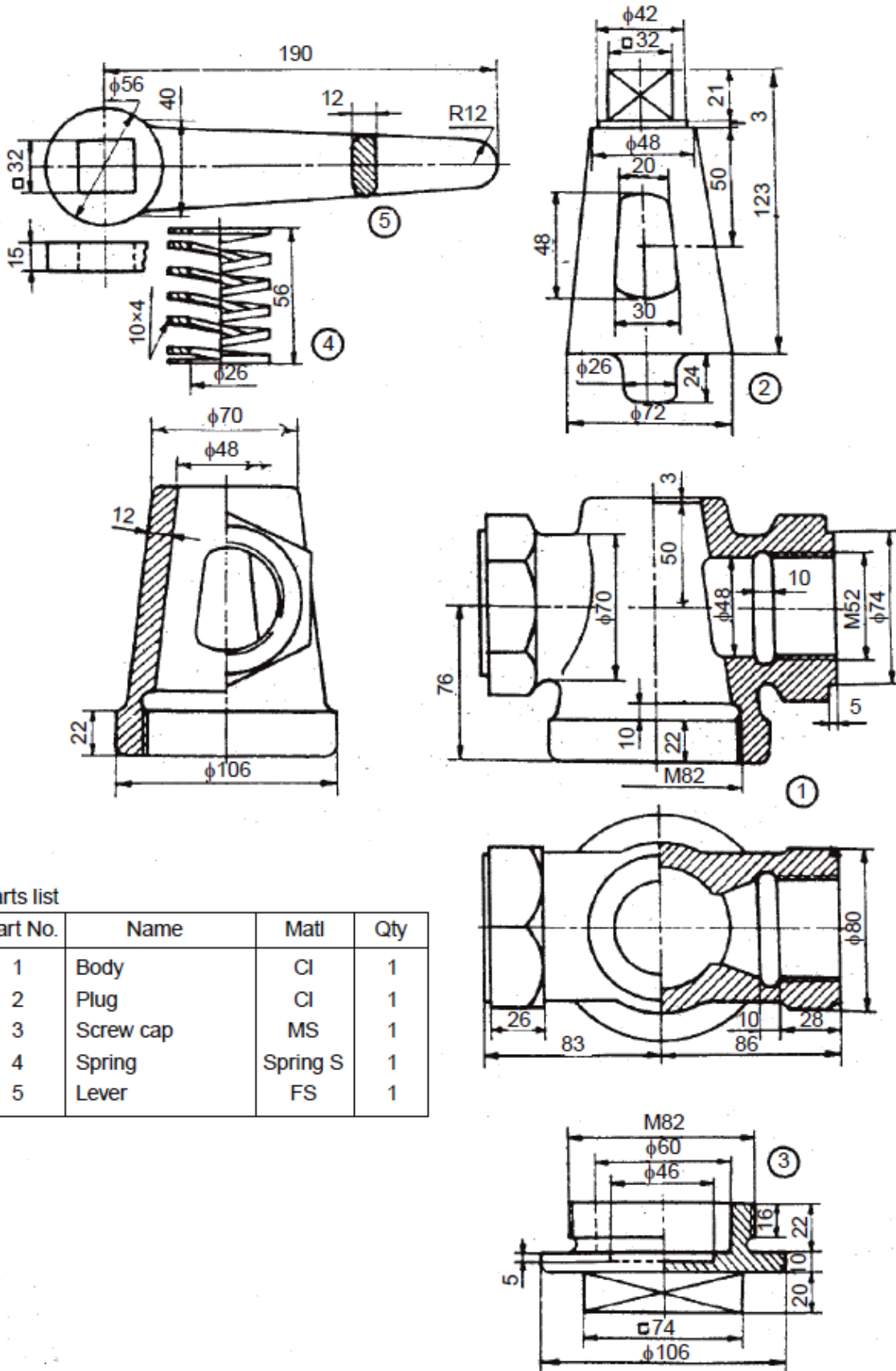### Part- A (30 Marks)
Answer any two of the following (15*2=30)
Q. No. 1. Sketch the conventional representation of at least five different thread forms
Q. No. 2. Draw three views of a hexagonal and square nut for 20 mm bolt diameter
Q. No. 3. Draw the sectional front, top and side view of a knuckle joint to join two pipes of
       diameter 30mm each.

Part-B (45 Marks)
Q. No.4 The details of an air cock are shown in the following Figure. Assemble the parts and
       draw
       a) half sectional view from the front,
       b) view from the right and
       c) the view from above.
        All dimensions are in mm.

Parts list

Part No.	Name	Matl	Qty
1	Body	CI	1
2	Plug	CI	1
3	Screw cap	MS	1
4	Spring	Spring S	1
5	Lever	FS	1

R15

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.
***
PART-A (25 Marks)

1).	a	What is meant by gyroscopic couple	**[2M]**
	b	Define angular velocity of precession	**[3M]**
	c	What is dynamic friction?	**[2M]**
	d	State the laws of static friction	**[3M]**
	e	What is the condition for self-locking of a brake and self-energized brake	**[2M]**
	f	What do you mean by term turning moment diagram	**[3M]**
	g	What do you understand by torsionally equivalent shaft	**[2M]**
	h	Why partial balancing of primary force is necessary	**[3M]**
	i	Define the terms governor effort and governor power	**[2M]**
	j	Explain the term hunting in connection to governor	**[3M]**

PART-B (50 MARKS)
SECTION-I

2   An aircraft consists of a propeller and engine .The mass moment of inertia of **[10M]** propeller and engine is 100kgm^2. The engine rotates at 2500rpm in the clockwise direction if viewed from the front of the aircraft. The aircraft completes half circle of radius of 1000m while flying at 500km/hr. Determine the gyroscopic couple on the aircraft and state its effect

OR

3   A ship has a propeller of mass moment of inertia 2000kgm^2 .The propeller rotates **[10M]** at a speed of 360rpm in clockwise sense looking from the stern. Determine i) gyroscopic couple and its effect when ship moves at 30km/hr and steers to the left at a radius of 200m ii) maximum gyroscopic couple and its effect when ship pitches and moving up having amplitude 10^0 and time period 20 seconds. The motion occurs with SHM

SECTION-II

4   Derive from the first principles, the expression for the torque due to friction of a **[10M]** conical pivot assuming i) uniform pressure ii) uniform wear.

5 In a thrust bearing the external and internal radii of the contact surfaces are **[10M]**
210mm and 160mm respectively. The total axial load is 60kN and co-efficient of
friction 0.05. The shaft is rotating at 380rpm. Intensity of pressure is not to exceed
$350kN/m^2$. Calculate i) power lost in overcoming the friction ii) number of collars
required for the thrust bearing

SECTION-III

6 A power of 60kW is transmitted by a multi-plate clutch at 1500 rpm. Axial **[10M]**
intensity of pressure is not to exceed $0.15 N/mm^2$ .The coefficient of friction for
the friction surfaces is 0.15. The external radius of friction surface is 120mm. Also
the external radius is equal to 1.25 times the internal radius. Find the number of
plates needed to transmit the required power. Assume the uniform wear

OR

7 The areas above and below the mean torque line for an I.C engine are -25,+200, **[10M]**
$-100,+150,-300,+150,-75mm^2$ taken in order. The scale for the turning moment
diagram is 1mm vertical scale = 10Nm and 1mm horizontal scale = 1.5^0 .The mass
of the rotating parts are 45 kg with the radius of gyration of 150mm. If the engine
speed is 1500 rpm. Find the coefficient of fluctuation of speed.

SECTION-IV

8 The moments of inertia of three rotors A, B, C are respectively 0.3, 0.6 and 0.18 **[10M]**
kgm^2 .The distance between A and B is 1.5 m and between B and C is 1 m. The
shaft is 70mm in diameter and the modulus of rigidity for the shaft material is
$84x10^9 N/mm^2$ .Find the i) frequencies of torsional vibrations ii) positions of nodes
iii) amplitude of vibrations

OR

9 Four masses are attached to a shaft at planes A, B C and D at equal radii of 1cm. **[10M]**
The distance of the planes B, C and D from A are 40cm,50cm and 120cm
respectively. The masses at A, B and C are 60kg, 45kg and 70kg respectively. If
the system is in complete balance, determine the mass at D and the position of
masses B,C and D with respect to A.

SECTION-V

10 A porter governor has all four arms 300mm long. The upper arms are pivoted on **[10M]**
the axis of rotation and lower arms are attached to the sleeve at a distance of
3.5mm from the axis. The mass of each ball is 7 kg and the mass on the sleeve is
54 kg. If the extreme radii of rotation of the balls are 200mm and 250mm, find the
range of speed of the governor.

OR

11 Calculate the minimum speed of a proell governor, which has equal arms each **[10M]**
200mm and pivoted on the axis of rotation. The mass of each ball is 4 kg and the
central mass on the sleeve is 20 kg. The extension arms of the lower links are each
60mm long and parallel to the axis when the minimum radius of the ball is 100mm

***

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, January 2024
Fluid Mechanics and Hydraulic Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.
***
PART-A (25 Marks)

1).	a	Define viscosity and kinematic viscosity	**[2M]**
	b	Prove that for a liquid droplet $P = 4\sigma / d$.	**[3M]**
	c	What do you understand by total pressure and center of pressure	**[2M]**
	d	Derive an expression for continuity equation in pipe flow	**[3M]**
	e	How the force can be calculate on plate when jet hits.	**[2M]**
	f	Write down the major elements of Hydro Electric power plant.	**[3M]**
	g	Define hydraulic efficiency in radial flow reaction turbine	**[2M]**
	h	What are the four major classification of Hydraulic turbines	**[3M]**
	i	What are the effects of cavitation in centrifugal pumps.	**[2M]**
	j	Define coefficient of discharge in Reciprocating pumps with equation.	**[3M]**

PART-B (50 MARKS)
SECTION-I

2	Derive and expression for surface tension on a liquid jet Two horizontal plates are placed 1.25 cm apart, the space between them being filled with oil of visocity 14 poises. Calculate the shear stress in oil if upper plate is moved with a velocity of 2.5m/s.	**[10M]**

OR

3	A circular plate 3.0 m diameter is immersed in water in such a way that their greatest and least depths below the free surface are 4m and 1.5m respectively. Determine the total pressure on one face of the plate and position of the centre of pressure.	**[10M]**

SECTION-II

4	An orifice meter with orifice diameter 10cm is inserted in a pipe of 20cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter gives readings of 19.62 N/cm^2 and 9.81N/cm^2 respectively. Co-efficient of discharge for the orifice meter id given as 0.6. find the discharge of water through pipe.	**[10M]**

OR

5	An oil of specific gravity 0.7 is flowing through a pipe of diameter 300 mm at the	**[10M]**

rate of 500 lit/sec. determine the loss of head due to friction and power required to maintain the flow for a length of 1000m. take $v = 0.29$ stokes.

SECTION-III

6 Derive an expression for force exerted by a jet of water on an unsymmetrical moving curved plate when jet strikes tangentially at one of the tips. **[10M]**

OR

7 A jet of water moving at 12 m/s impinges on vane shaped to deflect the jet through 120^0 when stationary. If the vane is moving at 5m/s. find the angle of the jet so that there is no shock at inlet. What is the absolute velocity of the jet at exit in magnitude and direction and the work done per second per unit weight of water striking per second? Assume that the vane is smooth. **[10M]**

SECTION-IV

8 A kaplan turbine runner is to be designed to develop 9100 kW. The net available head is 5.6m. If the speed ratio = 2.09, flow ratio = 0.68, overall efficiency = 86% and the diameter of the boss is 1/3 the diameter of the runner. Find the diameter of the runner, its speed and the specific speed of the turbine. **[10M]**

OR

9 a. What is the function of draft tube? **[5M]**
   b. Write the differences between impulse and reaction turbine. **[5M]**

SECTION-V

10 The internal and external diameters of the impeller of a centrifugal pump are 200mm and 400mm respectively. The pump is running at 1200 rpm. The vane angles of the impeller at inlet and outlet are 20^0 and 30^0 respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water. **[10M]**

OR

11 a. What is an air vessel? Describe the function of the air vessel for reciprocating pump. **[5M]**
    b. A double acting reciprocating pump, running at 50 r.p.m. is discharging 900 lit of water per minute. The pump has stroke of 400mm. The diameter of the piston is 250mm. The delivery and suction heads are 25m and 4m respectively. Find the slip of the pump and power required to drive the pump. **[5M]**

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Code No: **R15A0308**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, January 2024
Thermal Engineering
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,
Choosing ONE Question from each SECTION and each Question carries 10 marks.

***
PART-A (25 Marks)

1). a	What is time loss factor in actual cycles	[2M]
b	Distinguish between SI & CI engine	[3M]
c	What is IC engine?	[2M]
d	What do you mean be Scavenging in IC Engine	[3M]
e	An engine at full load delivers 200kW brake power. It requires 25kW to rotate it without fuel at the same speed. The mechanical efficiency at half load is	[2M]
f	A spark ignition engine has a compression ratio of 8 and the volume before compression is 0.9 m^3/kg. Net heat interaction per cycle is 1575kJ/kg. what is the mean effective pressure?	[3M]
g	How is air compressors classified?	[2M]
h	What is meant by FAD (Free Air Delivery)?	[3M]
i	List out the losses in a centrifugal compressor.	[2M]
j	Define the terms i) slip factor ii) Power input factor	[3M]

PART-B (50 MARKS)
SECTION-I

2   Why the actual cycle efficiency is much lower than the air standard efficiency? [10M]
List the major losses in an actual engine.

OR

3   What is carburetion? Explain the various factors affecting the process of [10M]
carburetion

SECTION-II

4   What is ignition lag in SI engines? Discuss the effect of various engine variables [10M]
on ignition lag of SI engine.

OR

5   What is swirl in CI engine? Explain different methods of swirl generation. State [10M]
advantages and disadvantages of compression swirl.

SECTION-III

6   What is a trial (testing) of I.C. engines? Write the importance of the following [10M]
performance parameters in connection with I.C. engines:

a. Mechanical efficiency b. Thermal efficiency c. Specific fuel consumption
d. Volumetric efficiency e. BP, IP, FP.

<div align="center">OR</div>

7   The following readings were taken during a test on a single-cylinder, four-stroke   [10M]
    cycle oil engine : Cylinder bore, 20 cm; Stroke length, 35 cm; Indicated mean
    effective pressure, 700 kPa; Engine speed, 4 r.p.s; Fuel oil used per hour, 3.5 kg;
    Calorific value of oil, 46,000 kJ/kg; Brake torque,. 450 N.m; Calculate the
    mechanical and indicated thermal efficiencies and brake power fuel consumption
    in kg per kW-hr.

<div align="center">**SECTION-IV**</div>

8   Derive an expression for intermediate pressure for two stage compression with   [10M]
    perfect intercooling. State the assumptions.

<div align="center">OR</div>

9   Compare reciprocating compressor with rotary compressor   [10M]

<div align="center">**SECTION-V**</div>

10 A centrifugal compressor used as a supercharger for aero-engine handles   [10M]
    150kg/min of air. The suction pressure and temperature are 1 bar and 290K. The
    suction velocity is 80m/s. After compression in the impeller the conditions are 1.5
    bar and 345Kand 220m/s. Calculate i) Isentropic efficiency ii) power required to
    drive the compressor. iii) the overall efficiency of the unit. It may assume that KE
    of air gained in the impeller is entirely converted into pressure in the diffuser

<div align="center">OR</div>

11 Explain the working of an axial flow compressor with a neat sketch?   [10M]

<div align="center">***</div>

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECH̲̲̲̲GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, June 2022
Thermal Engineering
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Answer Any **Five** Questions
All Questions carries equal marks.
******

1	a) What is the purpose of venture in SI engine fuel supply system?	**[7M]**
	b) Draw the line diagram and explain typical fuel feed system for a CI engine.	**[8M]**
2	a) Why the actual cycle efficiency is much lower than the air standard cycle efficiency? List the major losses in the actual engine.	**[7M]**
	b) Discuss the difference between theoretical and actual valve timing diagram of a diesel engine.	**[8M]**
3	a) Briefly explain the stages of combustion in SI engines elaborating the flame front propagation.	**[7M]**
	b) Explain the effect of various engine variables on SI engine knock	**[8M]**
4	a) Explain, how do the injection timing and the fuel quality affect the engine knock?	**[7M]**
	b) Explain the various factors that influence the flame speed.	**[8M]**
5	A six cylinder, 4 stroke SI engine having a piston displacement of 700cm3 per cylinder developed 78kW at 3200r.p.m. and consumed 27 kg of petrol per hour. The calorific value of petrol is 44 MJ/kg. Estimate: i) The volumetric efficiency of the engine if the air-fuel ratio is 12 and intake air is at 0.9 bar, 32^0C ii) The brake thermal efficiency iii) The brake torque For air, R=0.287kJ/kg K.	**[15M]**
6	Determine the process of evaluating indicated power of an IC engine.	**[15M]**
7	The free air delivered by a single stage, double acting air compressor measured at 1.013bar and 15^0C is 14m3/min. The pressure and temperature in the cylinder during induction are 0.95bar and 32^0C. The delivery pressure is 7bar and the index of compression and expansion, n=1.3. If the clearance volume is 5% of the swept volume, calculate the indicated power and volumetric efficiency.	**[15M]**
8	How will you classify the compressors? Differentiate between the working principles of positive displacement and dynamic compressors.	**[15M]**

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, June 2022
Dynamics of Machinery
(ME)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Answer Any **Five** Questions
All Questions carries equal marks.
***

1	An aeroplane makes a half circle of 100 m radius towards left when flying at 400 kmph. The engine and propeller of plane weigh 500 kg, and have a radius of gyration of 30 cm. The engine rotates at 3000 rpm *ccw*, when viewed from the front end. Find the gyroscopic couple.	**[15M]**
2	A motor cycle along with the rider weighs 2 KN, the C.G. of the machine and rider combined being 60 cm above the ground, with the machine in vertical position. The M.I. of each road wheel is 1030 N/mm^2, and the rolling diameter is 60 cm. The engine rotates at 6 times of the road wheels and in the same sense. The M.I. of rotating parts of the engine is 165 N/mm2. Determine the angle of heel necessary if the unit is speeding at 62.5 km/h round a curve of 30.4 m.	**[15M]**
3	A thrust bearing has contact surfaces of 40 cm and 30 cm external and internal diameters respectively. Calculate the number of collars required for an end thrust of 16 tonnes. The coefficient of friction is 0.04 and the maximum intensity of allowable pressure is 0.35 MPa. What is the HP lost in friction at a speed of 120 rpm	**[15M]**
4	Sketch an internal expanding shoe brake and derive the expression for friction torque of such a brake.	**[15M]**
5	A power of 100 kW is transmitted at 3000 rpm by a multiple disc friction clutch. The plates are having friction surface with a coefficient of friction 0.07, and the axial intensity of pressure is not to exceed 1.5 bar. External radius is 1.25 times the internal radius, and the external radius is 12.5 cm. Determine the number of plates needed to transmit the required torque. Assume uniform wear.	**[15M]**
6	Explain with an neat sketch Proney and Rope break dynamo meters.	**[15M]**
7	A four crank engine has the two outer cranks set at 120^0 to each other, and their reciprocating masses are each 400 kg. The distance between the planes of rotation of adjacent cranks are 450 mm, 750 mm and 600 mm. If the engine is to be in complete primary balance, find the reciprocating mass and the relative angular position for each of the inner cranks. If the length of each crank is 300 mm, the length of each connecting rod is 1.2 m and the speed of rotation is 240 r.p.m., what is the maximum secondary unbalanced force?	**[15M]**
8	Calculate the minimum speed, maximum speed and range of the speed of a Porter governor, which has equal arms each 150 mm long and pivoted on the axis of rotation. The mass of each ball is 4 kg and the central mass on the sleeve is 20 kg. The radius of rotation of the ball is 80 mm when the governor begins to lift and 120 mm when the governor is lowered .	**[15M]**

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MALLA REDDY COLLEGE OF ENGINEERING & TECH____GY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, June 2022
Fluid Mechanics and Hydraulic Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Answer Any **Five** Questions
All Questions carries equal marks.
***

1   Explain the working of a Bourdon pressure gauge with a neat sketch.   **[15M]**

2   An open tank contains water up to a depth of 1.5 m and above it an oil of sp.gr.0.8   **[15M]**
    for a depth of 2 m. Find the pressure intensity:
    i) at the interface of the two liquids, and
    ii) at the bottom of the tank.

3   Derive continuity equation for 3-D flow.   **[15M]**

4   The water is flowing through a pipe having diameters 20cm and 15 cm at sections   **[15M]**
    1 and 2 respectively. The rate of flow through pipe is 40 litres/s. The section 1 is 9
    m above datum line and section 2 is 5 m above the datum. If the pressure at
    section 1 is 32.40 N/cm^2, find the intensity of pressure at section 2.

5   How do you estimate the impact of a jet striking a moving normal plate in the   **[15M]**
    direction of the jet.

6   A jet of water of diameter 150 mm strikes a curved plate at its center with a   **[15M]**
    velocity of 15 m/s. The curved plate is moving with a velocity of 7 m/s in the
    direction of the jet. The jet is deflected through an angle of 150° Assuming the
    plate smooth find: (i) Force exerted on the plate in the direction of the jet, (ii)
    power of the jet.

7   A Kaplan turbine works under a head of 60m at a speed of 145rpm utilizing   **[15M]**
    175m^3/s of water. Diameter of runner and hub are 5.60m & 3.20m. Turbine
    develops 82500 kW. Find i) flow ratio ii) speed ratio iii) overall efficiency iv)
    specific speed.

8   a) Compare Reciprocating pump with Centrifugal pump.   **[8M]**
    b) The internal and external diameters of the impeller of a centrifugal pump are   **[7M]**
    200 mm and 400 mm respectively. The pump is running at 1200 r.p.m. The vane
    angles of the impeller at inlet and outlet are 20^0 and 30^0 respectively. The water
    enters the impeller radically and velocity of flow is constant. Determine the work
    done by the impeller per unit weight of water.

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, June 2022
Industrial Engineering
(ME)

Roll No | | | | | | | | | | |

Time: 3 hours   **Max. Marks: 75**

Answer Any **Five** Questions
All Questions carries equal marks.
***

1. a) What is the significance of Hawthrone experiments for management?   **[7M]**
    b) Explain the Maslow's theory of hierarchy of human needs.   **[8M]**

2. Discuss about matrix organization and its limitations.   **[15M]**

3. Write and explain the principles and types of plant layout?   **[15M]**

4. a) Discuss the various allowances which are taken into account while calculating standard time.   **[7M]**
    b) The total observed time for an operation i.e assembling of an switch is 3.0 minutes. If the rating is 120%, find normal time. If total allowances allowed are 10% for that job, determine the standard time.   **[8M]**

5. a) Explain the steps involved in inventory control.   **[7M]**
    b) Discuss various stages involved in stores management. How quality of product does is safe guarded by stores management?   **[8M]**

6. a) Describe the importance of Total Quality Management.   **[7M]**
    b) Write short notes on ISO 9000 series standards.   **[8M]**

7. Define PERT and discuss its features, advantages, limitations and steps involved in this technique.   **[15M]**

8. a) What are the objectives of merit rating? Explain.   **[7M]**
    b) Differentiate between selling and marketing. Explain the modern concept of marketing.   **[8M]**

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Code No: R15A0311

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, June 2022
Manufacturing Science
(ME)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Answer Any **Five** Questions
All Questions carries equal marks.
****

1.a. State and explain the types of patterns used in moulding. **[10M**]
   b. Write about casting defects. **[5M]**

2.a) What are the materials that are generally used for making patterns? Explain the
      reasons for their choice. **[7M**]
 b) What are the common allowances provided on patterns? Why and how they are
     provided? Give suitable examples. **[8M]**

3. Explain with neat sketches TIG and MIG welding processes with applications. **[15M**]

4. a) Why do we do the edge preparation before welding? What are the different ways of
       Edge   preparation techniques? **[7M]**
    b) What is brazing? Describe briefly two methods of brazing. **[8M**]

5. What is plastic deformation? What are the advantages and limitations of hot working
     over cold working? **[15M]**

6. Explain briefly with neat sketches two commercially used methods of blow moulding for
 blowing of plastic bottles and mention their specific advantages**. [15M]**

7. What is metal spinning? Illustrate the products made by this process and the advantages of the
     process over drawing. **[15M]**

8. Explain the different stages in drop forging in making a connecting rod. **[15M]**

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, June 2022
Machine Drawing
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

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Note: This question paper contains two parts A and B.
Part A is compulsory which carries 30 marks. Answer any two in Part A.
Part B consists of I section which carries 45 marks

Part- A (30 Marks)
Answer any two of the following (15*2=30)
Q. No. 1. Sketch the various methods of fitting a feather key in position.
Q. No. 2. Sketch the conventional representation of atleast four different thread forms.
Q. No. 3. Draw the sectional front, top and side view of a knuckle joint to join two pipes of
        diameter 30mm each.

Part-B (45 Marks)

Q. No.4   The details of an air cock are shown in figure. Assemble the parts and draw:
     a) half sectional view from the front
     b) view from the right and
     c) the view from above.
     All the dimensions are in mm
      .
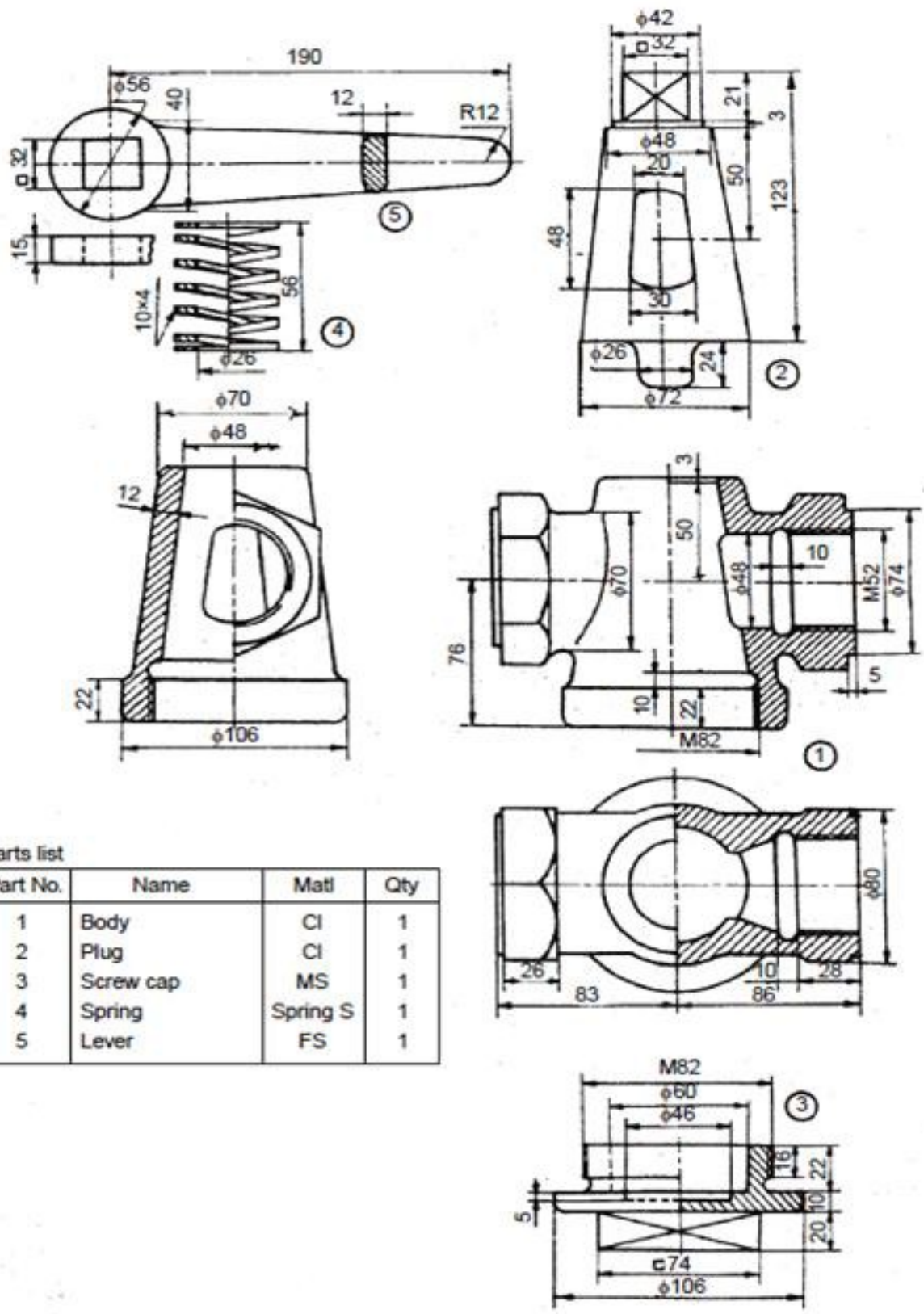
Parts list

Part No.	Name	Matl	Qty
1	Body	CI	1
2	Plug	CI	1
3	Screw cap	MS	1
4	Spring	Spring S	1
5	Lever	FS	1

Fig: The details of an air cock

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, Nov/Dec 2018
Thermal Engineering
(ME)

Roll No										

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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PART – A **(25 Marks)**

1. (a) what are the assumptions made in air standard cycle analysis [2M]
   (b) Briefly explain about exhaust blowdown with the help of P-V diagram [3M]
   (c) Explain the phenomenon of detonation in S.I engine [2M]
   (d) What is the basic difference in the combustion process of S.I and C.I engines [3M]
   (e) Explain about composition of exhaust gas. [2M]
   (f) Define mean effective pressure and distinguish between BMEP and IMEP [3M]
   (g) Write the advantages of roots compressor over vane compressor [2M]
   (h) State the conditions which lower the volumetric efficiency of reciprocating air compressor [3]
   (i) Define slip factor [2M]
   (j) What are the advantages of axial flow compressors over centrifugal compressors [3M]

PART –B **(50 Marks)**
SECTION – I
2. A). Describe the working of a modern carberettor with a neat sketch. [5M]
   B). Explain the working of battery ignition system with neat sketch. [5M]

(OR)

3. A).Briefly discuss the following   [3M+4M+3M]
   I.   Time loss factor
   II.   Heat loss factor
   III.   Loss due to gas exchange

SECTION – II
4. A). explain the various factors that influence the flame speed [4M]
   B). what are the various types of combustion chambers used in S.I engines explain any two with line diagram [6M]

(OR)

5. A). Explain the four stages of combustion in C I engine with pressure-crank angle diagram [5M]
   B). Explain the process of knocking and methods to reduce it in diesel engine [5M]

SECTION – III

6. A). Describe briefly about the rope brake dynamometer. [5M]

   B). the bore and stroke of a water cooled single cylinder, 4- stroke C.I engine are 80 mm and 110 mm respectively and torque is 23.5N-m calculate break mean effective pressure of the engine.[5M]

(OR)

7. A trail was conducted on a single cylinder oil engine having bore of 30cm and stroke 45cm, the engine is working on 4-stroke cycle, and the following observations were made. Duration of trail =54 min, total fuel used=7liters, calorific value 42 MJ/kg, total number of revolutions 12624, gross IMEP=7.25 bar, pumping IMEP=0.35 bar, Net load on the brake=150 kg, diameter of brake wheel drum= 1.78 m, diameter of the rope=4cm, cooling water circulated 550 liters, cooling water temperature raise=48^0 C, specific heat of water 4.18kj/kg K, specific gravity of oil=0.8 calculate Mechanical efficiency and also unaccounted losses. [10M]

SECTION – IV

8. With the help of P-V Diagram derive the expression for work done in two stage reciprocating air compressor with perfect inter cooling and without inter cooling.[10M]

(OR)

9. A). With the help of neat sketch explain the working of roots compressor[5M]

   B). an air compressor takes in air at 1 bar and 20^0C and compresses it according to the law $PV^{1.2}$ =C. it is then delivered to a receiver at a constant pressure of 10 bar. R=0.287kj/kg K, Determine: I) temperature at the end of compression, II work done and heat transferred during compression per kg of air. [5M]

SECTION – V

10. With the help of neat sketch explain the construction and working multi stage Axial flow air compressor [10M]

(OR)

11. A centrifugal compressor used as asuper charger handles 150kg/min of air. The suction pressure and temperature are 1 bar and 290K. The section velocity is 80m/s after compression in the impellor the conditions are 1.5 barand 345K and 220m/s, calculate I). Isentropic efficiency, II). Power required driving the compressor, III). The overall efficiency of the unit, it may be assumed that kinetic energy of air gained in the impellor is entirely converted into pressure in the diffuser. [10M]

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, Nov/Dec 2018
Dynamics of Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

<div align="center">

PART – A   **(25 Marks)**
</div>

1. (a) What is axis of precession?   2M
   (b) Explain the Gyroscopic effects on air craft.   3M
   (c) What is the importance of free body diagram?   2M
   (d) What is boundary friction?   3M
   (e) What is the function of a Brake?   2M
   (f) Explain the terms maximum fluctuation of energy.   3M
   (g) In case of balancing of rotary masses in different planes, how many
       planes in which balancing masses will be kept?   2M
   (h) If a damper exerts a force of 30kN at a speed of 2m/sec movement,
       Determine the damping coefficient.   3M
   (i) Why too sensitivity Governors are not useful?   2M
   (j) Define isochronisms of a governor.   3M

<div align="center">

PART – B   **(50 Marks)**

SECTION – I
</div>

2. A disc with radius of gyration 60mm and a mass of 4kg is mounted centrally on a horizontal axle of 80mm length between the bearings. It spins about the axle at 800rpm counter-clockwise when viewed from the right hand side bearing. The axle precesses about a vertical axis at 50rpm in clockwise direction when viewed from above. Determine the resultant reaction at each bearing due to the mass and the gyroscopic effect. [10M]

<div align="center">

(OR)
</div>

3. Derive the equation of gyroscopic couple $C = I\omega\omega_p$. [10M]

<div align="center">

.**SECTION – II**
</div>

4. In a thrust bearing, the external and internal diameters of the contacting surfaces are 320mm and 200mm respectively. The total axial load is 80kN and the intensity of pressure is 350kN/m². The shaft rotates at 400 rpm. Taking the coefficient of friction as 0.06, calculate the power lost in overcoming the friction. Also find the number of collars required for the bearing [10M]

<div align="center">

(OR)
</div>

5. A conical pivot with angle of cones as 100°, supports a load of 18kN. The external radius is 2.5 times the internal radius. The shaft rotates at 150rpm. If the intensity of pressure is to be 300kN/m² and coefficient of friction as 0.05. What is the power lost in working against the friction? [10M]

SECTION – III

6. A cone clutch with a semi-cone angle of 15° transmits 10kW at 600rpm. The normal pressure intensity between the surfaces in contact is not to exceed 100kN/m². The Width of the friction surfaces is half of the mean diameter. Assume coefficient of friction as 0.25. Determine
   i) The outer and inner diameters of the plates
   ii) The axial force to engage the clutch.   [10M]

(OR)

7. The turning moment curve for a two stroke `engine is represented by the equation
   T= 20000+9500 sin2θ-5700 cos2θ N-m, where θ is the rotation of the crank. If the resisting torque is constant.
   Find
   i.   Power developed   ii. Moment of Inertia of the flywheel
   iii. Angular acceleration of the flywheel at 45° of crank rotation from IDC. [10M]
        The speed of the engine is 180 rpm and the total fluctuation of speed is 1%.

SECTION – IV

8. A Twin cylinder engine has its crank at 90° apart the masses of reciprocating parts is 300kg, crank radius 0.3m. Driving wheel diameter 1.8m, the distance between the cylinder centre line is 0.65m.
   Determine:
   a) The fraction of reciprocating masses to be balanced, if the hammer blow is not be be exceed 40kN at 100 kmph.
   b) Variation in tractive effort
   c) Swaying couple. [10M]

(OR)

9. In a single degree of damped vibrating system a suspended mass of 3.75 kg makes 12 oscillation in 7 sec, when displaced from its equilibrium position. The amplitude of vibration reduces to 0.33 of its initial value in four oscillations.
   Determine: a) Stiffness of the spring
                     b) Logarithmic decrement
                     c) Damping factor
                     d) Damping coefficient. [10M]

SECTION – V

10. A porter governor has four arms of 30cm long. The upper arm are pivoted at the axis of rotation and the lower arms are attached to the sleeve at a distance of 3.5cmfrom the axis. The mass of each ball is 54kg. Determine the equilibrium speed for the two extreme radii of 20cm and 25cm of rotation of the governor balls and the range of speed. [10M]

(OR)

11. A governor of Hartnell type has equal balls of 3kg at radius of 200mm. the length of bell cranks are 110mmvertically and 150mm horizontally. Find (i) Initial Compressive force in the spring at a radius of 200mm at 240 rpm (ii) the stiffness of the spring required to permit a sleeve movement of 4mm on a fluctuation of 7.5% in the engine speed. [10M]

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, Nov/Dec 2018
Fluid Mechanics and Hydraulic Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question   from each SECTION and each Question carries 10 marks.

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PART – A   (25 Marks)

1. (a) What is the difference between an ideal and real fluid? [2M]

    (b) State and explain the newton's law of viscosity. [3M]

    (c) Define hydraulic gradient line and energy gradient line.[2M]

    (d) What are the different types of energies of a liquid in motion? [3M]

    (e) Define: Mechanical efficiency and overall efficiency. [2M]

    (f) Define cavitation. [3M]

    (g) What is the significance of specific speed?[2M]

    (h) Sketch the following draft tubes.[3M]

         i. Conical draft tube

         ii. Simple elbow tube

         iii. Moody spreading tube

    (i) What is NPSH? [2M]

    (j) What is an indicator diagram? Sketch the ideal indicator diagram for a single-cylinder single acting reciprocating pump.   [3M]

PART –B   (50 Marks)
SECTION – I

2. A pipe 1 of 450mm in diameter branches into two pipes (2&3) of diameter 300mm and 200mm as shown in fig 2. If average velocity in 450mm diameter pipe is 3m/s. Find

    a)Discharge through 450mm diameter pipe.

    b) Velocity in 200mm diameter pipe if the velocity in 300mm pipe is 2.5m/s. [10M]

(OR)

3. How are fluid flows classified? Explain. [10M]

SECTION – II

4. Two reservoirs are connected by a pipe line consisting of two pipes, one of 15 cm diameter and length 6m and other diameter 22.5cm and 16m length. If the difference of the water levels in the two reservoirs is 6m. Calculate the discharge and draw the energy gradient line. Take f=0.04. [10M]

(OR)

5. a) What are the assumptions made in deriving the Bernoulli's theorem? [4M]

    b) What are the applications of Momentum equation? Explain. [6M]

SECTION – III

6. A jet of water moving at 12 m/s impinges on a concave shaped vane to deflect the jet through 120degrees when stationary. The vane is moving at 5 m/s. find: [10M]

    (i) The angle of jet so that there is no shock at inlet,

    (ii) The absolute velocity of the jet at exit both in magnitude and direction, and

    (iii) The work done per second per N of water. Assume that the vane is smooth.

(OR)

7. What is a 'mass curve'? Explain the procedure for preparing a mass curve and also its uses. [10M]

SECTION – IV

8. a) Briefly explain the classification of turbines . [5M]

   b) A Francis turbine working under a head of 8m at a speed of 200 r.p.m, develops 70KW when the rate of flow of water is $1.6 m^3/s$. The runner diameter is 1m. If the head on this turbine is increased to 18m, determine its new speed, discharge and power. [5M]

(OR)

9. Explain performance characteristics curves of turbines? [10M]

SECTION – V

10. A centrifugal pump delivers water to a height of 22 m at a speed of 800 rpm. The velocity of flow is constant at a speed of 2m/s and the outlet vane angle is 45^0. If the pump discharges 225 litres of water / second, find the diameter of the impeller and width of the impeller. [10M]

(OR)

11. Derive expressions for discharge, work done and power required to drive single acting and double acting reciprocating pump. [10M]

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, Nov/Dec 2018
Industrial Engineering
(ME)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE
Questions, Choosing ONE Question from each SECTION and each Question carries
10 marks.

*****

PART – A   **(25 Marks)**

1. (a) write short notes on Mayo's Hawthorne Experiments   [2M]
    (b) Write short notes on line & staff organization structure.   [3M]
    (c) State the objectives of plant layout.   [2M]
    (d) Define work-study. State its objectives.   [3M]
    (e) State the duties of purchase manager.   [2M]
    (f) Write short notes on quality cost.   [3M]
    (g) State any four differences between PERT and CPM.   [2M]
    (h) Explain the relation between cost and duration of the project.   [3M]
    (i) Discuss the types of inspection.   [2M]
    (j) Define Job analysis and write importance of same .   [3M]

PART – B   **(50 Marks)**
SECTION – I

2. Explain Henri Fayol's Principles of Management. [**10M]**

(OR)

3. Discuss the different types, principles, advantages and disadvantages of Committee Organization. [**10M**]

SECTION – II

4. What is plant location and explain the factors effecting the plant location. [**10M**]

(OR)

5. Briefly explain the allowances considered for the calculation of "standard time".   [**10M**]

SECTION – III

6. Describe ABC analysis, an inventory control technique. State its applications. [**10M**]

(OR)

7. a) Describe the importance of Total Quality Management. [**5M**]
   b) Write short notes on ISO 9000 series standards. [**5M**]

SECTION – IV

8. Define PERT and discuss its features, advantages, limitations and steps involved in this technique. [**10M**]

(OR)

9. Considering following schedule of activities and related information for construction of new plant, construct network diagram, find out critical path and expected time to built the plant. [**10M**]

Activity	1-2	2-3	3-6	2-4	1-5	5-6	4-6	5-7	7-8	6-8
Expected time in months	4	2	3	6	2	5	9	7	10	1

SECTION – V

10. Explain the Importance of Statistical Quality Control in Industry. [**10M**]

(OR)

11. Explain the functions of HRM. [10M]

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, Nov/Dec 2018
Manufacturing Science
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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PART – A   (25 Marks)

1. (a) What is the ideal profile of a sprue? [2M]
   (b) Explain briefly about sweep pattern and match plate pattern. [3M]
   (c) Why shielding of weld area during welding is required? [2M]
   (d) Write short notes on heat affected zone in welding. [3M]
   (e) What is strain hardening? [2M]
   (f) List out any four parts that can be manufactured by shape rolling operations. [3M]
   (g) Distinguish between hot and cold spinning. [2M]
   (h) What is coining? State the principle of it. [3M]
   (i) Write short notes on forward extrusion process. [2M]
   (j) What properties of metals contribute to good forgeability? [3M]

PART – B   (50 Marks)
SECTION – I

2. Explain the moulding procedure carried out in the manufacturing of castings. [10M]

(OR)

3. Explain the working principle of shell mould casting, hot chamber and cold chamber die casting process. [10M]

SECTION – II

4. What is the difference between shielded and unshielded arc welding process? Give a schematic representation of MIG with advantages, disadvantages and applications [10M]

(OR)

5. a) Why do we do the edge preparation before welding? What are the different ways of edge preparation techniques? [5M]

   b) What is brazing? Describe briefly two methods of brazing. [5M]

SECTION – III

6. a) Explain hot working and cold working with their advantages and limitations. [5M]

   b) briefly explain flat strip rolling operation. [5M]

(OR)

7. Explain briefly with neat sketches two commercially used methods of blow moulding for blowing of plastic bottles and mention their specific advantages. [10M]

SECTION – IV

8. a) Explain with a neat sketch the process of wire drawing. [5M]

   b) Explain about bending, spring back and its remedies? [5M]

(OR)

9. a) Discuss with a neat sketch, the working of metal spinning process. [5M]
   b) Write short notes on
        i) Hydro forming [2M]
        ii) Magnetic pulse forming [3M]

SECTION – V

10. A copper billet 150 mm in diameter and 325 mm long is extruded at 1123 K at a speed of 300 m/s. Using square dies and assuming poor lubrication, estimate the force required in this operation if the extruded diameter is 75 mm, where strength coefficient C= 240 MPa and strain rate sensitivity coefficient m=0.06. [10M]

(OR)

11. a) Distinguish between open die and closed die forging processes. [5M]
    b) Explain the steps involved in drop forging with neat sketches. [5M]

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, Nov/Dec 2018
Machine Drawing
(ME)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is consists of Three questions among them Two questions should be answered Which carriers 30 marks.

Part B Consists of one question, which is compulsory, which carries 45 Marks.

********

Part-A (30Marks)
Answer any two of the following (2x15=30M)

1. Draw the following material conventions

   (i) CI (ii) Water (iii) Wood (iv) concrete (v) Leather

2. Draw front view and top view of double riveted zig-zag lap joint of 10mm plate thickness.

3. Draw the sectional front, top and side view of a knuckle joint to join two rods of diameter 30 mm each.

Part-B(45Marks) (1X45=45M)

4. Assemble all the parts of the stuffing box for a vertical steam engine, show the fallowing figure and draw

   a) Half sectional view from the front, with left half in section

   b) View from above. All dimensions are in mm
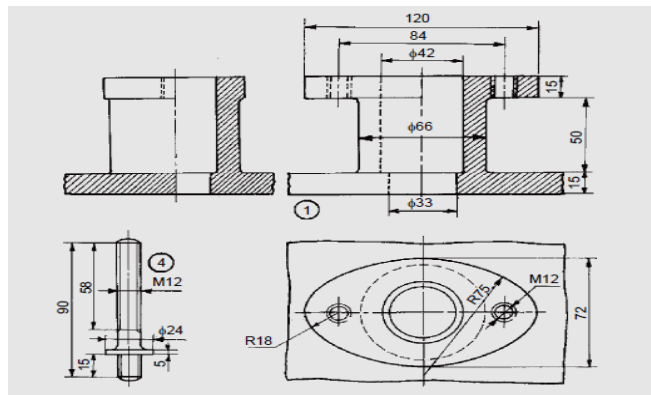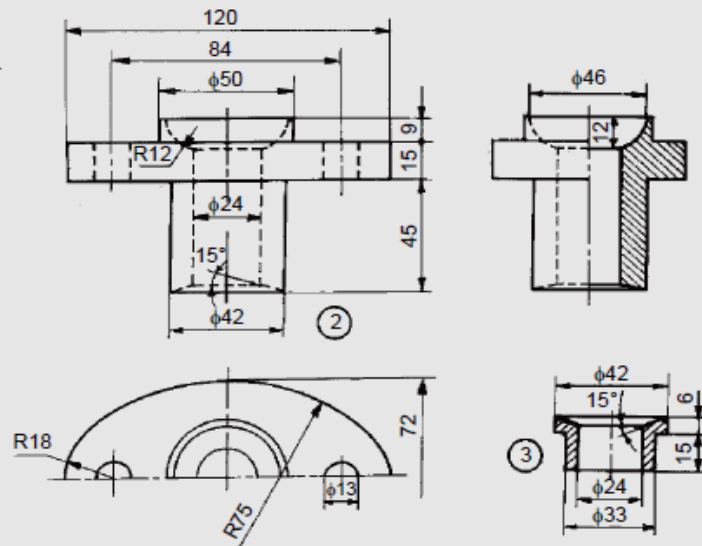
Parts list

Part No.	Name	Matl	Qty
1	Body	CI	1
2	Gland	Brass	1
3	Bush	Brass	1
4	Stud	MS	2
5	Nut, M12	MS	2

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, November/December 2017
Industrial Engineering
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART – A   **(25 Marks)**

1. (a) Define management.   2M
   (b) What are the different types of organization charts?   3M
   (c) Define plant layout.   2M
   (d) What do you mean by work study?   3M
   (e) State any three objectives of purchasing.   2M
   (f) Explain the process of FMEA documentation.   3M
   (g) State any three differences between PERT and CPM.   2M
   (h) Explain the meaning of 'crashing of project'.   3M
   (i) What is the concept of OC curve?   2M
   (j) Discuss the importance of HRM.   3M

PART – B   **(50 Marks)**

SECTION -I

2. a) What is the significance of Hawthrone experiments for management?   5M
   b) Explain the Maslow's theory of hierarchy of human needs.   5 M

(OR)

3. Why does 'organizing' assumes increasing importance in the modern times?   10M

SECTION - II

4. What do you understand by plant layout? Explain its systems and evaluate the same. 10M

(OR)

5. a) Discuss the various allowances which are taken into account while calculating standard time.   5M
   b) The total observed time for an operation i.e assembling of an switch is 3.0 minutes. If the rating is 120%, find normal time. If total allowances allowed are 10% for that job, determine the standard time.   5M

SECTION – III

6. a) Explain the steps involved in inventory control.   5M

    b) Discuss various stages involved in stores management. How quality of product does is safe guarded by stores management?   5M

(OR)

7. What do you understand by the term standard? What is ISO 9000 series of quality system standards? Describe the twenty elements of ISO 9000 standards   10M

SECTION- IV

8. Explain PERT and its importance in network analysis. What are the requirements for applications of PERT techniques?   10M

(OR)

9. A project has the following characteristics: 10M

Activity	Optimistic time	Pessimistic time	Most likely time
1-2	1	5	2
2-3	1	3	2
2-4	1	5	3
3-5	3	5	4
4-5	2	4	3
4-6	3	7	5
5-7	4	6	5
6-7	6	8	7
7-8	2	6	4
7-9	5	8	6
8-10	1	3	2
9-10	3	7	5

Construct a PERT network. Find the critical path and variances for each activity. Find the project duration at 90% probability.

SECTION –V

10. What is control chart? What are its uses in controlling the quality of a product or service? State different types of control charts used for controlling variables and attributes type of characteristics.   10M

(OR)

11. a) What are the objectives on merit rating? explain   5M

    b) Differentiate between selling and marketing. Explain the modern concept of marketing.   5M

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, November/December 2017
Machine Drawing
(ME)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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SECTION-I

1   Sketch the conventional representation of the following materials   (5+5+5)M
a.   Wood   b. cast iron   c. Bronze

(OR)

2   a) Draw the triple start square threads with D as 30 mm
b) Draw sectional front view and side view of Cotter joint with socket and spigot
ends taking d=30 mm.   (7+8)M

SECTION-II

3   Draw sectional front view and top view of double riveted, zig zag lap joint with dia of
rivet as 20 mm.

(OR)

4   Draw two views of Foot step bearing for a shaft of 75 mm diameter   15 M

SECTION-III

5   Draw two views of hexagonal headed bolt and nut and square headed bolt along
with nut. (D=30mm).

(OR)

6.   Draw the sectional front view and top view of the double riveted double strap zig zag
butt joint with diameter of the rivet as 14 mm.   15 M

SECTION-IV

7.   Draw half sectional view from the front and side view of a universal coupling to connect
two shafts of 30 mm diameter

(OR)

8.   Draw pan head, Flush counter sunk head and Truss head type of rivets with a
diameter of 16 mm.   15 M

SECTION-V

9. Details of knuckle joint are shown in fig 9.1. Draw the following views
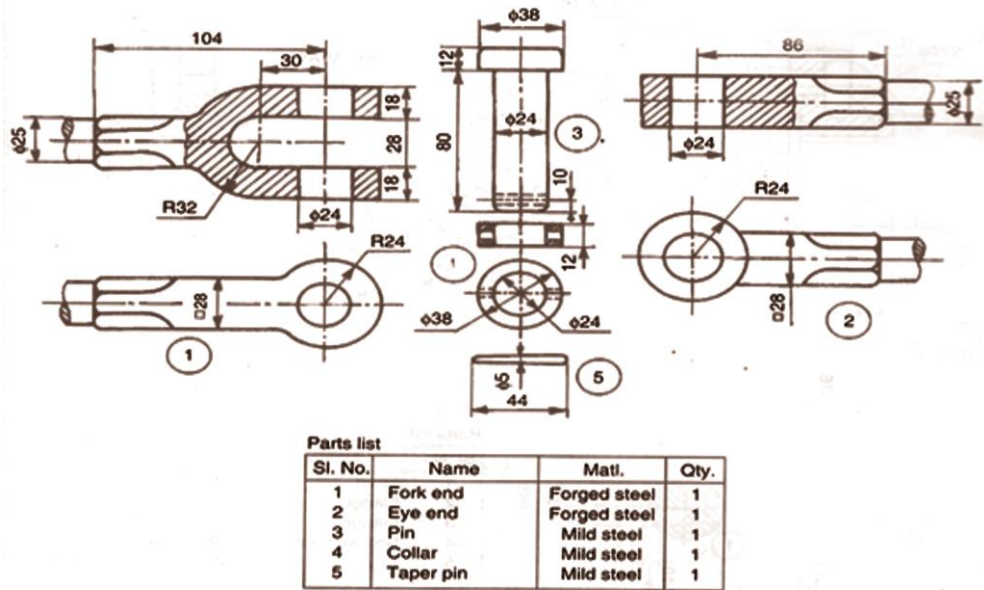   i. Sectional front view
   ii.Top view

Fig.9.1

(OR)

10. Draw sectional front view and top view single riveted lab joint with thickness of plate is 20 mm   15 M

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, November/December 2017
Manufacturing Science
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART – A   (25 Marks)

1.
   a) List a few materials used for making pattern.   2M
   b) What is meant by Directional solidification? State various aids to achieve Directional solidification.   3M
   c) What is difference between Gas welding and Gas cutting.   2M
   d) Explain the principle and advantages of Laser welding.   3M
   e) Why are formed components superior to cast components   2M
   f) Explain the products of rolling .   3M
   g) Distinguish between shearing and forming operations in sheet metal operations.   2M
   h) Explain the bending terminology.   3M
   i) How is the word 'Extrusion' understood in metal forming.   2M
   j) List three forging defects their causes and remedies.   3M

PART – B   (50 Marks)
SECTION – I

2. State and explain the types of patterns used in moulding.
(OR)
3. Explain phenomenon of solidification of Pure metal and Alloy

SECTION – II

4. Explain with neat sketches TIG and MIG welding processes with applications.
(OR)
5. Explain various defects in welding. State their causes and remedies.

SECTION – III

6. What is plastic deformation? What are the advantages and limitations of hot working over cold working.

(OR)

7. Describe the process of making single piece plastic bottle made of thermoplastics.

SECTION – IV

8. a) Explain the tube drawing process

   b) Explain how the coining process is conducted.

(OR)

9. What is metal spinning? Illustrate the products made by this process and the advantages of the process over drawing

SECTION – V

10. Explain the basic extrusion process and its characteristics.

(OR)

11. Explain the different stages in drop forging in making a lever

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, November/December 2017
Dynamics of Machinery
(ME)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART – A   (25 Marks)

1.(a) What do you mean by spin, precession and gyroscopic planes?(2)

 (b) Explain in what way the gyroscopic couple affects the motion of an aircraft while taking a turn.(3)

(C). Do you recommend the uniform pressure theory or uniform wear theory for the friction torque of a bearing? Explain.(2)

(d) What is the frictional torque transmitted in case of flat pivot bearing, assuming uniform wear condition.(3)

(e) Discuss the effectiveness of a band brake under various conditions.(2)

(f) Differentiate between Brakes and dynamometer.(3)

(g)Why is balancing necessary for rotors of high speed engines?(2)

(h)What do you mean by primary and secondary unbalance in reciprocating engines?(3)

(i)What do you mean by partial balancing in a reciprocating engines?(2)

(j) Distinguish the terms sensitiveness and stability relating to governors. (3)

## PART – B   (50 Marks)

SECTION – I

2(a) What is the effect of the gyroscopic couple on the stability of a four wheeler while negotiating a curve? In what way does this effect along with that of the centrifugal force limit the speed of the vehicle?(5)

 b) How do the effects of gyroscopic couple and of centrifugal force make the rider of a two-wheeler .Derive a relation for the limiting speed of the vehicle.(5)

(OR)

3. The rotor of a marine turbine has a moment of inertia of 750 kg. m2 and rotates at 3000 rpm clockwise when Viewed from aft. If the ship pitches with angular simple harmonic motion having a periodic time of 16 seconds and an amplitude of 0.1 radian, find the (i) maximum angular velocity of the rotor axis (ii) maximum value of the gyroscopic couple (iii) gyroscopic effect as the bow dips. (10)

SECTION – II

4. Determine the torque required to be applied to the link AB of a four link mechanism shown in figure to maintain static equilibrium at the given position.(10)

B
200
T
60°
700
A
700
150 N
30 N.m
D
(mm)
BC = 400
400
C
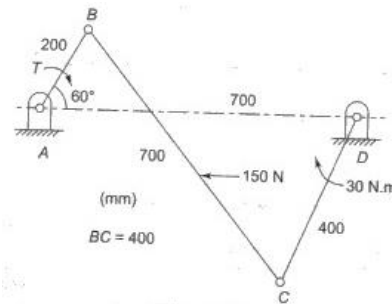
(OR)

5. In a four link mechanism ABCD the link AB revolves with an angular velocity of 10 rad/s and angular acceleration of 25 rad/s^2 at the instant when it makes an angle of 45^0 with AD, the fixed link. The lengths of the links are AB = CD = 800 mm, BC = 1000 mm and AD = 1500 mm. The mass of the links is 4 kg/m length. Determine the torque required to overcome the inertia forces , neglecting the gravitional effects. Assume all links to be of uniform cross-sections.(10)

SECTION – III

6. a. Explain single plate clutch with neat sketch (6)
   b. Derive the equation for a uniform wear and uniform pressure of pivot bearing (4)

(OR)

7(a). Classify dynamometers and explain function of one transmission type dynamometer. (4)

(b) A simple band brake is operated by a lever of length 500 mm. The brake drum has a diameter of 500 mm and the brake band embraces 5/8th of the circumference. One end of the band is attached to the fulcrum of the lever while the other end is attached to a pin on the lever 100 mm from the fulcrum,.If the effort applied to the end of the lever is 2 kN and the coefficient of friction is 0.25, find the maximum braking torque on the drum.(6)

SECTION – IV

8. A 2-cylinder uncoupled locomotive with cranks at 90^0 has a crank radius of 32.4cms. The distance between centers of driving wheel is 150 cms. The pitch of cylinders is 60cms. The diameter of treads of driving wheel is 180 cms. The radius of center of gravity of balance weights is 65 cms. The pressure due to dead load on each wheel is 4 tonnes. The weight of reciprocating and rotating parts per cylinder are 330 kg and 300 kg respectively. The speed of locomotive is 60 kmph. Find:

(a) The balancing weights both in magnitude and position required to be placed in the planes of driving wheels to balance whole of the revolving and 2/3 of reciprocating masses.

(b) Swaying couple.

(c) The variation of tractive force. (10)

(OR)

9. Four masses m1, m2, m3 and m4 having 100, 175, 200 and 25 kg are fixed to cranks of 20 cm radius and revolve in places 1, 2, 3 and 4. The angular position of the cranks in planes 2, 3 and 4 with respect to the crank in plane 1 are 75^0, 135^0 and 200^0 taken in the same sense. The distance of planes 2, 3 and 4 from plane 1 are 60 cm, 186 cm and 240 cm respectively. Determine the position and magnitude of the balance mass at a radius of 60 cm in plane L and M located at middle of the plane 1 and 2 and the middle of the planes 3 and 4 respectively.

(10)

SECTION – V

10. A Proell governor has equal arms of length 300mm . The upper and lower ends of the arms are pivoted on the axis of the governor. The extension arms of the lower links are each of 80 mm long and parallel to the axis, when the radius of rotation of the balls are 150 mm and 200 mm. The mass of each ball is 10 Kg and the mass of the central load is 100 Kg, determine the range of the speed of the governor?

(OR)

11. A Hartnell governor operates between 290 rpm and 310 rpm with a sleeve lift of 15 mm. The two right-angled bell-crank levers are pivoted at 120 mm from the governor axis. The sleeve arms and the ball arms are 80 mm and 120 mm respectively. Mass of each ball is 2.5 kg. The ball arms are parallel to the governor axis at the lowest equilibrium speed., Determine the stiffness of the spring and the loads on the spring at the lowest and the highest equilibrium speeds.(10)

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester supplementary Examinations, November/December 2017
Fluid Mechanics and Hydraulic Machinery
(ME)

Roll No										

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART – A   (25 Marks)

1. (a) How does the viscosity of air vary with temperature?   2M
   (b) Differentiate between stream function and velocity potential.   3M
   (c) Explain any one application of momentum equation.   2M
   (d) Explain the working principle of Venturimeter.   3M
   (e) How do you find the force when a jet is striking a fixed vertical plate with a velocity 'v'?
                                                                                    2M
   (f) Write an expression for the force exerted by a jet on moving flat plate.   3M
   (g) Explain the use of draft tube of a turbine.   2M
   (h) Explain the importance of governing of turbines   3M
   (i) What is slip of a reciprocating pump? When does negative slip occur?   2M
   (j) Explain Net Positive Suction Head in centrifugal pump.   3M

PART – B   (50 Marks)

SECTION – I

2. a) List all fluid properties and derive Newton's law of viscosity.   [5 M]
   b) Find the height through which water rises by capillary action in a glass tube of 2mm bore if the surface tension at the prevailing temperature is 0.075 N/m.?   [5 M]
(OR)
3. a) Differentiate between laminar flow and turbulent flows, and rotational and irrotational flows.   [5 M]
b) Derive the continuity equation from fundamentals. Determine whether the following velocity components satisfy the continuity equation. i) u = cx, v = -cy ii) u = -cx/y , v = c log xy   [5 M]

SECTION – II

4. a) What are the different types of flow ? State and Explain Bernoulli's equation.   [5M]
b) A pipe line 300 m long has a slope of 1 in 100 and tapers from 1.2m diameter at the high end to 0.6m at the low end. The discharge through the pipe is 5.4 m³/minute. If the pressure at the high end is 70 kpa, find the pressure at the low end. Neglect the losses.   [5M]

(OR)

5. a) Explain how Reynold's experiment is conducted in the lab and bring its practical uses.
[5M]

b) Compare Venturimeter and Orificemeter. [5M]

SECTION – III

6. a) A nozzle of size 10 cm diameter issues a jet of water with a velocity of 50m/sec. The jet strikes a moving flat plate perpendicularly at the centre. The plate is moving with a velocity of 15m/sec in the direction of the jet. Calculate i. The force exerted on the plate ii. The work done iii. Efficiency of the jet [5M]

b) Derive the equation for the impact of jet striking a moving inclined plate in the direction of the jet. [5M]

(OR)

7. a) A jet of oil of specific gravity strikes a fixed curved symmetrical plate at its center and leaves at the outlet tips. The diameter of the jet is 62 mm and the velocity of the jet is 45 m/sec. If the jet is deflected by 100 degrees, calculate the force exerted on the curved plate. [5M]

b) How do you estimate the impact of a jet striking a moving normal plate in the direction of the jet. [5M]

SECTION – IV

8. a) Explain the classification of turbines ? Explain the working of Francis turbine with a neat sketch. [5M]

b) What is cavitation? How it can be avoided in reaction turbines. [5M]

(OR)

9.a) What type of turbine is Kaplan turbine? Explain how it works with a neat diagram. [5M]

b) What are the unit quantities to study the performance of turbines? [5M]

SECTION – V

10. a) A centrifugal pump delivers water against a net head of 10 m at a design speed of 800 rpm. The vanes are curved backwards and make an angle of 30 degrees with the tangent at the outer periphery. The impeller diameter is 30 cm and has a width of 5 cm at the outlet. Determine the discharge of the pump if the manometric efficiency is 85% [5M]

b) What is indicator diagram for a reciprocating pump? Explain slip and coefficient of discharge of a reciprocating pump. [5M]

(OR)

11. a) A fluid is to be lifted against a head of 120m . The pumps that run at a speed of 1200 rpm with rated capacity of 300 litres per second are available. How many pumps are required to pump the water if specific speed is 700. [5M]

b) What is the working principle of a reciprocating pump ? Explain its working with the help of an indicator diagram. [5M]

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