DEPARTMENT OF MECHANICAL ENGINEERING

COURSE COVERAGE SUMMARY
AND
QUESTION BANK

FOR

III B.TECH I SEMESTER
(2017 – 18)

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COURSE COVERAGE SUMMARY

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MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
MECHANICAL DEPARTMENT
III B.TECH I SEM
SUB: ATE
MODEL PAPER-I

Part – A   Marks: 25

1. List out the effect of operating conditions on Rankine cycle efficiency.   (3M)
2. Explain the concept of mean temperature of heat addition.   (2M)
3. Define nozzle efficiency state the factors on which it depends.   (3M)
4. Define the terms shell, furnace, grate, heating surface,   (2M)
5. Write the difference between impulse turbines and reaction turbines.   (3M)
6. What is the necessity of compounding a steam turbine?   (2M)
7. Sketch Brayton cycle on P-V and T-S diagrams.   (3M)
8. Mention the applications of gas turbines.   (2M)
9. Classify the different propulsion systems.   (3M)
10. Why liquid propellants are preferred in rocket propulsion?   (2M)

Part – B   Marks: 50

1. a) Draw the lay out, P-v & T-S diagrams of Rankine cycle and its working in detail.
   b) In a steam turbine steam at 20 bar, 360° C is expanded to 0.08 bar. It then enters a condenser, where it is condensed to saturated liquid water. The pump feeds back the water into the boiler. Assume ideal processes; find per kg of steam the net work and the cycle efficiency.

OR

2. A steam turbine consumes 9 kg/kW-hr when steam is supplied at a pressure f 10 bar and at 400^0. The exhaust takes place at 0.1 bar. Compare the efficiency of the engine with the Rankine efficiency.

3. a) What do you mean by natural draught? What are the limitations of natural draught?
   b) With a neat sketch briefly explain about Babcock and Wilcox boiler.

OR

4. Dry saturated steam enters a frictionless adiabatic nozzle with negligible velocity at a temperature of 300^0C. It is expanded to a pressure of 5000 kPa. The mass flow rate is 1kg/s. Calculate the exit velocity of steam.

5. In a De-Laval turbine steam issues from the nozzle with a velocity of 1200m/s. The nozzle angle is 20^0, the mean blade velocity is 400m/sand the inlet and outlet angles of blade are equal. The mass of steam flowing through the turbine per hour is 1000kg.

Calculate: i) Blade angles ii) Relative velocity of steam entering the blades iii) tangential force on the blades iv) power developed v) blade efficiency Take blade velocity coefficient as 0.8.

OR

6. a) With a neat sketch explain working of ejector condenser.

b) One stage comprising of a pair of blade rings of 50% reaction axial flow turbine has inlet and outlet angles of 80° and 20° the mean diameter of blade is 1.8 m and the turbine runs at 20 rev/s. Steam is admitted to the stage at 12 bar pressure and 200^OC temperature and undergoes an adiabatic heat drop of 18 kJ five per cent of the steam is lost through leakage. If the power developed in the stage is 460kW. Determine : a) the stage efficiency b) the blade height.

7. In a gas turbine plant, air is drawn at 1 bar, 15^0 C and the pressure ratio is 6. The expansion takes place in two turbines. The efficiency of compressor is 0.82, high pressure turbine is 0.85 and low pressure turbine is 0.84. The maximum cycle temperature is 625^0 C. Calculate i) Pressure and temperature of gases entering the low pressure turbine. Ii) Net power developed iii) Work ratio iv) Thermal efficiency. v) Work output of high pressure turbine is equal to compressor work.

OR

8. A Brayton cycle operates with the air entering the compressor at 1 bar and 25° C the pressure ratio across the compressor is 3 to 1 and the maximum temperature in the cycle is 650° C. Determine the compressor work, turbine work, thermal efficiency and work ratio of cycle.

9. In a jet propulsion unit, initial pressure and temperature to the compress r are 1.0 bar and 100C. The speed of the unit is 200m/s. The pressure and temperature of the gases /+before entering the turbine are 7500 C and 3 bar. Isentropic efficiencies of compressor and turbine are 85% and 80%. The static back pressure of the nozzle is 0.5 bar and efficiency of the nozzle is 90%. Determine (a) Power consumed by compressor per kg of air. (b)Air-fuel ratio if calorific value of fuel is 35,000 kJ/kg. (c) Pressure of gas leaving the turbine. (d)Thrust per kg ofair/sec Cp of gases=1.12 kJ/kg K, Cp of air=1.005 kJ/kg K, γ =1.4 for air, γ =1.32 for gases.

OR

10. a) How rocket are classified?

b) What is the essential difference between rocket propulsion and turbojet propulsion?

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MECHANICAL DEPARTMENT
III B.TECH I SEM
SUB: ATE
MODEL PAPER-II

Part – A   Marks: 25

1. What are the advantages and limitations of regenerative Rankine cycle over reheat cycle. Explain.   (3M)
2. What is the effect of regeneration on efficiency and specific work output of the steam power plant?   (2M)
3. What is a steam boiler? How the boilers are are classified?   (3M)
4. Explain the criteria to decide the shape of the nozzles.   (2M)
5. List out the various losses in a steam turbine.   (3M)
6. Define degree of reaction and reheat factor.   (2M)
7. Discuss the influence of reheating on the performance of a gas turbine. (3M)
8. List the advantages of gas turbines over steam turbines.   (2M)
9. Give the fundamental differences between jet propulsion and rocket propulsion.(3M)
10. What are the important properties of a good propellant?   (2M

Part - B

1. a) Explain with a neat diagram about Regenerative cycle. Derive an expression for the thermal efficiency.

   b) A steam turbine is fed with steam having an enthalpy of 3100 kJ/kg. It moves out of the turbine with an enthalpy of 2100 kJ/kg. Feed heating is done at a pressure of 3.2 bar with steam enthalpy of 2500 kJ/kg. The condensate from a condenser with an enthalpy of 125 kJ/kg enters into the feed heater. The quantity of bled steam is 11200 kg/h. Find the power developed by the turbine. Assume that the water leaving the feed heater is saturated liquid at 3.2 bar and the heater is direct mixing type. Neglect pumps work.

OR

2. A power generating plant uses steam as a working fluid and operates at a boiler pressure of 50 bar, dry saturated and condenser pressure of 0.05 bar. Calculate for these limits a) the cycle efficiency, and b) the work ratio and specific steam consumption for Rankine cycle.

3. a) What are the factors involved in the selection of a boiler?

   b) Under what circumstances water tube boilers are used in preference to fire tube boilers?

OR

4. In a steam nozzle the steam expands from 4bar to 1bar. The initial velocity is 60m/s and the initial temperature is 200^0C. Determine the exit velocity if the nozzle efficiency is 92%.

5. a) List the advantages of steam turbines over gas turbines.

b) Determine the isentropic enthalpy drop in the stage of Parsons Reaction turbine which has the following particulars: speed = 1500 rpm, mean diameter of rotor = 1m, stage efficiency = 80%, speed ratio = 0.7, blade outlet angle = 20°.

OR

6. A surface condenser fitted with separate air and water extraction pumps has a portion of the tubes near the air pump suction screened off from the steam so that the air is cooled below the condensate temperature. The steam enters the condenser at 38°C and the condensate is removed at 37°C. The air removed has the temperature of 36°C. If the total air infiltration from all sources together is 5kg/hr. determine the volume of air handled by the air pump per hour. What would be the corresponding value of the air handled if a combined air condensate pump was employed? Assume uniform pressure in the condenser. [16]

7. A gas turbine unit receives air at 1 bar and 300K and compresses it adiabatically to 6.2 bar the compressor efficiency is 88%. The fuel has C.V of 44186kJ/kg and the fuel air ratio is 0.017kJ/kg of air. The turbine i9nternal efficiency is 90% calculate the work of turbine and compressor per kg of air compressed and thermal efficiency. For products if combustion Cp= 1.147 kj/kg-K and ¥ = 1.33

OR

8. A gas turbine draws in air from atmosphere at 1 bar and 10oC and compresses it to 5 bar with an isentropic efficiency of 80%. The air is heated to 1200 K at constant pressure and then expanded through two stages in series back to 1 bar. The high pressure turbine is connected to the compressor and produces just enough power to drive it. The low pressure stage is connected to an external load and produces 80 kW of power. The isentropic efficiency is 85% for both stages.
 Calculate the mass flow of air, the inter-stage pressure of the turbines and the thermal efficiency of the cycle.
 For the compressor □ = 1.4 and for the turbines □ = 1.333.
 The gas constant R is 0.287 kJ/kg K for both.
 Neglect the increase in mass due to the addition of fuel for burning.

9. a) Write a detailed classification of propulsive devices.
   b) Explain working of turbo prop engine with a neat sketch.

OR

10. a) What are the various applications of rockets?
    b) Describe with a neat sketch a solid propellant rocket.

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III B.TECH I SEM
SUB: ATE
MODEL PAPER-III

Part – A   Marks: 25

1. Draw the T-S and H-S diagrams of reheat cycle representing all the salient points. (3M)
2. Draw the block diagram of reheat cycle with all components. (2M)
3. Define the terms water space and steam space, boiler mountings and accessories. (3M)
4. What is meant by critical pressure ratio of nozzle? (2M)
5. Write the relationship between overall efficiency and stage efficiency. (3M)
6. What is meant by governing? (2M)
7. What do you mean by the term gas turbine? How the gas turbines are classified? (3M)
8. Write a note on various fuels used for gas turbines. (2M)
9. Define propulsive efficiency and thermal efficiency of jet propulsion system. (3M)
10. Define thrust Augmentation. (2M)

Part - B

1. A steam power plant operates on a theoretical reheat cycle. Steam at boiler at 150 bar, 550 °C expands through the high pressure turbine. It is reheated at a constant pressure of 40 bar to 550°C and expands through the low pressure turbine to a condenser at 0.1 bar. Draw T-s and h-s diagrams. Find :

    (i) Quality of steam at turbine exhaust; (ii) Cycle efficiency; (iii) Steam rate in kg/kW

OR

2. A power generating plant uses steam as a working fluid and operates at a boiler pressure of 50 bar, if the steam is superheated to 500 °C before supplying, to turbine calculate for Rankine cycle, a) the cycle efficiency and b) the specific steam consumption. Neglect the feed pump work.

3. A convergent divergent nozzle at a pressure of 10 bar and a temperature of 300 °C. The exit of nozzle is in a space where the pressure is 5.35 bar. Calculate the flow per m^2 of exit area. When the fluid is superheated steam $\gamma = 1.3$, behaves gas through out.

OR

4. Give sketches and description of the following boiler mountings
    a) Water level indicator
    b) Safety valve
    c) High steam and low water safety valve
    d) Fusible plug and
    e) Feed check valve.

5. In a reaction turbine the blade tips are inclined at 35° and 20° in the direction of motion. The guide blades are of same shape as the moving blades but reversed in direction. At a certain place in the turbine, the drum diameter is 1m and the blades are 10cm high. At this place, the steam has a pressure of 1.75 bar and dryness 0.935. If the speed of the turbine is 250 rpm and steam passes through the blades without shock, find the mass of steam flow and power developed in the ring of moving blades.

OR

6. A surface condenser deals with 13625 kg of steam per hour at a pressure of 0.09 bar. The steam enters 0.85 dry and the temperature at the condensate and air extraction pipes is 360C. The air leakage amounts to 7.26 kg/hour. Determine: The surface required if the average heat transmission rate is 3.97 kJ per second.

7. In a gas turbine cycle, the pressure ratio is 6 and maximum cycle temperature is 6500 C. The efficiencies turbine and compressors are 0.85 and 0.82. Air enters the compressor at 150 C and flow rate of air is 12kg/sec. For compression process, cp=1.005 kJ/kg-K; γ =1.32. For combustion process, cp=1.11 kJ/kg-K. Determine power developed thermal efficiency and work ratio.

OR

8. Air enters the compressor of a gas turbine plant operating on Brayton cycle at a pressure of 1 bar and 300K. the pressure ratio is 5 and the maximum cycle temperature is 1075K. if the compressor and turbine efficiencies are 80% and 85% make calculations for the network output, cycle efficiency and work ratio.

9. Describe with a neat sketch turbojet engine and explain its thermodynamic cycle.

OR

10. a) Explain liquid propellant rocket with a neat sketch.
    b) What are the various thrust augmentation techniques used in turbo-jet engine?

Part – A **Marks: 25**

1. Define Rankine cycle efficiency. What are the advantages of regenerative cycle over simple Rankine cycle? (3M)
2. State the methods of increasing the thermal efficiency of Rankine cycle. (2M)
3. Define the function of a nozzle and name some applications where it is used? (3M)
4. Define equivalent evaporation and boiler efficiency. (2M)
5. What is the effect of friction on the performance of a steam turbine? (3M)
6. State the difference between jet condensers and surface condensers. (2M)
7. List the advantages & disadvantages of gas turbines. (3M)
8. What are the requirements of a gas turbine combustion chamber? (2M)
9. Define thrust, thrust power, propulsion efficiency. (3M)
10. Compare the advantages and disadvantages of solid and liquid propellants. (2M)

Part - B

1. Steam is supplied to a turbine at a pressure of 30 bar and a temperature of 400°C and is expanded adiabatically to a pressure of 0.04 bar. At a stage of turbine where the pressure is 3 bar a connection is made to a surface heater in which the feed water is heated by bled steam to a temperature of 130°C. The condensed steam from the feed heater is cooled in a drain cooler to 27°C. The feed water passes through the drain cooler before entering the feed heater. The cooled drain water combines with the condensate in the well of the condenser.
   Assuming no heat losses in the steam, calculate the following:
   (i)   Mass of steam used for feed heating per kg of steam entering the turbine; (ii) Thermal efficiency of the cycle.

   OR

2. A steam turbine operating on the Rankin cycle receives steam from the boiler at 3.5 MN/m 2 and 3500C and exhaust to the condenser at 10 kN/m ^{2} . The condensate is then returned to the boiler by the feed pump. Determine the following considering pump work also.
   i. the energy supplied in the steam generator
   ii. the dryness fraction of the steam entering the condenser,
   iii. the Rankin efficiency.
3. A convergent divergent nozzle receives steam at 10bar and 200^{0}C and exhaust to 5bar. The mass flow rate of the steam is 0.1kg/s and the flow is supersaturated with $PV^{1.3}$=constant. Neglecting inlet velocity make calculations for the nozzle exit area,

degree of under cooling and the degree of super saturation. If the nozzle coefficient is 0.92 and the mean value of Cp= 1.925kJ/kg-K. Determine the exit area. Use the relation $pv \times 10^3 = 2.308 \times (h-1943)$, where v is in m^3/kg , p is in bar and h is in kJ/kg.

OR

4. a) What is the difference between economizer and super heater? Why are they used in a boiler?

    b) What are the factors to be considered while selecting a boiler?

5. In a reaction turbine the fixed blades and moving blades are of the same shape but reversed in direction the angles of the receiving tips are 35° and of the discharging tips 20°. Find the power developed per pair of blades for a steam consumption of 2.5kg/s, when the blade speed is 50m/s. If the heat drop per pair is 10.04kJ/kg. Find the efficiency of the pair.

OR

6. (a) Draw the schematic diagram of high level jet condenser and explain its working principle.

    b) Explain how quantity of cooling water in a condenser is estimated.

7. Describe the operation of the gas turbine. What are the principal factors affecting its power and efficiency?

OR

8. A closed cycle gas turbine using Argon as the working fluid has a two compression with perfect inter cooling. The overall pressure ratio is 9 and pressure ratio in each stage is equal. Each stage has an isentropic efficiency of 85%. The turbine is also two stage with equal pressure ratio with inter change reheat to original temperature. Each turbine stage has an isentropic efficiency of 90%. The turbine inlet temperature is 1100K and the compressor inlet is 303K. Find

    (a) work done per kg of fluid flow

    (b) work ratio

    (c) The overall cycle efficiency.

    The properties of argon are Cp= 0.5207kJ/kg K and R=0.20813kJ/kg-K

9. (a) What do you mean by jet propulsion? Explain the Various devices in a jet propulsion unit.

OR

10. (a) What is ramjet? Explain the working of a ramjet with a neat sketch.

    (b) Explain the following terms

    i. Isentropic Compressor efficiency

    ii. Isentropic Turbine efficiency

    iii. Propelling nozzle efficiency

    iv. Transmission efficiency.

Part – A   Marks: 25

1. How are the maximum temperature and maximum pressure in the Rankine cycle fixed (3M)
2. What are the advantages and disadvantages of Reheat cycle?   (2M)
3. Write the differences between fire tube boilers and water tube boilers.   (3M)
4. Define degree of under cooling and degree of super saturation.   (2M)
5. List out the different methods used for governing of steam turbines.   (3M)
6. Write the principle of an impulse reaction turbine.   (2M)
7. Deduce an equation to prove efficiency of simple gas turbine depends only on pressure ratio and nature of gas.   (3M)
8. What are the limitations of a gas turbine plant?   (2M)
9. State the differences between jet propulsion and rocket propulsion system.   (3M)
10. Explain the principle of jet propulsion and mention how the jet propulsion engines are classified.   (2M)

Part - B

1. The following data refer to a simple steam power plant :

S. No.	Location	Pressure	Quality/temp.	Velocity
1.	Inlet to turbine	6 MPa (= 60 bar)	380°C	—
2.	Exit from turbine inlet to condenser	10 kPa (= 0.1 bar)	0.9	200 m/s
3.	Exit from condenser and inlet to pump	9 kPa (= 0.09 bar)	Saturated liquid	—
4.	Exit from pump and inlet to boiler	7 MPa (= 70 bar)	—	—
5.	Exit from boiler Rate of steam flow = 10000 kg/h.	6.5 MPa (= 65 bar)	400°C	—

Calculate:

(i)   Power output of the turbine.
(ii)   Heat transfer per hour in the boiler and condenser separately
(iii)   Mass of cooling water circulated per hour in the condenser.

Choose the inlet temperature of cooling water 20°C and 30°C at exit from the condenser.

(iv)   Diameter of the pipe connecting turbine with condenser.

OR

2. A turbine is supplied with steam at a pressure of 32 bar and a temp. of 4100C. The steam then expands isentropic ally to a pressure of 0.08 bar. Find the dryness fraction at the end of expansion and thermal efficiency of the cycle. If the steam is reheated at 5.5 bar to a temp. of 400 0 C and then expanded isentropic ally to a pressure of 0.08 bar, what will be the dryness fraction and thermal efficiency of the cycle.

3. Dry saturated steam at a pressure of 11bar enters a convergent divergent and leaves at a pressure of 2bar. If the flow is adiabatic and frictionless determine
    a.) The exit velocity of the steam
    b.) Ratio of cross section at exit and throat.
       Assume the index of adiabatic expansion to be 1.13

OR

4. a) Explain the working of i) water level indicator ii) high steam and low water safety valve with the help of neat sketches.
    b) Describe briefly the advantages which you would expect to be gained from incorporating an economizer, an air pre-heater and super heater in a steam generating plant and indicate their positions in a typical boiler plant.

5. A 50% reaction turbine (with symmetrical velocity triangles) running at 400 rpm as the exit angle of the blades as 20° and the velocity of steam relative to the blades at the exit is 1.35 times the mean blade speed. The steam flow rate is 8.33kg/s and at a particular stage the specific volume is $1.381m^{3}$/kg. calculate for this stage i) a suitable blade height assuming the rotor mean diameter 12 times the blade height and ii) the diagram work.

OR

6. A stage of an impulse turbine has two rows of moving blades separated by a row of fixed guide blades. The moving blades have tip angles of 380 and the blade speed, nozzle and fixed blade angles are designed on the assumption that the velocity of discharge from the nozzle is 540 m/s. The relative velocity of steam drops by 10% during passage through each ring of blades and the final discharge is axial. Determine the blade speed and the blade efficiency.

7. In an open cycle gas turbine plant, air enters at 1.5 bar and 250 C and leaves the compressor at 5.5 bar. Maximum cycle temperature is 6750 C, pressure loss in the combustion chamber is 0.2 bar. Efficiency of compressor is 0.85, turbine is 0.80, combustion is 0.90, r=1.4 and cp=1.022 kJ/kg K for air and flue gases. Neglecting

mass of fuel, Determine: (a) Quantity of air circulation if power developed is 1050 kW. (b) Heat supplied per kg of air. (c) Thermal efficiency of the cycle.

OR

8. a) Explain the working principle of gas turbine along with p-v and T-s diagrams.
   b) Describe the differences between closed cycle gas turbine and open cycle gas turbine.

9. a) Where is rocket propulsion used? What are the kinds of rocket propellants? b) Describe liquid propellant rocket engine with neat sketch.
   [8+8]

OR

10. A turbo jet engine inducts 51 kg of air per second and propels an aircraft with an uniform ight speed of 912 km/h. The isentropic enthalpy change for the nozzle is 200 kj/kg and its velocity co efficiency is 0.96. The fuel air ratio is 0.0119, the combustion efficiency is 096 and the lower heating value of the fuel is 42mj/kg. Calculate i) The thermal efficiency of the engine, ii) The fuel flow rate in kg/h and sfc, iii) The propulsive power in kW iv) The thrust power.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
MECHANICAL DEPARTMENT
III B.TECH I SEM
SUB: Machine Design - I

MODEL PAPER-I

Time : 3 Hours   Max.Marks : 75

Note : This   question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units . Answer any one full question from each unit.

Each question carries 10 marks and may have a,b,c as sub questions .

Part -A	**(25 Marks)**

1 a) . Define load . How are the loads classified ?.   [2M]

 b)   What is the significance of   theories of failure ?.   [3M]

 c)   Describe the tests that are   performed on rivets.   [2M]

 d)   What is the effect of initial tightening ?   [3M]

 e) What is the difference between the shaft and the axle ?.   [2M]

 f)   What type of stresses are induced in the key ?.   [3M]

 g)   What is the function of   couplings and clutches ?.   [2M]

 h)What is Wahl's correction factor ?   [3M]

 i) What are the practical applications of various springs ?.   [2M]

 j) What is a reinforced weld ?.   [3M]

Part -B	**(50 Marks)**

 2 a) What are the basic requirements of machine element?

 b) A 50 mm diameter shaft is made from carbon steel having ultimate tensile str--ess of 630 Mpa.It is

subjected to a torque which fluctuates between 2000 N-m to 800 N-m .Using Soderberg method ,calculate

the factor of safety. Assume suita--ble values for any other data needed.

OR

3 a) Determine the diameter of a circular rod made of ductile material made with a fatigue strength (complete reversal) , $\sigma_e = 265$ Mpa and tensile yield strength of 350 Mpa.The member is subjected to a varying axial load from $W_{min} = - 300 \times 10^3$ N to $W_{max} = 700 \times 10^3$ N and has a stress concentration factor = 1.8.Use factor of safety as 2.0.

4 a) Design a double riveted butt joint with two cover plates for the longitudinal seam of a boiler shell 1.5 meter in diameter subjected toa steam pressure of 0.95 N/mm^2. Assume joint efficiency as 75%,allowable tensile stress in the plate 90 Mpa; compressive stress 140 Mpa ; and shear stress in the rivet 56 Mpa .

b) What is a weld joint, explain with a neat sketch.

OR

5 a) Discuss bolts of uniform strength.

 b) A steam engine cylinder has an effective diameter of 350 mm and the maximum steam pressure acting on the cylinder cover is 1.25 N/ mm^2 .Calculate the number and size of studs required to fix the cylinder cover ,assuming the permissible stress in the studs as 33 Mpa.

 6 a) W hat are the applications of a cottered joint?.

  b) Design and draw a cottered joint to support a load varying from 30 kN in compression to 30 kN in tension.The material used is carbon steel for which the following allowable stresses may be used.The load is applied statically.

   Tensile stress= compressive stress = 50 Mpa; shear stress= 35 Mpa and crushing stress=90 Mpa.

OR

7 a) Determine a sleeve and cotter joint to resist a tensile load of 60 kN .All the parts of the joint are made of the material with the following allowable stresses :

$\sigma_t = 60$ Mpa ; T = 70 Mpa ; and $\sigma_c = 125$ Mpa.

 b) what are the practical applications of a knuckle joint?.

8 a) How are the keys classified ?.

 b) A shaft is made of mild steel is required to transmit 100 Kw at 300 rpm.The supported length of the shaft is 3 meters.It carries 2 pulleys each weighing 1500 N supported at a distance of 1 meter from the ends respectively. Assuming the safe values of stresses ,determine the diameter of the shaft.

OR

9 a) What type of flexibility does an Oldham coupling provide ?.

 b) Design a muff coupling for a shaft transmitting 25Kw at 250 rpm. The safe shear stress for plain carbon steel shaft is 50 N/mm^2 and for the cast iron muff is 12 N/mm^2 . The allowable

shear and crushing stresses for key's material are 40.. N/mm $_2$ and 80 N/mm $_2$, respectively.Design torque may be taken as 1.15 times the average torque.

10 a) What do you mean by buckling of a spring ?.

  b) A helical spring is made from a wire of 6mm diameter and has outside diameter of 75 mm.If the permissible shear stress is 350 Mpa and modulus of rididity 84 KN/mm ^{2} , find the axial load which the spring can carryand the deflection per active turn.

OR

11 a) What are the materials and practical applications of various springs.

  b) Design a close coiled helical spring for a service load ranging from 2250 N and 2750 N. The axial deflection of the spring for the load range is 6 mm.Assume a spring index of 5.The permissible shear stress intensity is 420 Mpa and modulus of rigidity . G= 84 kN/ mm ^{2} . Neglect the effect of stress concentration .Draw a fully dimensioned sketch,showing details of the finish of the end coils.

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MECHANICAL DEPARTMENT
III B.TECH I SEM
SUB: Machine Design - I

MODEL PAPER-II

Time : 3 Hours   Max.Marks :75

Note : This   question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units . Answer any one full question from each unit.

Each question carries 10 marks and may have a,b,c as sub questions .

Part -A   (25 Marks)

1 a) Explain the different types of fits.   [2M]

 b) Define factor of safety and margin of safety.   [3M]

 c) What is the limitation of single strap butt joint   [2M]

 d) Define a cotter,why it is tapered ?.   [3M]

 e)Define bolt of uniform strength.   [2M]

 f) What are the different criteria of designing a shaft.   [3M]

 g) What do you mean by whirling of a shaft.   [2M]

 h) What are the various types of misalignments.   [3M]

 i) What is nipping of leaf springs .   [2M]

 j)What is spring surge.   [2M]

Part -B   (50 Marks)

2 a) What are the manufacturing considerations in welding process ?.

 b) A spherical vessel of 500 mm diameter is subjected to an internal pressure
which varies from 2 Mpa to 6 Mpa. The material of pressure vessel is cold drawn C 20
steel having ultimate tesile strength of 450 MN/m^2 and yield strength of 240 MN/m^2

.If the reliability of vessel is 95% and the required factor of safety is 3, find the thickness of the pressure vessel for an infinite life period.

OR

3 a) Determine the thickness of a 120 mm wide uniform plate for safe continuous operation if the plate is subjected to a tensile force that has a maxmimum value of 250 KN and a minimum value of 100 k N .The properties of the material are as follows :

Endurance limit stress =225 Mpa ,and yield point stress =300 Mpa.

The factor of safety based on yield point is 1.5.

4 a) Classify the permanent joints.

   b) Determine the weld size to be used for the bracket shown in figure .The maximum shear in the weld is limited to 800 kg/cm$^{2..}$
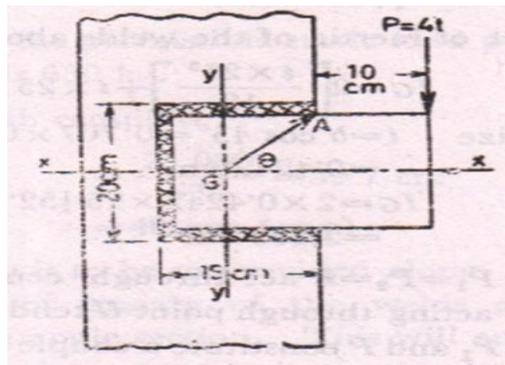
OR

5 a) Mention the efficiencies of riveted joints .

   b) Two lengths of mild steel tie rod having width 200 mm and thickness 12.5 mm are to be connected by means of a butt joint with double cover plates .Design the joint if the permissible stresses are 80 Mpa in tension, 65 Mpa in shearand 160 Mpa in Crushing . Make a sketch of the joint.

6 a) Two rod ends of a pump are joined by means of a cotter and spigot and socket at the ends .Design the joint for an axial load of 100k N which alternately changes from tensile to compressive. The allowable stresses for the material are 50 Mpa in tension , 40 Mpa in shear and 100 Mpa in crushing.

b) What are the failure modes of keys.

OR

7 a) A Steel shaft transmits 100 Kw at 200rpm,The maximum twisting moment during each revolution exceeds the mean by 30%. Suggest the suitable for the solid shaft if the torsional shear stress is not to exceed 65 Mpa.

 b) What are the materials used for shafts?.

8 a) What are the purposes of coupling ?

   b) Classify broadly about the types of couplings .

OR

9 a) How is the strength of a shaft is effected by a keyway.

   b) It is required to design a square key for fixing a gear on the shaft which transmits 10 Kw at 720 rpm.The shaft and the key are both made of plain carbon steel C 45 and the factor of safety is 3.0.

10 a) Explain leaf spring with a neat sketch.

   b) A semi elliptical spring has ten leaves in all,with the two full length leaves extending 625 mm.It is 62.5 mm wide and 6.25 mm thick. Design a helical spring with mean diameter of coil 100mm which will have approximately the same induced stress and deflection for any load. The E for the material of the semi elliptical spring may be taken as 200 KN/mm^2 and the modulus of rigidity for the material of helical spring is 80 KN/mm^2 .

OR

11a) What is the terminology of compression springs.

   b) Design a helical compression spring for a maximum load of 1000N for a deflection of 25 mm using the value of spring index as 5.
The maximum permissible value of shear stress for the spring wire is 420 Mpa and modulus of rigidity is 84 Kn/mm^2 .

The Wahl 's factor $K = \dfrac{4C-1}{4C-4} + \dfrac{0.615}{C}$ where C = spring index.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
MECHANICAL DEPARTMENT
III B.TECH I SEM
SUB: Machine Design - I

MODEL PAPER-III

Time : 3 Hours   Max.Marks :75

Note : This   question paper contains two parts A and B.

   Part A is compulsory which carries 25 marks. Answer all questions in Part A.

   Part B consists   of 5 Units . Answer any one full question from each unit.

   Each question carries 10 marks   and may have a,b,c as   sub questions .

Part -A   (25 Marks)

1 a)   What is the importance of maximum shear stress theory ?.   [2]

  b)   Classify mechanical design.   [3]

  c] What do you mean by temporary fasteners ?.   [2]

  d) What are the stresses induced in a riveted joint ,when it is loaded eccentrically?.   [3]

  e) What are the various types of screws ?.   [2]

  f) Why are the keys used in mechanical couplings ?   [3]

   g) Mention two types of loads on the shafts .   [2]

   h) What is the difference   between the flange coupling and   the protective   [3]

       rigid flange   coupling?.

   i) Write the torsion equation for   flange in a coupling.   [2]

   j) Define   spring index.   [3]

Part -B   (50 Marks)

2 a) Define   variable loads on machine elements.

  b) A hot rolled 070M26 steel rod is to be subjected to a tortional load that will vary from -110 N-m to 440 N-m. Determine the required diameter of the rod using a factor of safety of 1.75 .

OR

3 a) Classify the steels.

b) The piston of a reciprocating compressor has a diameter of 60mm .The maximum pressure on the piston face is 1.25 MN/ m ^{2} .Assuming that the gudgeon pin passing through the small end of the connecting rod can be safely loaded in shear upto 10 MN/m ^{2} .Calculate the minimum diameter of the gudgeon pin.

4a) Design a lap joint for a mild steel flat tie bar 200 mm x 10mm thick .using 24 mm diameter rivets.Assume allowable stresses in tension and compression of the plate material as 112 Mpa and 200 Mpa respectively and shear stress of the rivets as 84 Mpa.Show the disposition of the rivets for maximum joint efficiency and determine the efficiency.Take diameter of the rivet hole as 25.5 mm for a 24 mm diameter rivet.

 b) write IBR regulations for boilers.

OR

5a) Write design considerations in screw joints .

  b) The cylinder head of a steam engine is held ina position by 12 studs.The cylinder bore is 500 mm and the maximum pressure is 1.2 Mpa. A copper gasket is used to make the joint steam-tight. Select a suitable size of the stud.Assume appropriate initial tightening force, material of the studs and factor of safety.

6a) Where Knuckle joints are used?.

  b) Design a knuckle joint to transmit 150 KN.The design stresses may be taken as 75 Mpa in tension,60 Mpa in shear and 150 Mpa in compression.

OR

7a) Design and draw a cottered foundation bolt which is subjected to a maximum pull of 50 KN.The allowable stresses are : σ_t = 80 Mpa ; shear stress =50 Mpa and σ_c =100 Mpa.

8 a) What are flexible couplings, give two examples.

   b)Design a clamp coupling to transmit 30 Kw at 100 rpm.The allowable shear stresses for shaft and key is 40 Mpa and the number of bolts connecting two halves are six.The permissible tensile stress for the bolts is 70 Mpa.The coefficient of friction between the muff and the shaft surface may bne taken as 0.3.

OR

9a)   What do you mean by stiffness and rigidity of a shaft ?.

b) A shaft is supported by two bearings placed 1m apart. A 600 mm diameter pulley is mounted at a distance of 300 mm to the right of left hand bearing and this drives a pulley directly below it with the help of belt having maximum tension of 2.25KN. Another pulley 400 mm diameter is placed 200 mm to the left of right hand bearing and is driven with the help of electric motor and belt, which is placed horizontally to the l right.The angle of contact for both the pulleys 180^0 and μ =0.24.Determine the suitable diameter for a solid shaft,allowing working stress of 63 Mpa in tension and 42 Mpa in shear for the material of shaft. Assume that the torque on one pulley is equal to that on the other pulley.

10a) In what ways ,can the fatigue resistance of a leaf spring be increased?.

b) The free end of a torsional spring deflects through 90^0 when subjected to a torque 4 N-m.The spring index is 6.Determine the coil wire diameter and number of turns with the following data.

Modulus of rigidity   =   80 Gpa

Modulus of elasticity   =   200 Gpa

Allowable stress   = 500 Mpa.

OR

11) A rail wagon of mass 20 tonnes is moving with a velocity of 2m/s. It is brought to rest by two buffers with springs of 300mm diameter.The maximum deflection of springs is 250 mm.The allowable shear stress in the spring material is 600 Mpa.Design the spring for the buffers.

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III B.TECH I SEM
SUB: Machine Design - I

MODEL PAPER-IV

Time : 3 Hours   Max.Marks :75

Note : This   question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units . Answer any one full question from each unit.

Each question carries 10 marks and may have a,b,c as sub questions .

Part -A   (25 Marks)

1 a) What are the factors to be considered for the selection of materials   for the   design of machine elements ?.   [2]

b) Illustrate how the stress concentration in a component can be reduced.   [3]

c) What is an economical joint and where does it find applications?   [2]

d) Sketch and discuss the various types of welded joints used in pressure vessels.   [3]

e) Distinguish between cotter joint and   Knuckle joint.   [2]

f) What is the   effect of keyway cut into the shaft ?.   [3]

g) What type of stresses are induced in shafts ?.   [2]

h) What are flexible couplings and what are their applications ?   [3]

i) Classify springs according to their shapes .   [2]

j) What is nipping in a leaf spring?   Discuss its role.   [3]

Part -B   (50 Marks)

2)   A mild steel shaft   of 50 mm diameter is subjected to a bending moment of 2000 Nm and a torque T. If the yeild point of   the steel in tension is 200 MPa, find the maximumvalue of this torque without causing yielding of the shaft   according to (a) the maximum principal stress theory   (b) the max shear stress   theory and (c) the maximum distortion strain energy theory of yielding   [10]

4) Design the longitudinal joint for a 1.25 m diameter steam boiler to carry a steam pressure of 2.5 N/mm^2 . The ultimate strength of the boiler plate may be assumed as 420MPa, crushing strength as 650 MPa and shear strength as 300 MPa. Take the jointefficiency'as 80%. Sketch the joint with all dimensions. Adopt the suitable factor ofsafety.   [10]

OR

5 a) Design a double riveted butt joint with two cover plates for the longitudinal seam of a boiler shell 1.5 meter in diameter subjected toa steam pressure of 0.95 N/mm ^{2}. Assume joint efficiency as 75%,allowable tensile stress in the plate 90 Mpa; compressive stress 140 Mpa ; and shear stress in the rivet 56 Mpa .
b) What is a weld joint, explain with a neat sketch.

 6) Design and draw a sleeve and cotter joint to resist a tensile load of 60 kN. All parts of the joint are made of the same material with the following allowable stresses: Tensile stress = 60 MPa,Shearstress =70 MPa and crushing stress = 125 MPa.   [10]

OR

7) Design and draw a knuckle joint to connect two mild steel bars under a tensile load of25 kN. The allowable stresses are 65 Mpa in tension, 50 MPa in shear and 83 Mpa in crushing. [10]

8) A steel solid shaft transmitting 15 kw at 200 rpm is supported on two bearings 750 mm apart and has two gears keyed to it.The pinion having 30 teeth of 5 mm module is located 100 mm to the left of the right hand bearing and delivers power horizontally to the right. The gear having 100 teeth of 5 mm module is located 150 mm to the right ofthe left hand bearing and receives power in a vertical direction from below. Using an,allowable stress of 54 Mpa in shear , determine diameter of the shaft.   [10]

OR

9) Design and draw a protective type of cast iron flange coupling for a steel shaft transmitting 15 kW at 200 rpm and having   an allowable shear stress of 40 MPa. The working stress in the bolts should not exeeed 30 MPa. Assume that the same material is used for shaft and key and that the crushing stress is twice the value of its shear stress. The maximum torque is 25% greater than the full load torque. The shear stress for cast iron is 14 MPa.   [10]

10) Design a helical spring for a spring loaded safety valve for the following conditions:

Diameter of the valve seat = 65 mm

Operating pressure = 0.7 N/mm^2

Maximum pressure when the valve blows off freely = 0.75 N/mm^2

Maximum lift of the valve when the pressure rises from 0.7 to 0.75 N/mm^2 is 3.5 mm

Maximum allowable stress = 550 MPa

Modulus of rigidity = 84 kN/mm2

Spring index = 6

Draw a neat sketch of the free spring showing the main dimensions. [10]

OR

11) A helical spring B is placed inside the coils of a second helical spring A, having the same number of coils and free length. The springs are made of the sarhe material. The composite spring is compressed by an axial load of 2300 N which is shared between them. The mean diameters of the springs A and B are 100 mm and 70 mm respectively and wire diameters are 13 mm and 8 mm respectively. Find the load taken and the maximum stress in each spring. [10]

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SUB: Machine Design - I

MODEL PAPER-V

Time : 3 Hours   Max.Marks :75

Note : This   question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units . Answer any one full question from each unit.

Each question carries 10 marks and may have a,b,c as sub questions .

Part -A   (25 Marks)

1a) What design parameters are calculated when bolt is under tension ?. [2] b) What are the

steps involved in design of machine elements? Why does the tensile strength of cast iron

decrease as the thickness of part increases? [3]

c) What is the difference between caulking and fullering? Explain with the help of neat
   sketches?   [2]

d) How are the keys clssified ? Draw neat sketches of different types of keys and state their
   applications?   [3]

e) What are the materials for making transmission shaft?   [2]

f) How the shaft is designed when it is subjected to twisting moment and axial stress? [3]

g) What types of stresses are induced in shafts?   [2]

h) What are the advantages of flexible coupling ?.   [3]

i) For what purpose is a concentric helical compression spring used ?.   [2]

j) Explain the utility of the center bolt , U-clamp , rebound clip and   camber in a leaf
spring .   [3]

Part -B   (50 Marks)

2a) What do you understand by preferred numbers? Explain in detail.   [4]

b)The load on a bolt consists of an axial pull of 20 KN together with a transverse shear force of 5 KN. Find the diameter of bolt required according to Maximum distortion energy theory.   [6]

OR

3 a) Explain the terms 1) Stress Concentration factor 2) Notch sensitivity   [3]

 b) A leaf spring in an automobile is subjected to cyclic stresses.The average stress = 150 MPa, Variable stress = 500 MPa, Ultimate stress = 630 MPa, Yield stress = 350 MPa, and endurance limit = 150 MPa.Estimate under what factor of safety the spring is working by Goodman's and Soderberg's formula.   [7]

4 (a) What are the two methods to make bolt of uniform strength?   [3]

 (b) A wall bracket is attached to a wall by means of four identical bolts, two at A and two at B as shown in fig. Assuming that the bracket is held against the wall and prevented from tipping about point C by all four bolts and using an allowable tensile stress in the bolts as 35 N/mm^2. Determine the size of the bolts on the basis of Maximum principal stress theory.   [7]
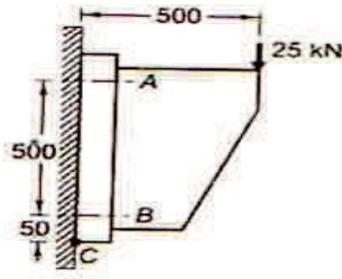
OR

5a)What is an eccentric riveted joint? Explain the method adopted for   [3]
designing such a joint?

b)A 65 mm diameter solid shaft is to be welded to a flat plate by a fillet weld around the circumference of the shaft. Determine the size of the weld if the torque on the shaft is 3 KN-m. The allowable shear stress in the weld is 70 MPa.   [7]

6a) What is cotter joint? Explain with the help of a neat sketch, how a cotter joint is made?   [4]

 b) A 20 KW, 960 rpm motor has a mild steel shaft of 40 mm diameter and the extension being 75 mm. The permissible shear and crushing stresses for the mild steel key are 50 MPa and 120 MPa. Design the keyway in the motor shaft extension.   [6]

7a) Write about working principle of 'sleeve and cotter joint' and 'jib and cotter joint?

[3]

b) A shaft 80 mm diameter transmits power at maximum shear stress of 63 MPa. Find the length of a 20 mm wide key required to mount a pulley on the shaft so that the stress in the key does not exceed 42 MPa. [7]

8 a) A hollow shaft has greater strength and stiffness than solid shaft of equal weight. Explain. [4]

b) Find the diameter of a solid steel shaft to transmit 20 kW at 200 r.p.m. The ultimate shear stress for the steel may be taken as 360 MPa and a factor of safety as 8. If a hollow shaft is to be used in place of the solid shaft, find the inside and outside diameter, when the ratio of inside to outside diameter is 0.5.

[6]

OR

9)   Design a bushed-pin type of flexible coupling to connect a pump shaft to a motor shaft transmitting 32 kW at 960 r.p.m. The overall torque is 20 percent more than mean torque.

The material properties are as follows :
The allowable shear and crushing stress for shaft and key material is 40 MPa and 80 MPa respectively.
The allowable shear stress for cast iron is 15 MPa.
The allowable bearing pressure for rubber bush is 0.8 N/mm$_2$.
The material of the pin is same as that of shaft and key.

10 a)Draw a neat sketch of multi leaf spring and show its essential parts. Also explain nipping leaf spring [4]

b)   Find the maximum shear stress and deflection   induced in a helical spring of the   [8]

following specifications, if it has to absorb 1000 N-m of energy

Mean diameter of spring = 100 mm; Diameter of steel wire, used for making the spring = 20 mm; Number of coils = 30; Modulus of rigidity of steel = 85 kN/mm^2. [6]

OR

11a) Describe different end connections for compression springs. [3]

b) Design a spring for a balance to measure 0 to 1000 N over a scale of length 80 mm. The spring is to be enclosed in a casing of 25 mm diameter. The approximate number of turns is 30. The modulus of rigidity is 85 kN/mm^2. Also calculate the maximum shear stress induced .

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SUB: MT
MODEL PAPER-I

Note: This question paper contain two parts A and B..Part A is compulsory which carries 25 marks. Answer all question in part A. part B consists of 5 units. Answer any one full question from each unit. Each question carries 10 marks and may have a,b,c as sub questions.

PART A (25 MARKS)

1. a) Discuss the variables affecting tool life?   [2]
b) Explain requirement of tool materials?   [3]
c) Discuss about attachment of lathe?   [2]
d)What are the main parts capstan and turret lathe?   [3]
e)List out the types of boring machine?   [2]
f) List the advantages of shapers?   [2]
g) Describe a milling cutter?   [3]
h) Define honing process?   [2]
i)What is the difference between rough grinding and precision grinding?   [3]

PART-B (50 MARKS)

2.a) Describe basic requirements of machining?
   b) Explain the construction of merchant force diagram?

(OR)
3.a) List out various tool materials and explain their applications?
   b)Explain the use of chip breakers in metal cutting?

4.a)Explain the principal features of automatic lathes?
   b) Discuss about the thread turning attachment on lathe?
(OR)
5.a)Differentiate between single spindle and multi spindle automatic lathes?
   b)Discuss the working of various tool holding devices of lathe?

6.a)Explain various operations performed in drilling machine?
   b)Sketch and explain the working of hydraulic drive of a horizontal shaper?

(OR)

7.a)What is the planner? Illustrate and describe its working principle?
 b) Explain operation of vertical boring machine?

8.a)Sketch and describe a vertical milling machine?

b)List the product applications of lapping process?

(OR)

9.a)With the help of a neat diagram. explain the honing process?

b) Explain the factors to be considered while selecting a milling cutter?

10.a) Sketch and explain the three methods of external cylindrical centre less grinding?

b) Explain the different types of abrasives used in grinding wheel?

(OR)

11.a)Differentiate between traverse and plunge grinding?

b)Explain with neat sketch i) Centre less grinding ..ii) Internal grinding.

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SUB: MT
MODEL PAPER-2

Note: This question paper contain two parts A and B..Part A is compulsory which carries 25 marks. Answer all question in part A. part B consists of 5 units. Answer any one full question from each unit. Each question carries 10 marks and may have a,b,c as sub questions.

PART A (25 MARKS)

1.a) What are the causes of built up edge?   [2]
b)What are the various types of single point cutting tools?   [3]
c)Applications of lathe?   [2]
d)What is the chucks? Differentiate between independent and universal holding chuck?   [3]
e)What are the parts in planner machine?   [2]
f) What are the specifications of drilling machine?   [3]
g) What is tap? How the taps are Classified?   [2]
h) h) What is the main difference between horizontal and vertical milling machine?   [3]
i)What are the limitation of surface grinding?   [3]
j)What is honing?   [2]

PART-B (50 MARKS)

2.a) What are the various types of chips formed during machining ? under what conditions is each formed?

b) A carbide tool with mild steel work piece was found to give life of 2 hours while cutting at 0.50 mpm. Compute the tool life if the same tool is used at a speed of 25% higher than the previous one. Also determine the value of cutting speed if the tool is required to have tool life of 3 hours. Assume Taylors exponent n=0.27.

(OR)

3. What is tool signature ? with a neat diagram define varios angles in single point cutting tool geometry ?

4.a) Explain any three methods of taper turning on a lathe?
  b)Differentiate between turret and capstan lathe machines state their applications?

(OR)
5.a) Classify different types of lathe .Explain any one in detail?

  b)Explain about tool layout of automatic lathe with a neat sketch?

6.a) How is planner specified? Differentiate shaper, planner and slotting machine?

   b)With a neat sketch explain construction and working of a planner?

<div align="center">

(OR)

</div>

7.a) With a neat sketch explain construction and working of jig boring machine?

   b) A hole of 50 mm and 75 mm depth is to be drilled in a mild steel component. The cutting speed can be taken as 65 mm and the feed rate as 0.25 mm rev. calculate the machining time and material removal rate?

8.a)State the various type of milling cutters .Explain any three of them?

  b)Distinguish between simple, compound and differentiate indexing head?

<div align="center">

(OR)

</div>

9.a) Compare the grinding with lapping and broaching process?

   b)Give the kinematic scheme of lapping with neat diagrams?

10.a) Explain with a neat sketch the construction and working of tool and cuttergrinder?

   b) State the advantages and limitations of centre less grinding?

<div align="center">

(OR)

</div>

11.a) What are differentiate type of grinding machines? Draw and describe the surface grinding machine?

b) Mention the various types of bonds used in the making of grinding wheel. Also mention their applications/

Note: This question paper contain two parts A and B..Part A is compulsory which carries 25 marks. Answer all question in part A. part B consists of 5 units. Answer any one full question from each unit. Each question carries 10 marks and may have a,b, c as sub questions.

PART A (25 MARKS)

1.a) Differentiate ORS and ASA system?   [2]
b)What are the types of chip breakers?   [3]
c)Why are engine lathes called by that lathe?   [2]
d)Define speed ,depth of cut and feed for plain turning operation?   [3]
e)Classify and list of shapers and planners?   [2]
f)Write short notes on the elements of drilling machine?   [3]
g)What is reaming and counter bouring?   [2]
h)What is jig boring?   [3]
i)What are the merits and demerits of grinding?   [2]
j)What are roll grinders and where are they used?   [3]

PART-B (50 MARKS)

2.a) Explain the mechanism of chip formation in metal cutting with a neat sketch?

b) what is meant by built up edge? State the causes of it?

(OR)

3.a) Define cutting speed ,feed , and depth of cut with respect turning process , also state the units of measurements?

b)Describe basic elements of machining/

c)Explain briefly mechanics of chipformation?

4.a) What are the different operations performed on lathe explain briefly?

 b)Explain about work holding devices and tool holding devices on lathe?

(OR)
5.a) Discuss the different operations that can be performed on turret and capstan lathe operations?

b)Write briefly about tooling layout of automatic lathes?

6.a) Explain construction and working of universal drilling machine with a neat sketch?

   b)Describe the vertical boring machine. What they are performed and why?

(OR)

7.a) Describe the operation of quick return motion in mechanical shaper?

   b)Explain the principal of planner and types of planner machine?

8.a) Name the various milling attachments? Explain universal milling with neat diagram ?

   b)What is indexing ? describe direct indexing with example?

(OR)

9.a) Specify the honing parameters for good honing process?

   b)Give advantages and limitations of honing and lapping?

   c) Give the complete classifications of broaching machines?

10.a) Briefly describe about tool and cutter grinding machine?

   b) Describe dressing and balancing in grinding requirement in grinding?

   c)What are the advantages and limitations of using centre less grinding?

(OR)

11.a) How is abrasive is selected for grinding operation?

   b) Specify different grinding machines?

   c)Explain clearly the various thermal effects in grinding?

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III B.TECH I SEM
SUB: MT
MODEL PAPER-4

Note: This question paper contain two parts A and B..Part A is compulsory which carries 25 marks. Answer all question in part A. part B consists of 5 units. Answer any one full question from each unit. Each question carries 10 marks and may have a,b, c as sub questions.

PART A (25 MARKS)

1.a) What are the types of chips?   [2]
b)What are the requirements of cutting tool?   [3]
c)What are the parts of engine lathe?   [2]
d)What is spinning?   [2]
e)How is shaping machine specified?   [3]
f)Explain the slotted link and gear mechanism?   [2]
g)What are the different types of drills used?   [3]
h)What is the difference between peripheral milling and face milling?[3]
i)What is a centre less internal grinder?   [2]
j)What is grain, bond and structure?   [3]

PART-B (50 MARKS)

2.a) Explain the methods for changing feed in gear boxes in detail with suitable sketches?

  b)Draw the merchants circle diagram and derive the expressions to show the relationships among the different forces acting on the cutting tool and different parameters involved in metal cutting?

(OR)
3.Write short notes on the following
   a) Chip breakers in single point cutting tools?
   b) Advantages of negative rake angle?
   c) Cutting speed and feed?

4.a) How do you classify turret lathes? Give a brief description of different types?
 b)Write briefly about following holders used in capstan and turret lathes ?
      i) Multiple cutter holder, ii)Drill tool holder
(OR)

5. a) How do you specify the lathe? What is the material used for lathe beds and explain the

reasons for using such material?

b) Explain about box tool with a neat sketch. When it is used and what are its advantages?

6.a) Describe the various elements of a twist drill with a neat sketch?

b)What factors contributes to increased production rates in broaching?

(OR)

7.a) Define speed, feed, depth of cut and machining time in shaper with a neat sketch?

b)Define speed, feed, depth of cut and machining time in planner with a neat sketch?

8.a) Make a neat sketch of universal milling machine indicating the various controls and constructional features? Give brief description ?

b)Difference between up milling and down milling explain their applications/

(OR)

9.a) What is difference between compound indexing and differential indexing/

b)What are the various types of milling cutters and used in milling explain?

10.a) Describe grinding wheel structure with a neat sketch?

b)Compare grinding honing and lapping?

(OR)

11.a) What are the advantages and limitations of using centre less grinding?

b)Discuss various variables of grinding process?

c)What is grindability, sensitivity,Finishability and grinding ratio?

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
MECHANICAL DEPARTMENT   **SUB: MSE**
MODEL PAPER 1

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all question in part A. part B consists of 5 units. Answer any one full question from each unit. Each question carries 10 marks and may have a,b,c as sub questions.

PART A   (25 MARKS)

1. a.Give the complete classification of clearance fit. Explain them with the help of suitable examples

                                              (2M)

  b. Explain with neat sketches, the construction and application of vernier bevel protractor?

                                              (3M)

  c. Explicate the principle of operation of optical flats   (2M)

  d.What is profilomete?   (3M)

  e. Explain the important of British standard system and ISO of limits and fits?   (2M)

  f. Enumerate various interferometers.   (3M)

  g. Enumerate various screw thread parameters for metrological measurement.   (2M)

  h. Describe the working principle of electronic comparators.   (3M)

  i. What are angle gauges? Discuss their use in metrology lab   (2M)

  j. Differentiate between measuring instrument and comparator.   (3M)

PART B   (50 MARKS)

2. a)What are the various orders of geometrical irregularities on surfaces? How these are classified?

  b) As per ISI specification how many roughness grade numbers are specified? Draw the roughness symbol for each grade and indicate its Roughness values?

OR

3. a) What are slip gauges ? For what purpose they are used?

  b) Give the classification of slip gauges according to their accuracy?

4.Describe the following alignment tests on a lathe for i. Level of installation ii. Parallelism of tail stock sleeve to saddle movement.

OR

5. a) Explain how flatness errors of lapped surfaces are measured with an optical flat?

  b) Describe the three methods of testing straight edge of one meter long?

6. State uses of i)Tool makers flat ii) angle plate iii) V Block iv) Straight edge

OR

7. Difference between a) Roughness and waviness ?

b) Direct and Indirect methods of Roughness measurement?

8. A 35 mm diameter shaft and bearing ate to be assembled with clearance fit. The tolerances and allowances are as under

Allowances=0.003mm

Tolerance on hole= 0.007mm

Tolerance on shaft=0.002 mm

OR

9. Explain terms : Interchageablity and selective assembly. Enumerate the differences between them.

10. a) What is the principle of sine bar and limitations of sine bar?

b) What are the types of sine bar?

c) Explain the uses of sine bar?

OR

11. a)What is the role of CMM?

b) Types of Coordinate Measuring machines?

c) What are the advantages & Applications of CMM?

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
MECHANICAL DEPARTMENT   **SUB: MSE**
MODEL PAPER 2

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all question in part A. part B consists of 5 units. Answer any one full question from each unit. Each question carries 10 marks and may have a,b,c as sub questions.

PART A   (25 MARKS)

1. a.Define terms of a)Allowance b) Limits c) Tolerance d)fits?   (2M)

b.Name the various instruments used for measuring angles?   (3M)

c.Explain the symbols used to represent surface roughness?   (2M)

d.What is Optical flat and what are its uses?   (3M)

e.What are the main instruments required for geometric test for testing machine tools   (2M)

f.Differentiate between measuring instrument and comparator.   (3M)

g.Discuss in detail the salient features of the system of limits and as per Indian standard   (2M)

h.What is the effect of pitch error on effective diameter?   (3M)

i.Describe the working mechanism of dial indicator?   (2M)

j.Difference between primary texture and secondary texture?   (3M)

PART B   (50 MARKS)

2. a) What is Interchangeable manufacture? Briefly describe different types of Interchange ability?

   b) A gear ring of 85 mm diameter bore is fitted on to a hub resulting in H7/J6 fit. Calculate the tolerances and hence the limits of size for hub and gear bore. Specify the type of fit. The diameter step is 80-100mm. The fundamental deviation for J shafts is 0.009mm.

OR

3. a)State the principle of a micrometer & sketch outside micrometer and name its various parts?

   b) With the help of sketch describe a vernier type micrometer. How do you calculate its least count?

4. Describe the following methods of checking straightness of a surface?

   i) Auto collimator method ii) Straight edge method.

OR

5. a) Explain the construction and working of a profilograph for surface roughness measurement?

   b) Explain the following terms i) Roughness ii)waviness iii) Lay

6. a) Explain the nomenclature of screw thread with the help of a neat sketch?

b) Discuss the various types of pitch errors along with their causes and effects?

OR

7. a) Discuss the Principles of NPL flatness interferometer?

b) Explain how flatness errors of lapped surfaces are measured with an optical flat?

8. Define terms: Clearance; interference; allowance fit. Draw a conventional diagram for explicit representation of these terms on a shaft and hole pair. ii. he hole and shaft assembly of 90 mm nominal size have tolerances specified as mm for shaft. Determine i. Maximum and minimum clearance (interference) attainable. ii. Allowance (iii) Hole and shaft tolerances (iv) Fundamental deviation (v) MML for shaft and hole (vi) Type of fit. Sketch these values on a conventional diagram.

OR

9. a)Explain the details of construction, Principle and operation of stylus probe?

b) What are the advantages and limitations of stylus probe?

10. Describe taking linear measurements with "inside micrometer" ii. Describe the calibration of slip gauges by Eden-Rolt millionth comparator.

OR

11. Describe with the help of a neat sketch the working of "Gear tooth vernier caliper".

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

MECHANICAL DEPARTMENT   **SUB: MSE**

MODEL PAPER 3

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all question in part A. part B consists of 5 units. Answer any one full question from each unit. Each question carries 10 marks and may have a,b,c as sub questions.

PART A   (25 MARKS)

1. a. Explain difference between Tolerance and Allowance   (2M)
b. Explain the Taylors principle of gauge design   (3M)
c. Name the various types of interferometers   (2M)
d. What are the factors Affecting Surface Roughness   (3M)
e. Discuss about types of Assemblies used in engineering   (2M)
f. Explain the principle of spirit level
g. Difference between comparator and a gauge   (2M)
h.What are the various manufacturing errors in gear   (3M)
i. What is an Optical flat?   (2M)
j. State how surface finish is designated on drawings   (3M)

PART B   (50 MARKS)

2. a) Explain the relationship between the Cost Vs tolerance

   b) Draw the conventional diagram of limits and fits and explain the terms:

   i) Basic size, ii) Upper deviation ,iii) Lower deviation ,iv) fundamental deviation and v) Zero line

OR

3. What is wringing? Explain the procedure for wringing of slip gauges?

4. Describe surface measurement with inspection by comparison methods?

OR

5. a)Explain the use of rollers and slip gauges for the measurement of minor diameter of internal threads?

   b) Explain how effective diameter of an external thread can be measured using two wire method?

6. Describe briefly with neat sketches   a) Sine centre   b) Sine table?

OR

7. a) what are the advantages of Interchangeability

   b) Explain briefly the difference between the interchangeable manufacturing and selective assembly

8. a) Explain the principle of an optical projector.

   b) Explain the working of an optical projector and applications with neat diagram.

OR

9. a) In the measurement of surface roughness, heights of 10 successive peaks and valleys were measured from a datum as follows

| Peaks : | 45 | 42 | 40 | 35 | 35 | μm |
| Valleys: | 30 | 25 | 25 | 24 | 18 | μm |

Determine the Rz value of the surface?

   b) Write short note on grades for specifying the surface texture?

10. Elucidate the Effective diameter measurement by two wire method

OR

11. a)What is Optical flat and what are its uses?

   b) Describe Michelson's interferometer?

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
MECHANICAL DEPARTMENT   SUB: MSE
MODEL PAPER 4

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all question in part A. part B consists of 5 units. Answer any one full question from each unit. Each question carries 10 marks and may have a,b,c as sub questions.

PART A   (25 MARKS)

1. a. What are the advantages of interchangeable assembly?   (2M)

b. What is a collimator? Explain its working?   (3M)

c. What is wringing ? Explain the procedure for wringing of slip gauges?   (2M)

d. Difference between primary texture and secondary texture?   (3M)

e. Discuss the various types of pitch errors along with their causes and effects?   (2M)

f. Explain Tool Makers Microscope with neat sketch   (3M)

g. Describe pitch measurement of internal and external screw threads by pitch measuring machine?

(2M)

h. Define terms of a)Allowance b) Limits c) Tolerance d)fits?   (3M)

i. Write short note on grades for specifying the surface texture?   (2M)

j. Give the classification of slip gauges according to their accuracy?   (3M)

PART B   (50 MARKS)

2. Describe with a sketch the working principle of an autocollimator. What is meant by flatness? How is it measured with autocollimator? What are the uses of the instrument?

OR

3. i. Explicate i. position gauge ii. snap gauge with sketches. ii. Design and sketch a working gauge with a GO and NO-GO ends for spindle mm and a hole of mm.

4. i. Describe the working principle of tool markers microscope. What are its uses ii. Explicate the utility of straight edge and surface plate in laboratories.

OR

5. i) Enumerate various alignment tests on milling machine.

ii. Enumerate the various equipments and their essential precision and accuracy levels for performing alignment tests

6. Explain the manufacturing process, calibration , and uses of slip gauges

OR

7. Calculate CLA and RMS roughness values for the following date: Sampling length:20 mm, peaks : 40, 42, 40, 41, 42, valleys : 25, 22, 22, 24, 23.

8. Describe with the help of a neat sketch the working of "Gear tooth vernier caliper".

OR

9. Explain terms : Interchageablity and selective assembly. Enumerate the differences between them. ii. Determine and sketch the limits of tolerance and allowance for a 25 mm shaft and hole pair designated H8 - d9. The basic size lies in the range of 18-30mm. The multipliers for grades 8 and 9 are 25 and 40 respectively. The fundamental deviation for 'd' shaft is (-16D0.44) microns.

10. a) Taking an example, Explain the concept of limit gauging. What are its advantages and disadvantages?

b) What are angle gauges? Discuss their use in metrology lab?

OR

11. a) What are the elements of surface texture with neat diagram?

   b) What are the advantages and limitations of stylus probe?

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
MECHANICAL DEPARTMENT   SUB: MSE
MODEL PAPER 5

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all question in part A. part B consists of 5 units. Answer any one full question from each unit. Each question carries 10 marks and may have a,b,c as sub questions.

PART A   (25 MARKS)

1. a. Explain about tolerance system with neat diagram   (2M)

b. Define fit   (3M)

c. Explain the construction and working of bevel protractor with neat diagram   (2M)

d. State the advantages and possible sources of errors in CMM.   (3M)

e. Define fit.   (2M)

f. Explain optical flat types and its limitations   (3M)

g. Define the principle of profilograph.   (2M)

h. Explain the principle of Tool Makers microscope.   (3M)

i. Explain the uses of limit gauges in mass production   (2M)

j. Explain about the Primary Texture along with neat diagram   (3M)

PART B   (50 MARKS)

2. Define terms: Clearance; interference; allowance fit. Draw a conventional diagram for explicit representation of these terms on a shaft and hole pair. ii. he hole and shaft assembly of 90 mm nominal size have tolerances specified as mm for shaft. Determine i. Maximum and minimum clearance (interference) attainable. ii. Allowance (iii) Hole and shaft tolerances (iv) Fundamental deviation (v) MML for shaft and hole (vi) Type of fit. Sketch these values on a conventional diagram.

OR

3. a) In the measurement of surface roughness, heights of 10 successive peaks and valleys were measured from a datum as follows

| Peaks : | 45 | 42 | 40 | 35 | 35 | μm |
| Valleys: | 30 | 25 | 25 | 24 | 18 | μm |

Determine the Rz value of the surface?

   b) Write short note on grades for specifying the surface texture?

4. a) Taking an example, Explain the concept of limit gauging. What are its advantages and

disadvantages?

    b) What are angle gauges? Discuss their use in metrology lab?

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

5. A hole and mating shaft are to have nominal and minimum assembly size of 50 mm. The assembly is to have a maximum clearance of 0.15mm and a minimum clearance of 0.05mm. The hole tolerance is 1.5 times the shaft tolerance. Determine the limits for both hole and shaft by using i) Hole basis system ii)Shaft basis system.

6. a) Discuss the Principles of NPL flatness interferometer?

    b) Explain how flatness errors of lapped surfaces are measured with an optical flat?

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

7. a) Describe the working mechanism of dial indicator?

    b) Advantages and disadvantages of dial indicators?

8. a) What is profilometer? Sketch and explain the use of profilometer?

    b) Explain the symbols used to represent surface roughness?

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

9. a) Explain the nomenclature of screw thread with the help of a neat sketch?

    b) Discuss the various types of pitch errors along with their causes and effects?

10. i. Explicate the working principle of an Autocollimator. ii. Explicate the use of interferometer in measuring flatness of surfaces.

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

11. a) What is the role of CMM?

    b) Types of Coordinate Measuring machines?

    c) What are the advantages & Applications of CMM?

PART A   (25 MARKS)

1. a. Explain briefly requirements and uses of biogas in I.C. engine.   (2M)
   b. Write a short note on vegetable oil as an alternate fuel.   (3M)
   c. Discuss advantages and disadvantages of gaseous fuel over liquid fuels. (2M)
   d. Write a short note on green house effect.   (3M)
   e Explain the term calorific values of fuels.   (2M)
   f. Write a short note on 'CNG as an engine fuel' for I.C. Engine   (3M)
   g. Define alternative fuel.   (2M)
   h. Write a short note on biodiesel production process.   (3M)
   i. Write a short note on eco friendly plastic fuels.   (2M)
   j. Write a short note on fuel cell.   (3M)

PART B   (50 MARKS)

2. a) Explain use of LPG as fuel for I.C. engines.
   b) Write merits and limitations of Hydrogen as an automotive fuel.

OR

   Explain the properties of C.N.G. as engine fuels.

3. a) Discuss production and storage of hydrogen.
   b) Discuss engine performance and exhaust emissions using CNG.

OR

   Compare ethanol and methanol as substitute to gasoline.

4. Discuss "scope of availability of fossil fuel in future".

OR

   Explain the manufacturing of ethanol fuel.

5. Explain the properties of alternative fuels

OR

   Enlist various vegetable oils used as an engine fuel and write its required characteristics.

6. a) Explain the performance of alcohol fuel compare with petrol fuel
   b) Explain layout of fuel cell vehicle.

OR

   Describe the working of fuel cell vehicles.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
MECHANICAL DEPARTMENT
III B.TECH I SEM
SUB: AFIC
MODEL PAPER-I
PART A   (25 MARKS)

1.
a) Define alternative fuel.   (2M)
b) Write short notes of need for alternative fuels.   (3M)
c) List out the raw materials for manufacture of alcohol fuels   (2M)
d) What are the disadvantages of LPG fuel?   (3M)
e) What are the advantages of Ammonia fuel?   (2M)
f) Draw the chart for briefing about percentage availability of world energy sources and their main uses?   (3M)
g) Write advantages of electric vehicles.   (2M)
h) Enumerate the desirable properties of alcohol as engine fuel   (3M)
i) Brief about emission characteristics of methanol and gasoline blend used in C.I., engines. (2M)
j) What are the advantages of CNG fuel?   (3M)

PART B

(50 MARKS)

2.   **(a)**   Explain Green house effect and the factors affecting it.
         (b)   Explain sources of fossil fuel, scope of availability of fossil fuel in Future.
                                          OR
         (a)   Explain process of separation of Bio-diesel.
         (b)   Explain sources of Methanol and Ethanol, methods of its production.
3.   Discuss the emission norms and procedure for confirmation of Bharat Standard IV
OR
         (a)   Discuss layout of hydrogen car with neat sketch.

         (b)   Draw schematic layout of solar powered auto vehicle and give its advantages.

4.   **(a)**   Compare various parameters of three different Alternative fuels.

         (b)   Write economics of application and advantages of liquid hydrogen as fuel for IC engine.

OR
         (a)   What is Eco plastic fuel? Discuss scope of it.

         (b)   Write short note on variable compression engine.

5.   **(a)**   What is emulsification of alcohol with diesel? Describe emission improvement by blending of alcohol with diesel.
         (b)   What   is fuel cell? Explain its power rating and performance
                                          OR.
         (a)   Explain advantages and limitation of electric vehicles.

         (b)   Write a short note on Sterling engine.
6.   **(a)**   Describe the procedure for Carbon credit calculation briefly.
                   (b) Write short note on Esterification.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
MECHANICAL DEPARTMENT
III B.TECH I SEM
SUB: AFIC
MODEL PAPER-III

1.   **PART A**   **(25 MARKS)**

    a) What are the properties of CNG fuel?   (2M)

    b) What are the advantages of CNG fuel?   (3M)

    c) Explain in brief surface ignition concept.   (2M)

    d) Write the chemical equation for esterification of vegetable oil and explain the esterification process.   (3M)

    e) What are the problem experienced while using vegetable oil in diesel engine? (2M)

    f) Explain about storage and handling of hydrogen as engine fuel.   (3M)

    g) What is esterfication of vegetable oils?   (2M)

    h) Brief about bio-fuel and its characteristics   (3M)

    i) Explain the on-board production of Hydrogen.   (2M)

    j) Explain unfavorable proprieties of Vegetable oil.   (3M)

PART B   (50 MARKS)

2. a) Describe the harmful effects of each pollutants from exhaust gases of auto vehicle on atmosphere and human being in details.

  b) What is the need of alternative fuels? Discuss the barriers in implementing alternative fuels in India.

OR

  a) Write a short note on green house effect.

  b) What is emulsification of alcohol with diesel? Describe emission improvement by blending of alcohol with diesel.

3.   Discuss advantages, disadvantages & properties of hydrogen fuel with its applications.

OR

  a) Enlist factors affecting biogas formation.?

  b) Describe the three methods of testing straight edge of one meter long?

4. Describe the process for production of biodiesel from Jatropha seeds.

OR

  a) Write a short note on fuel cell with neat sketch.

  b) Compare LPG, CNG and gasoline fuel on basis of cost and safety.

5. a) Explain solar powered vehicle with neat sketch.

  b) Explain important components of hybrid vehicle.

OR

  a) Write a short note on Eco Friendly Plastic Fuels.

  b) Discuss about carbon foot print and Carbon credit calculation.

6. a) Write merits and demerits of alcohol as a fuel for IC engine.

  b) Draw layout of hydrogen car and explain it.

OR

Discuss Performance and emission characteristics of any one vegetable oil on IC engine.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
MECHANICAL DEPARTMENT
III B.TECH I SEM
SUB: AFIC
MODEL PAPER-IV

PART A   (25 MARKS)

1. a. Brief about hi-energy and power density battery.   (2M)
   b. . What is fuel cell?   (3M)
   c. Draw a block diagram for solar powered vehicles.   (2M)
   d. Write the advantages and limitation of Electrical Vehicles.   (3M)
   e. Brief about bio-fuel and its characteristics   (2M)
   f. . What is esterfication of vegetable oils?   (3M)
   g. Write short notes of need for alternative fuels.   (2M)
   h. What are the disadvantages of LPG fuel?   (3M)
   i. Enumerate the desirable properties of alcohol as engine fuel   (2M)
   j. What are the advantages of CNG fuel?   (3M)

PART B   (50 MARKS)

2. a) Write a short note on calorific values of fuels. Mention **advantages** & disadvantages of gaseous fuels over solid fuels.
   b) Classify I.C. engine in detail. Explain working of four stroke petrol engine with suitable sketches.

OR

   a) Explain combustion process & production process of methanol
   b) Write a short note on vegetable oil as an alternate fuel

3. Write a short note on eco friendly plastic fuels.

OR

   a) Discuss in detail uses of biogas in I.C. engine.
   b) Write a short note on biodiesel production process.

4. Discuss the effects on properties of diesel by blending it with biodiesel.

OR

   a) Explain working of Wankel engine with neat sketch.
   b) Describe properties & production process of LPG as an engine fuel.

5. Draw layout of solar powered vehicle and explain it.

OR

   a)Describe properties & production process of CNG as an engine fuel
   b) Write a short note on fuel cell.

6. a)Write a short note on green house effect.
   b)Explain working of sterling engine with neat sketch.

OR

   a) Describe advantages & disadvantages of electric vehicles.
   b) Draw layout of hydrogen car and explain it.

PART A   (25 MARKS)

1. a. Write advantages of electric vehicles.   (2M)
b. What are the advantages of CNG fuel?   (3M)
c. What is esterfication of vegetable oils?   (2M)
d. What are the disadvantages of LPG fuel?   (3M)
e. Write advantages of electric vehicles   (2M)
f. . Explain unfavorable proprieties of Vegetable oil.   (3M)
g. What is fuel cell?   (2M)
h. List out the raw materials for manufacture of alcohol fuels   (3M)
i. What are the advantages of Ammonia fuel?   (2M)
j. Explain about storage and handling of hydrogen as engine fuel.   (3M)

PART B   (50 MARKS)

2. **(a)** Discuss the significant reasons for the development of alternative fuels. Also discuss the barriers in implementing alternative fuels in India.
   (b) Explain biodiesel production process with suitable sketch.

OR

   (a) Discuss advantages, disadvantages and properties of methanol as an alternative fuel.
   (b) Define the term volatility of fuel. Discuss the effects of volatility on S.I. engine performance.

3.**(a)** Discuss advantages, disadvantages & important properties of biodiesel.
   (b) Draw layout of LPG vehicle and explain it.

OR

   (a) Explain construction & working of Wankel engine with neat sketches.
   (b) Discuss advantages & disadvantages of CNG as an alternative fuel. Explain different components of CNG gas conversion kit in brief.

4. **(a)** Explain different types of biogas plants.
   (b) Write a short note on Solar vehicle.

OR

   (a) Explain series type & parallel type hybrid electric vehicle with neat schematic diagrams.
   (b) Discuss advantages, disadvantages & performance characteristics of Electric **07** vehicles

5. (a) Discuss advantages, disadvantages & properties of hydrogen fuel.
   (b) Explain basics of fuel cell with neat sketch. Also discuss advantages & challenges for the fuel cell vehicles.

OR

   (a) Write a short note on Eco Friendly Plastic Fuels.
   (b) Discuss different emission norms as per BS-I,II,III,IV for the engines in brief.

6. a)Explain process of separation of Bio-diesel.
   b)Discuss about Fuel cell vehicle with sketch.

OR

   (a) Compare LPG, CNG and gasoline fuel on cost and safety .
   (b) Discuss advantages and disadvantage of Liquid Hydrogen as fuel for IC engine.
   ****

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
MECHANICAL DEPARTMENT
III B.TECH I SEM
MANAGERIAL ECONOMICS AND FINANCIAL

MODEL PAPER 1
PART A

Answer the following questions   **Marks: 25**

   a. Define the concept of 'managerial economics'.   (2M)
   b. What do you understand by statistical methods?   (3M)
   c. Explain the difference between fixed cost and variable cost?   (2M)
   d. How do you measure margin of safety?   (3M)
   e. What is monopolistic competition?   (2M)
   f. What is meant by liberalization?   (3M)
   g. What is contra entry?   (2M)
   h. Define public enterprises?   (3M)
   i. How does current ratio is differ from quick ration?   (2M)
   j. Explain Du Pont Chart.   (3M)

PART –B

Answer the following questions   **Marks: 50**
(5*10)

2. What is elasticity of demand? Explain the measurements of elasticity of demand with suitable examples?   **OR**

3. What is test marketing? Why is it preferred by marketing managers?

4. Explain production function? How can a producer find it useful?
                 OR
5. Explain how the short-run and long-run influence the costs?

6. Differentiate between perfect and imperfect markets.
                 OR
7. What are the limitations of partnership form of organizations?

8. What factors influence the volume of working capital needed by an organization?
                 OR
9. What are the different subsidiary accounts? Explain in detailed.
                 OR
10. From the following Trial Balance of Premier Company as on 31st March 2015, Prepare Trading and Profit and loss for the year ended 31st March 2015 and a Balance Sheet as on that dates:

Debit Balances	Amount (Rs)	Credit Balances	Amount (Rs)
Cash in hand	1,500	Sales	2, 50,000
Cash at bank	3,000	Return outwards	2,000
Purchases	1, 10,000	Capital	56, 000
Return outwards	1,500	Accounts payables	30,000
Wages	20,000		
Power and fuel	8,000		
Carriage outwards	6,000		
Carriage inwards	5,000		
Opening inventory	6,000		
Land	10,000		
Buildings	80,000		
Machinery	30,000		
Patents	15,000		
Salaries	12,000		
Sundry expenses	6,000		
Insurance	1,000		
Drawings	8,000		
Accounts receivable	1500		
Total	**3, 38,000**	**Total**	**3, 38,000**

Adjustments:

Closing inventory as on 31.03.2015 Rs. 20,000

Provision for doubtful receivables at 5% on debtors

Outstanding salaries Rs. 5,000

Outstanding wages Rs. 3,000

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
MECHANICAL DEPARTMENT
III B.TECH I SEM
MANAGERIAL ECONOMICS AND FINANCIAL

MODEL PAPER 2
PART - A

Answer the following questions   **Marks: 25**

a. What is the scope of managerial economics?   (2M)
b. Define the basic law of consumption.   (3M)
c. How do you define BEP?   (2M)
d. ISOCOST &MRTS   (3M)
e. Define Explicit and implicit cost.   (2M)
f. Public company vs private company.   (3M)
g. What are the types of the competition markets in present scenario? (2M)
h. What are the significance ratios?   (3M)
i. Define the different types of companies.   (2M)
j. What is Gross-profit ratio?   (3M)

PART - B

Answer the following questions   **Marks: 50**
(5*10)

2. What is the managerial economic role in decision making?

Or

3. Explain Demand function and its determents.

4. What is the production function explain the Cobb-Douglas function?

Or

5. Explain how cost output relationship helps the enterprenurer in expansion of the decision.

6. Describe the highlights of 1991 industrial policy.

Or

7. What is the joint stock company? Discuss the features, advantages & disadvantages?

8. What is capital budgeting? Explain different methods of capital budgeting.

Or

9. Explain the factors affecting the requirements of working capital.

10. What are the various types of the ratios?

Or

11. Journalize the following transactions in the books
     of Dixit Enterprises. 1.3.2015 Started business
     with a capital of Rs. 7, 50,000

     5.3.2015 Purchased goods from Tandon & co. for cash Rs. 1, 00,000

     12.3.2015 Purchased goods from Burman for Rs. 2, 00,000

     14.3.2015 Sold goods to Mr.Karan for cash Rs. 2, 50,000

18.3.2015 Goods retuned by Mr.Karan for Rs. 25, 000

22.3.2015 Purchased furniture for office purpose Rs. 1, 00, 000

28.3.2015 Paid rent Rs. 12000, Paid electricity bill Rs. 1200, Paid salaries Rs. 55, 000.

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III B.TECH I SEM
MANAGERIAL ECONOMICS AND FINANCIAL

MODEL PAPER 3

PART A

Answer the following questions   **Marks: 25**

    a. What is macroeconomics?   (2M)
    b. Explain changes in Demand   (3M)
    c. Discuss Barometric Techniques.   (2M)
    d. Difference Between the perfect and Monopoly market.   (3M)
    e. What are the different kinds of partners?   (2M)
    f. List out the accounting concepts?   (3M)
    g. Features of working capital?   (2M)
    h. Discuss various types of capital budgeting techniques?   (3M)
    i. Explain payback period?   (2M)
    j. What re the limitations of ratio analysis?   (3M)

PART – B   **Marks: 50**

Answer the following questions

2. Define elasticity of demand? Explain different types of elasticity of demand.

        Or

3. Describe the different methods of demand forecasting?

4. Explain the law of returns with appropriate examples?

        Or

5. Define the BEP. How do you use this for decision making?

6. What is the price output relation in monopoly competition?

        Or

7. What are the new economic reforms of India after new economic policy?

8. What are the main features of different source of short-term finance?

        Or

10. Write about accounting concepts and conventions?
        Or

11. Prepare a trial balance from the following accounting records.

Particulars	Amount (Rs)
Sundry debtors	32, 000
Opening stock	22, 000
Cash in hand	35

Cash at bank	1, 545
Plant and machinery	17, 500
Sundry creditors	10, 650
Trade expenses	1, 075
Sales	2, 34,500
Carriage outwards	400
Rent	900
Bills payables	7, 500
Purchases	2, 18,870
Discount allowed	1, 100
Capital	79, 500
General expenses	34, 500

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MODEL PAPER 4

MANAGERIAL ECONOMICS AND FINANCIAL
PART A

Answer the following questions   **Marks: 25**

    a. What is the importance of investment decision in managerial Economics?   (3M)
    b. Explain the point of elasticity?   (2M)
    c. Describe the features of an Isoquants?   (3M)
    d. What is the impact of short run cost on production?   (2M)
    e. What is the Memorandum of association?   (3M)
    f. Influence of globalization on business environment?   (2M)
    g. List out the different branches of accounting?   (3M)
    h. Write the significance of capital?   (2M)
    i. Explain the profitability index?   (3M)
    j. Significance of liquidity ratios in the firm?   (2M)

PART - B

Answer the following questions   **Marks: 50 (5*10)**

2. Explain the nature and scope of Managerial Economics?

Or

3. Define the price elasticity and its measurements?

4. Explain the different type's costs?

Or

5. Calculate BEP in both volume and units where fixed cost is 20000`, variable cost is 50 per unit selling

price 80?

6. Explain the features of Perfect Competition?

Or

7. What do you understand by LPG? Explain their impact on the India economy in the recent years.

8. Calculate PB, ARR, NPV for following Initial investment is 15000 and discounting factor 10% p.a

Year	Amount
1	5000
2	7000
3	5000

4	-
5	6000

Or

9. Explain the difference between capital budget and cash budget.

10. Explain the following in brief:

      (a) Journal

      (b) Ledger

      (c) Personal account

      (d) Real account

      (e) Nominal account

      (f) Subsidiary books

Or

11. Calculate the liquidity and Turnover ratios?

Liabilities	Amount (000)	Assets	Amount(000)
Preference share capital	100	Land and buildings	225
Equity share capital	150	Plant and machinery	250
General reserve	250	Furniture and fixture	100
Debentures	400	stock	250
creditors	200	debtors	125
Bills payable	50	Cash at bank	250
Outstanding expenses	50	Cash in hand	125
P&l a/c	100	Prepaid expenses	50
Long-term bank loan	200	Marketable securities	125
	1500		1500

MODEL PAPER 5

MANAGERIAL ECONOMICS AND FINANCIAL
PART A

Answer the following questions   **Marks: 25**

    a. What are the determinants of demand?   (2M)
    b. Explain the exceptions of law of Demand?   (3M)
    c. What is the production function with two variable inputs?   (2M)
    d. Define the terms MRTS and Least cost combination of inputs?   (3M)
    e. What are the objectives of pricing?   (2M)
    f. What are the elements of partnership deed?   (3M)
    g. Mention different types of capitals?   (2M)
    h. What is cash budget?   (3M)
    i. Define the accounting and importance?   (2M)
    j. Define the words (a) Payback Period, (b) Average rate of return?   (3M)

PART –B

Answer the following questions   **Marks: 50 (5*10)**

2. What is the Micro and Macro economics significance on managerial economics on decision making?   Or

3. What are the factors governing demand forecasting?

4. How the laws of returns to scale play a vital role in decision making of production?

Or

5. A company making single product has the following sales and net profit for the two half of the financial year.

Period	I half of the financial year	II half of the financial year
Sales in Rs	8, 00,000	10, 00,000
Net profit in Rs.	1, 00,000	1, 50,000

Find breakeven point of production and the margin of safety.

6. How the monopolies are formed in the market?   Or

7. Discuss the role of cooperative societies in economic growth?

8. How does the firm estimate its fixed and working capital requirements?
    Or

9. A project costs Rs. 75, 000, cost of capital is 15% and its cash inflows (Rs.) are given below.

Year	1	2	3	4	5
Cash Inflows	22, 000	23, 000	30, 0000	25, 000	20, 000

Compute the Net Present Value.

10. How many different types of Activity Ratios? Explain

   Or

11. What is capital structure and write different types of leverage ratios' with formulas?