

Code No: R17A0319

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Regular Examinations, October/November 2020

Machine Design - II

(ME)

Roll No									
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Time: 2 hours

Max. Marks: 70

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

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**NOTE: Data Books are allowed**

- 1 a. What is a journal bearing?  
b. A journal bearing of 80mm in diameter and 120mm long runs at 600 rpm. It uses an oil having viscosity of 60 centipoises. Radial clearance provided is of 0.15mm. Determine the safe load that the bearing can take. Assume Sommerfeld number =  $1.43 \times 10^9$ .
- 2 a. Describe the mechanism of Hydrodynamic lubrication.  
b. Select a deep groove ball bearing for a radial load of 4000N and an axial load of 5000N operating at a speed of 1600 rpm for an average life of 5 years at 10hours per day. Assume uniform and steady load.
- 3 a. What is the function of piston in an I.C Engine?  
b. Design a aluminium alloy piston for a single acting four stroke engine for the following data.  
Cylinder bore=0.3m, stroke=0.375m, Max. gas pressure=1.15MPa  
Fuel consumption=0.22kg/kW/hr, Speed= 50 rpm.
- 4 Design a connecting rod for a petrol engine form the following data:  
Diameter of the piston : 110 mm, Mass of the reciprocating parts : 2kg  
Length of the connecting rod: 325 mm, Stroke: 150 mm, Speed: 1500 rpm.  
Maximum explosion pressure: 2.5MPa.
- 5 a. Enumerate the advantages and disadvantages of flat belt drive.  
b. Find the width of the belt necessary to transmit 10kW to a pulley 250mm diameter if the pulley runs at 1500rpm and the coefficient of friction between the belt and pulley is 0.22. Assume the angle of contact as  $210^\circ$  and the maximum tension in the belt is not to exceed 8N/mm width.
- 6 A lift system is provided with cushion springs at the bottom of lift. The lift is free to fall. Springs are set in parallel. Specify the no. of springs if the lift has free fall of 1.5m from rest. Use the following data  
Weight of the lift=30kN, Allowable deflection/spring=370mm, No.of active turns= 15, spring mean coil dia=30mm, Spring index=6, modulus of rigidity=80GPa.
- 7 a. State the advantages of helical gear over the spur gear.  
b. A pair of helical gears with  $23^\circ$  helix angle is to transmit 2.5kW at 1000 rpm of pinion. The velocity ratio is 4:1. The pinion is to be made up of forged steel and the driven gear is to be cast steel. The gears are of  $20^\circ$  full depth involute form and the pinion is to have 24 teeth. Design the gear drive.
- 8 a. Explain, what are the different types of stresses induced in the power

screws?

- b. Show that the efficiency of overhauling screw is greater than 50 percent.

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Code No: R17A0323

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Regular Examinations, October/November 2020

Automobile Engineering

(ME)

Roll No										
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Time: 2 hours

Max. Marks: 70

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- 1 a) Explain two basic types of internal combustion engines.  
b) What are the main components of an automobile? Explain the functions of each component.
- 2 a) How do you classify automobiles? Explain in detail giving example.  
b) Draw the schematic layout of all wheel drive vehicle and discuss the function of each component
- 3 a)What are the main sources of pollutants from internal combustion engines.  
b) Explain with neat sketches Two-way and Three-way catalytic converters.
- 4 a)What do you mean by Air pollution.  
b) Explain with a neat sketch working of common rail direct injection system.
- 5 a) What are the requirements a transmission system?  
b) What is a fluid flywheel? How does it work
- 6 a)Why is a gear box necessary in a motor car?  
b) Explain with a neat sketch the construction and working of torque converter.
- 7 a)What are the functions of steering system.  
b)Explain different type of steering systems used in the automobile
- 8 What is a hybrid vehicle? Discus clearly various hybrid systems used for automotive purposes along with the merits and demerits of each.

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Code No: R17A0322

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Regular Examinations, October/November 2020

CAD/CAM

(ME)

Roll No									
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Time: 2 hours

Max. Marks: 70

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

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- 1 Explain Product cycle and its importance
- 2 Discuss term transformation of geometry
- 3 Explain geometric modeling
- 4 Discuss on methods for surface representation methods
- 5 Explain Computer aided part programming and its features
- 6 Differentiate between NC and CNC machine tool technology
- 7 What are the advantages and limitations of Group Technology
- 8 Explain functions of material handling systems

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Code No: R17A0553

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Regular Examinations, October/November 2020

Data Structures Using Python

(EEE, ME, ECE & AE)

Roll No									
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Time: 2 hours

Max. Marks: 70

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

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1. a) Illustrate interpreter and interactive mode in python with example.  
b) Write the following python programs.
  - i. Test whether a given year is leap year or not
  - ii. To find the sum of n natural numbers
2. Explain briefly constant, variables, expression, keywords and statements available in python.
- 3.a) Explain in detail about Control flow structures.  
b) Write a Python program to find the first duplicate element in a given array of integers. Return -1 If there are no such elements.
- 4.a) Explain the Loop manipulation statements with an example.  
b) Write a Python program to find those numbers which are divisible by 7 and multiple of 5, between 1000 and 2000.
- 5.a) What are fruitful functions? illustrate with an example?  
b) Write a Python program to detect the number of local variables declared in a function.
- 6.a) Discuss Function arguments with examples in Python.  
b) Write a Python function that accepts a string and calculate the number of upper case letters and lower case letters.
- 7 Explain Dictionary Operation & Methods .
8. What is Queue? Why it is known as FIFO? List the applications of Queue.

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Code No: R17A0320

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**  
(Autonomous Institution – UGC, Govt. of India)

**III B.Tech II Semester Regular Examinations, October/November 2020**

**Finite Element Methods**

(ME)

<b>Roll No</b>									
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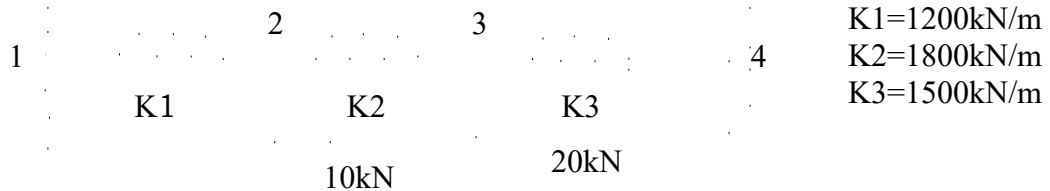
**Time: 2 hours**

**Max. Marks: 70**

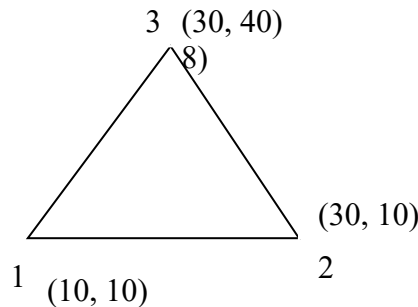
Answer Any **Four** Questions  
All Questions carries equal marks.

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- 1 a Discuss how finite element method is evolved in the engineering field.
- b Discuss the advantages and disadvantages of Finite Element Method
- 2 Solve for the nodal displacement and support reactions, using the principle of Min. Potential Energy approach for the system shown in Figure.



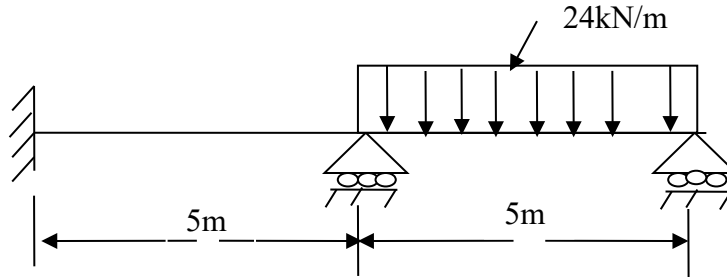
- 3 Derive stiffness matrix for a Truss bar Element
- 4 Derive the stiffness matrix for a Three noded CST Element.
- 5 a What is an axi-symmetric problem?
- b For the Axi-symmetric element shown in figure, find the Strain-Displacement Matrix.



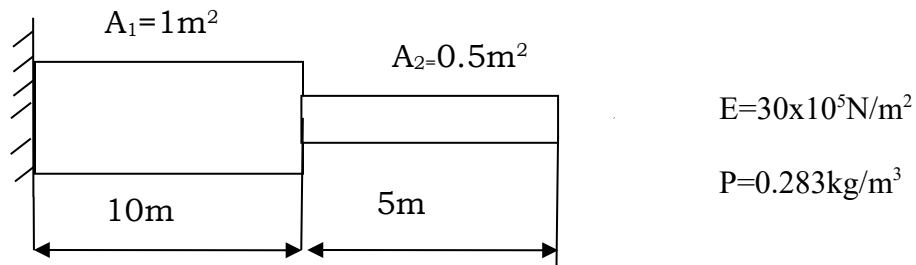
- 6 Use Gaussian Quadrature to obtain the exact value of the integral

$$f(x) = \int_{-1}^1 \frac{1}{1+x^2} + 2x - \sin x$$

- 7 For the beam loaded as shown in figure, determine the slope at the simple supports. Take  $E=200\text{GPa}$ ,  $I=4 \times 10^6 \text{m}^4$ .



- 8 Determine the Eigen values and Eigen vectors for the beam shown in figure



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Code No: R17A0321

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Regular Examinations, October/November 2020

Heat Transfer

(ME)

Roll No									
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Time: 2 hours

Max. Marks: 70

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

**NOTE: Data Books are allowed**

- 1) a. What are the basic modes of Heat transfer? Explain with examples  
2) b. Derive an expression for heat Transfer through Cartesian Co-ordinates
- 2 Hot air at a temperature of  $65^{\circ}\text{C}$  is flowing through a steel pipe of 120mm diameter. The pipe is covered with two layers of different insulating materials of thickness 60 mm and 40 mm, and their corresponding thermal conductivities are 0.24 and  $0.4 \text{ W/m}^{\circ}\text{C}$ . The inside and outside heat transfer coefficients are  $60$  &  $12 \text{ W/m}^{\circ}\text{C}$  respectively. The atmosphere is at  $20^{\circ}\text{C}$ . Find the rate of heat loss from 60 m length of pipe.
- 3 a) What is Meant by the Lumped Heat Analysis?  
b) A  $40 \times 40$  cm copper slab 5 mm thick at a uniform temperature of  $250^{\circ}\text{C}$ , suddenly has its temperature Lowered at  $30^{\circ}\text{C}$ . Find the time at which the slab temperature becomes  $90^{\circ}\text{C}$ . Take  $\rho = 9000 \text{ Kg/m}^3$ ,  $c = 0.38 \text{ Kj/KgK}$ ,  $K = 370 \text{ W/mK}$  and  $h = 90 \text{ W/m}^2\text{K}$ .
- 4 Aluminium of 100mm thick initially at  $500^{\circ}\text{C}$ . is suddenly immersed in a liquid at  $100^{\circ}\text{C}$  with heat transfer Coefficient  $1200 \text{ W/m}^2\text{ok}$ . Determine i) Temp. at the centre of plane after 1min. ii) Temp at surface at a depth of 30 mm after 1min. iii) Total energy removed per unit area during this period?
- 5 a) What is the advantage of dimensional analysis  
b) Derive an expression for forced convection in terms of Reynolds, Nuesult and Prandtl number.
- 6 a) Explain in detail with neat sketch prandtil boundary-layer theory concept.  
b) Air at  $20^{\circ}\text{C}$  is flowing along a heated flat plate at  $134^{\circ}\text{C}$  at a velocity of 3 m/s. the plate is 2 m long and 1.5 m wide. Calculate the thickness of the hydrodynamic boundary layer and the skin friction coefficient at 40 cm from the leading edge of the plate. The kinematic viscosity of air at  $20^{\circ}\text{C}$  may be taken at  $15.06 \times 10^{-6} \text{ }^2/\text{s}$ .
- 7 a) Define boiling. Give some examples of boiling  
b) Explain with neat sketch various zones of boiling curve for water.
- 8 a) State Steffen- Boltzmann law of radiation.  
b) The amount of radiant energy falling on  $50 \times 50$  cm horizontal thin metal plate insulated to the bottom is  $3600 \text{ KJ/m}^2\text{-hr}$ . If the emissivity of the plate surface is 0.8 and ambient air temperature is  $30^{\circ}\text{C}$ . Find the equilibrium temperature of the plate.

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III B.Tech II Semester Supplementary Examinations, December 2022

Machine Design - II

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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**SECTION-I**

- 1 A ball bearing is subjected to a radial force of 2500 N and an axial force of 1000 N. The dynamic load carrying capacity of the bearing is 7350 N. The values of X and Y factors are 0.56 and 1.6 respectively. The shaft is rotating at 720 rpm. Calculate the life of the bearing. [14M]

OR

- 2 Design a full hydrodynamic journal bearing with the following specifications for the machine tool application: Journal diameter : 75 mm, Radial load : 10 kN, Journal speed :1440 rpm, Minimum oil film thickness : 25 microns, Inlet temperature : 40°, Bearing material : Babbitt. Determine the length of the bearing and select suitable oil for this application. [14M]

**SECTION-II**

- 3 Design a piston for a four stroke diesel engine consuming 0.3 kg of fuel per Kw of power per hour and produces a brake mean effective pressure of the 0.7 N/mm<sup>2</sup>. The maximum gas pressure inside the cylinder is 5 N/mm<sup>2</sup> at a speed of 3500 r.p.m. The cylinder diameter is required to be 300 mm with stroke 1.5 times the diameter. The piston may have 4 compression rings and an oil ring. The following data can be used for design: [14M]

Higher calorific value of fuel =  $46 \times 10^3$  KJ/kg; Temperature at the piston centre = 700 K; Temperature at the piston edge = 475 K; Heat conductivity factor = 46.6 W/m/K; Heat conducted through top = 5% of heat produced; Permissible tensile strength for the material of piston = 27 N/mm<sup>2</sup>; Pressure between rings and piston = 0.04 N/mm<sup>2</sup>; Permissible tensile stress in rings = 80 N/mm<sup>2</sup>; Permissible Pressure on piston barrel = 0.4 N/mm<sup>2</sup>; Permissible pressure on piston pin = 15 N/mm<sup>2</sup>; Permissible stress in piston pin = 85 N/mm<sup>2</sup>.

OR

- 4 A. Explain design procedure of connecting rod. [10M]  
B. What is the function of connecting rod and what are the materials used for connecting rods. [4M]

**SECTION-III**

- 5 A compressor, requiring 90 kW, is to run at about 250 r.p.m. The drive is by V-belts from an electric motor running at 750 r.p.m. The diameter of the pulley on the compressor shaft must not be greater than 1 metre while the centre distance [14M]

between the pulleys is limited to 1.75 metre. The belt speed should not exceed 1600 m / min. Determine the number of V-belts required to transmit the power if each belt has a cross sectional area of 375 mm<sup>2</sup>, density 1000 kg / m<sup>3</sup> and an allowable tensile stress of 2.5 MPa. The groove angle of the pulleys is 35°. The coefficient of friction between the belt and the pulley is 0.25. Calculate also the length required of each belt.

OR

- 6 A flat spiral steel spring is to give a maximum torque of 1500 N-mm for a maximum stress of 1000 MPa. Find the thickness and length of the spring to give three complete turns of motion, when the stress decreases from 1000 to zero. The width of the spring strip is 12 mm. The Young's modulus for the material of the strip is 200 kN/mm<sup>2</sup>. [14M]

**SECTION-IV**

- 7 A bronze spur pinion rotating at 600 r.p.m. drives a cast iron spur gear at a transmission ratio of 4 : 1. The allowable static stresses for the bronze pinion and cast iron gear are 84 MPa and 105 MPa respectively. The pinion has 16 standard 20° full depth involute teeth of module 8 mm. The face width of both the gears is 90 mm. Find the power that can be transmitted from the standpoint of strength. [14M]

OR

- 8 A pair of helical gears are to transmit 15 kW. The teeth are 20° stub in diametral plane and have a helix angle of 45°. The pinion runs at 10000 r.p.m. and has 80 mm pitch diameter. The gear has 320 mm pitch diameter. If the gears are made of cast steel having allowable static strength of 100 MPa; determine a suitable module and face width from static strength considerations and check the gears for wear, given  $\sigma_{es} = 618$  MPa. [14M]

**SECTION-V**

- 9 A vertical screw with single start square threads of 50 mm mean diameter and 12.5 mm pitch is raised against a load of 10 kN by means of a hand wheel, the boss of which is threaded to act as a nut. The axial load is taken up by a thrust collar which supports the wheel boss and has a mean diameter of 60 mm. The coefficient of friction is 0.15 for the screw and 0.18 for the collar. If the tangential force applied by each hand to the wheel is 100 N, find suitable diameter of the hand wheel. [14M]

OR

- 10 An electric motor driven power screw moves a nut in a horizontal plane against a force of 75 kN at a speed of 300 mm / min. The screw has a single square thread of 6 mm pitch on a major diameter of 40 mm. The coefficient of friction at screw threads is 0.1. Estimate power of the motor. [14M]

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R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, December 2022

Automobile Engineering

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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**SECTION-I**

- 1 (a). Discuss the construction and materials required for cylinder head and cylinder block. [8M]  
(b). Illustrate  
(i) Camshaft [2M]  
(ii) Flywheel [2M]  
(iii) Valves [2M]  
OR
- 2 (a). Construct and explain the chassis & body of an automobile vehicle indicating all the components. [7M]  
(b). What are various methods used to reduce the expansion in Aluminum Alloy pistons. [7M]

**SECTION-II**

- 3 (a). What are the difference between VGT and WGT turbocharger? [7M]  
(b). Explain the Euro norms and BS norms. [7M]  
OR
- 4 (a). Illustrate the working of Electronically controlled diesel injection system. [7M]  
(b). Explain the working of catalytic converter system [7M]

**SECTION-III**

- 5 (a). With a neat sketch, Demonstrate the working of Sliding mesh gear box. [7M]  
(b). Distinguish between fluid coupling and Torque convertor? [7M]  
OR
- 6 (a). Justify the need of clutch in automobiles. [7M]  
(b). Demonstrate the working of differential in an automobile with neat sketch. [7M]

**SECTION-IV**

- 7 (a). Illustrate the operational details of Disc braking system. [7M]  
(b). Discuss the advantages of Air-suspension system. [7M]  
OR
- 8 (a). Illustrate the following [4M]  
(i) Toe-in & Toe-out [4M]  
(ii) Centre point steering.  
(b). What are the advantages of hydraulic brakes over mechanical brakes? [6M]

**SECTION-V**

- 9** (a). What are the modifications are required for an engine to use Bio-diesel as fuel. **[7M]**  
(b). List the advantages and disadvantages of usage of hydrogen as fuel over conventional fuels. **[7M]**
- OR
- 10** (a). Differentiate between Electric vehicles and Fuel Cell vehicles **[7M]**  
(b). Discuss different energy alternatives with their merits and demerits **[7M]**

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Code No: R17A0554

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**III B.Tech II Semester Supplementary Examinations, December 2022****Python Programming****(CSE)**

<b>Roll No</b>									
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**Time: 3 hours****Max. Marks: 70**

**Note:** This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing **ONE** Question from each SECTION and each Question carries 14 marks.

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**SECTION - I**

- Write a Python program that accepts a string as input and counts number of lower case and number of upper case letters. **(7M)**
  - “Python is called a dynamic and strongly typed language”-Justify this statement with suitable justification. **(7M)**

(OR)

- Discuss the use of complex data type with the help of an example python program to perform basic arithmetic operations on two complex numbers. **(7M)**
  - Write short note on the primitive data types of Python language. **(7M)**

**SECTION – II**

- Discuss about various functions available in array module of python language for performing array operations. **(7M)**
  - Write a python program to display the following pattern using nesting of loops concept: **(7M)**

```

1
1 2
1 2 3
1 2 3 4
1 2 3 4 5

```

(OR)

- Distinguish among *pass*, *break* and *continue* statements with the help of a python program. **(7M)**
  - Explain how “else” works with WHILE and FOR loops with an example python program **(7M)**

**SECTION – III**

- What are the various ways of calling function in python? Briefly explain. **(7M)**
  - Discuss the need of using variable length arguments with an example python program. **(7M)**

(OR)

- How does Lambda function differ from a normal function in python? Explain. **(7M)**
  - Illustrate the difference between local and global variables with an example program. **(7M)**

SECTION – IV

7. a) What is slicing in python? Explain array slicing with an example. **(7M)**  
b) What is list comprehension in python and also write the short note on the circumstances where list comprehension is not a right choice. **(7M)**

(OR)

8. a) What are python sequence types? Explain with examples. **(7M)**  
b) Briefly explain dictionary method in python and also illustrate the process of creating a dictionary in python. **(7M)**

SECTION – V

9. a) Explain about date,time and calendar modules. **(7M)**  
b) Illustrate an example to handle the exceptions in python.**(7M)**

(OR)

10. a) Design a python code to count number of characters, words and lines in a given file. **(7M)**  
b) How do you explore the packages with an example. **(7M)**

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Time: 3 hours

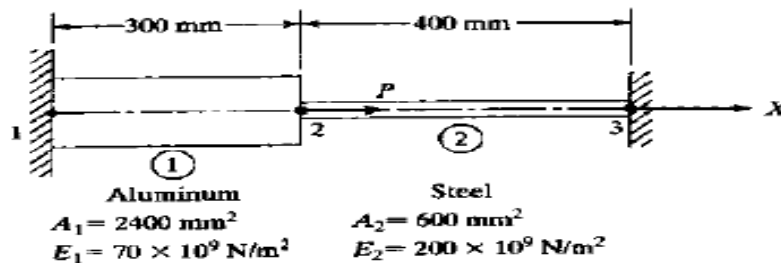
Max. Marks: 70

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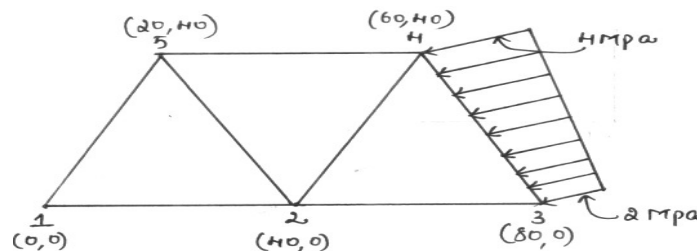
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**SECTION-I**

- Explain the following
  - Step by Step Procedure of FEM [7M]
  - Advantages, disadvantages and applications of FEM [7M]
 OR
- Consider the bar shown in Fig. An axial load  $P = 200 \times 10^3 \text{ N}$  is applied as shown. [14M]  
Determine the nodal displacements

**SECTION-II**

- A two dimensional plate is shown in figure. How could you evaluate the traction loads at nodes 3 and 4 for the linearly distributed load acting on the edge 3-4. Given thickness = 10mm. [14M]



OR

- Derive the Element Stiffness Matrix for Plane truss element [14M]

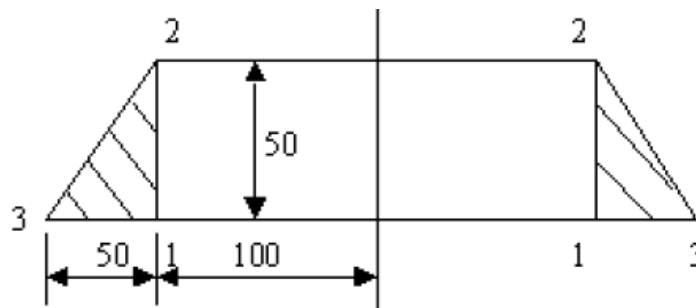
**SECTION-III**

- Derive the stiffness matrix of an Axisymmetric element using potential energy approach [14M]

OR

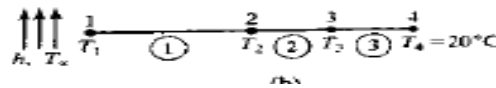
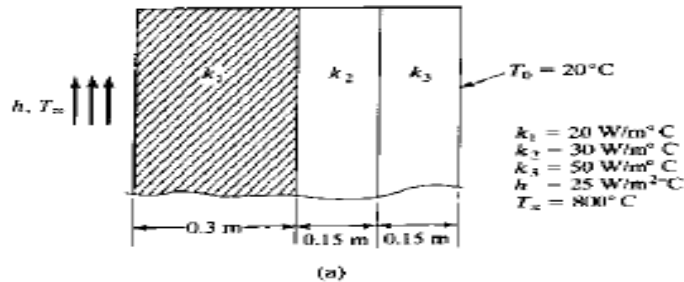
- An axi-symmetric ring element is shown in figure. Evaluate the matrices [B] and [D]. Take  $E = 2 \times 10^5 \text{ N/mm}^2$  and  $\mu = 0.33$  [14M]





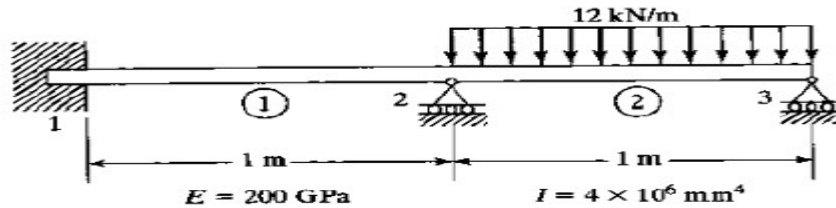
**SECTION-IV**

- 7 A composite wall consists of three materials, as shown in Fig. The outer temperature is  $T_o = 20^\circ\text{C}$ . Convection heat transfer takes place on the inner surface of the wall with  $T_\infty = 800^\circ\text{C}$  and  $h = 25 \text{ W/m}^2\text{C}$  Determine the temperature distribution in the wall. [14M]



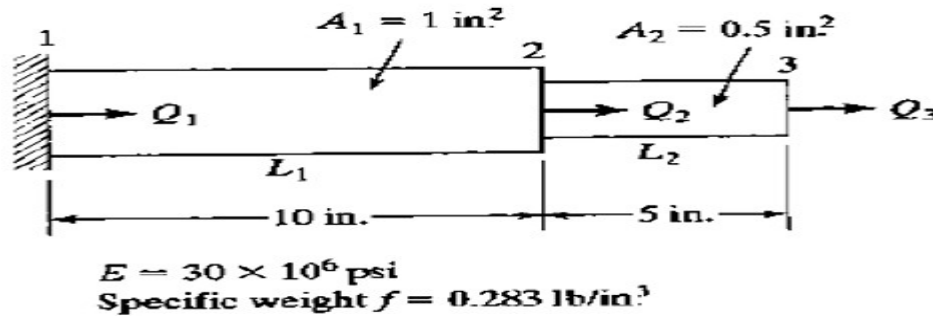
OR

- 8 Evaluate the Element Stiffness matrix for beam Element As shown in Fig. Take  $E = 200 \text{ Gpa}$  and  $I = 4 \times 10^6 \text{ mm}^4$  [14M]



**SECTION-V**

- 9 Determine the eigenvalues and eigenvectors for the stepped bar shown in Fig [14M]



OR

- 10 Describe the properties of Eigenvectors and Differentiate the static and Dynamic Analysis of structural problems [14M]

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III B.Tech II Semester Supplementary Examinations, December 2022

Heat Transfer

(ME)

Roll No									

Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

\*\*\*

**SECTION-I**

- 1 A hollow sphere of inside radius of 30 mm and outside radius 50 mm is electrically heated its inner surface at a constant rate of  $105 \text{ W/m}^2\text{K}$ . the outer surface is exposed to a fluid at  $30^\circ\text{C}$  with heat transfer coefficient of  $170 \text{ W/m}^2\text{K}$ . the thermal conductivity of the material is  $20 \text{ W/mK}$ . Calculate inner and outer surface temperature. [14M]

OR

- 2 An aluminium alloy fin ( $k=200\text{W/mK}$ ) 3.5 mm thick and 2.5 cm long extends from a wall. The base is at  $420^\circ\text{C}$  and ambient temperature is  $30^\circ\text{C}$ . the heat transfer coefficient  $11 \text{ W/m}^2\text{K}$ . Find the heat loss and fin efficiency per unit width of the fin if heat loss from tip is negligible. [14M]

**SECTION-II**

- 3 An aluminium alloy plate  $0.2 \text{ m}^2$  surface area (both sides) 4 mm thick and a  $200^\circ\text{C}$  is suddenly quenched into liquid oxygen which is at  $-183^\circ\text{C}$ . Find the time required for the plate to reach the temperature of  $-70^\circ\text{C}$ . [14M]

OR

- 4 A hot mild sphere ( $k=42.5 \text{ W/m}^\circ\text{C}$ ) having 12 mm diameter is planned to be cooled by an air flow at  $27^\circ\text{C}$ . the convective heat transfer coefficient is  $114 \text{ W/m}^2\text{C}$ . Determine the following: [14M]
- (i) Time required to cool the sphere from  $540^\circ\text{C}$  to  $95^\circ\text{C}$ ;
  - (ii) Instantaneous heat transfer rate 2 minutes after the start of cooling;
  - (iii) Total energy transfer from the sphere during the first 2 minutes. Take mild steel properties as  $\rho=7850 \text{ kg/m}^3$ ,  $c=475 \text{ J/kg}^\circ\text{C}$ ,  $\alpha= 0.043 \text{ m}^2/\text{h}$ .

**SECTION-III**

- 5 Water flows in a duct of rectangular cross-section of height of 6 mm and width 12 mm with a mean bulk temperature of  $30^\circ\text{C}$ . If the duct wall temperature is constant at  $60^\circ\text{C}$  and fully developed laminar flow is experienced, calculate the heat transfer per unit length. [14M]

OR

- 6 The maximum allowable surface temperature of an electrically heated vertical plate 15 cm high and 10 cm wide is  $140^\circ\text{C}$ . Estimate the maximum rate of heat dissipation from both sides of the plate in an atmosphere at  $20^\circ\text{C}$ . The radiation heat transfer coefficient is  $8.72 \text{ W/m}^2 \text{ K}$ . [14M]

**SECTION-IV**

7 Explain drop wise and film wise condensation [14M]

OR

8 In a food processing plant, a brine solution is heated from 8°C to 14°C in a double pipe heat exchanger by water entering at 55°C and leaving at 40°C at a rate of 0.18kg/s. if the overall heat transfer coefficient is 800W/m<sup>2</sup>K, Determine the area of heat exchanger required [14M]

For parallel flow arrangement, and

For counter flow arrangement. Take  $C_p=4.18$  kJ/kg K.

**SECTION-V**

9 Two circular disc of diameter 20 cm each are placed 2 m apart. Calculate the radiant heat exchange for these plates if these are maintained at 800°C and 300°C respectively and their corresponding emissivities are 0.3 and 0.5. [14M]

OR

10 Determine the net radiant heat exchange per m<sup>2</sup> area for two infinite parallel plates held at temperature of 800K and 500K respectively. Take emissivity as 0.6 for the hot plate and 0.4 for the cold plate. What should be emissivity of a polished aluminum shield placed between them if heat flow is to be reduced to 40% of its original value? Proceed to calculate the equilibrium temperature of the shield. [14M]

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Code No: R17A0319

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, February 2021

Machine Design - II

(ME)

Roll No									
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Time: 2 hours 30 min

Max. Marks: 70

Answer Any Five Questions

All Questions carries equal marks.

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- 1 a. Define static load carrying capacity of the bearing. [02M]  
b. A ball bearing is required to resist a radial load of 10kN and thrust load of 5kN. The average life of the bearing is to be 5000hrs with inner race is at rotation of 980 rpm. What basic dynamic load rating must be used in selecting the bearing? If the bearing is to have a life of 5000hrs at reliability 97%, what is the basic required dynamic load capacity? [12M]
- 2 Design a journal bearing for a centrifugal pump with following data. [14M]  
Load on journal: 20kN, Speed of the journal: 900 rpm, oil used having absolute viscosity at 55°C is 0.017kg/m-s. Ambient temperature is 15.5°C. Allowable bearing pressure for pump is 1.5N/mm<sup>2</sup>. Calculate mass of lubricating oil required for artificial cooling, if rise of temperature of oil is limited to 10°C. Assume heat dissipating coefficient: 1232 W/m<sup>2</sup>-K.
- 3 a. What are the commonly used materials for the piston? [02M]  
b. The connecting rod of petrol engine is designed for the following data. [12M]  
Piston dia = 80mm, stroke = 120mm, Weight of reciprocating parts = 15N, length of connecting rod = 240mm, max. Speed = 2800 rpm. Explosion pressure corresponding to 10° of crank angle is 3MPa, factor of safety is 6. If the connecting rod is to be made of 40cr steel, find the dimensions of the connecting rod.
- 4 Explain the detailed design procedure of the piston. [14M]
- 5 a. What are the advantages of V-belt over Flat belt? [04M]  
b. A leather belt 9mmx 250mm is used to drive a CI pulley 900mm in diameter at 336 rpm. If the active arc on the smaller pulley is 120° and stress in belt is 2MPa. Find the power capacity of the belt. The density of the leather may be taken as 980kg/m<sup>3</sup> and coefficient of friction of leather on CI is 0.35. [10M]
- 6 A load of 2kN is dropped axially on a closed helical spring from a height of 250mm. The spring has 20 effective turns and it is made of 25mm diameter wire. The spring index is 8. Find the max. shear stress induced in the spring and the amount of compression produced. The modulus of rigidity if the material of the spring wire is 84kN/mm<sup>2</sup>. [14M]
- 7 A helical gear with 30° helix angle transmits 35kW at 1500 rpm and has 24 teeth. The gear has 20° full depth teeth. Determine necessary module, pitch diameter and face width. For cast steel gear static stress may be taken as 56MPa, face width 3 times the normal pitch. Calculate the end thrust cause by the gear. [14M]
- 8 a. List the types of threads used as ‘Power Screws’. Give practical example for each type of threads. [07M]

b. Discuss the working principle of compound screw with a neat sketch.

**[07M]**

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Roll No										
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Time: 2 hours 30 min

Max. Marks: 70

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

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- 1 Draw the schematic layout of Rear wheel vehicle and discuss the functions of each component. [14M]
- 2 a) Enlist various systems of an automotive engine and explain the function of each. [7M]  
b) Describe clearly the working of a four stroke internal combustion petrol engine. [7M]
- 3 a) Discuss the latest trends in the design of petrol injection systems. [4M]  
b) Describe with the help of schematic diagrams, the electronic injection system used in S.I. engines. [10M]
- 4 a) How does an automobile contribute towards pollution of the atmosphere? [4M]  
b) What is a Three-way converter? Explain clearly how it is used to convert the pollutants in the engine exhaust into harmless constituents. [10M]
- 5 a) What is the function of a clutch? Discuss various factors affecting the torque transmission in a clutch. [4M]  
b) Explain the constructional features and working of single plate dry clutch. [10M]
- 6 a) Explain clearly the necessity of a transmission in a vehicle. [4M]  
b) Describe the working of a synchromesh gear box with the help of a sketch. [10M]
- 7 a) Explain clearly the requirements of automobile brakes. [4M]  
b) Explain in detail the construction and operation of an air pressure braking system. [10M]
- 8 a) Explain the importance of alternative energy used in an internal combustion engines. [4M]  
b) Explain combustion and emission characteristics of S.I. engines with alternative fuels. [10M]

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Code No: R17A0322

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**III B.Tech II Semester Supplementary Examinations, February 2021**

**CAD/CAM**

**(ME)**

<b>Roll No</b>										
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**Time: 2 hours 30 min**

**Max. Marks: 70**

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

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- 1 Explain database structure for graphics [14M]
- 2 Discuss the role of computers in industrial manufacturing [14M]
- 3 Discuss on modeling facilities [14M]
- 4 Explain curve representation methods [14M]
- 5 Explain CNC turning Center. [14M]
- 6 Explain CNC part programming with examples [14M]
- 7 What are the benefits of CAPP [14M]
- 8 Discuss on contact inspection methods [14M]

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**R17**





Code No: R17A0553

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, February 2021

Data Structures Using Python

(EEE, ME, ECE & AE)

Roll No									
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Time: 2 hours 30 min

Max. Marks: 70

Answer Any Five Questions  
All Questions carries equal marks.

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1. a) Explain the data types in python. [6M]
- b) Write the following python programs. [8M]
  - i. To print Fibonacci series
  - ii. To find factorial of a given number
- 2.a) Define block in python. Illustrate with an example how to structure python programs with indentation. [7M]
- b) What is string? How to declare strings ? How do you index strings in python? [7M]
- 3.a) What is an array? How to access, add and remove array elements using python? Explain with an example. [8M]
- b) Write a Python program using while loop first N numbers divisible by 5 . [6M]
- 4.a) What are the statements that were used to control loop. Explain with an example. [8M]
- b) Write a Python program to count the number of even and odd numbers from a series of numbers? [6M]
- 5.a) What is lambda function? How to write lambda functions? How lambda functions are compared with regular function objects? [9M]
- b) Write a Python program to add two given lists using map and lambda? [5M]
- 6.a) What is a function? Explain user defined functions with an example and list their advantages. [8M]
- b) Write a Python function that takes a number as a parameter and check the number is prime or not. [6M]
7. What is Dictionary? Explain Python dictionaries in detail discussing its operations and methods. [14M]
8. Explain about sorting Techniques. [14M]

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**Code No: R17A0320**

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**  
 (Autonomous Institution – UGC, Govt. of India)

**III B.Tech II Semester Supplementary Examinations, February 2021**  
**Finite Element Method**

(ME)

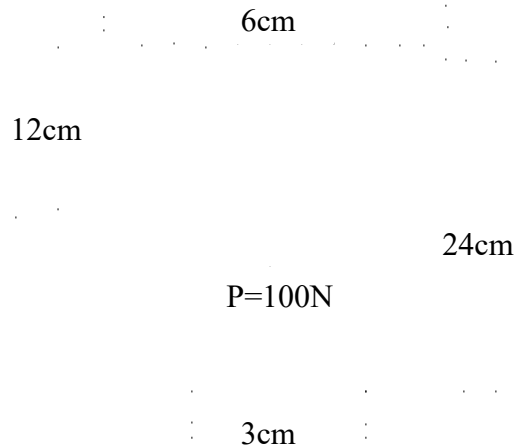
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**Time: 2 hours 30 min**

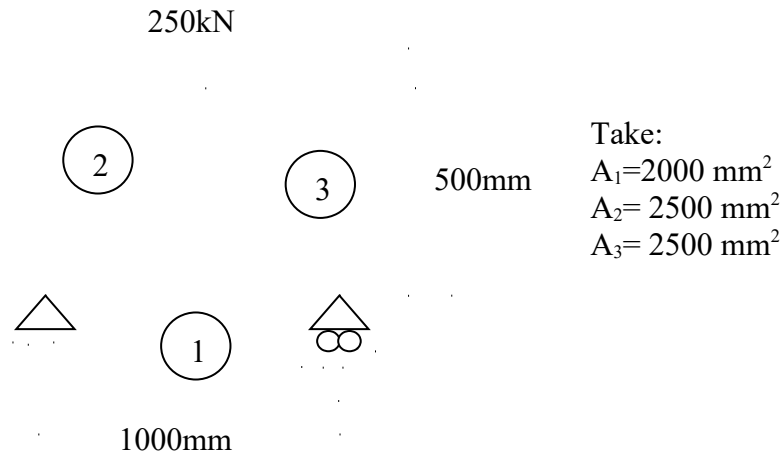
**Max. Marks: 70**

Answer Any **Five** Questions  
 All Questions carries equal marks.  
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- 1 Derive the equations of equilibrium of a 3-Dimensional stressed body. [14M]
- 2 Consider the thin (steel) plate shown in figure. The plate has a uniform thickness  $t=10\text{mm}$ , Young's modulus  $E=20 \times 10^9 \text{N/m}^2$ . [14M]
  - a) Using the elimination approach, solve for the global displacement vector
  - b) Evaluate the stresses in each element.
  - c) Determine the reaction force at the support.



- 3 Consider a three bar truss as shown in figure. It is given that  $E=2 \times 10^5 \text{N/mm}^2$ . [14M]  
 Calculate the following:
  - (i) Nodal displacements
  - (ii) Stress in each member
  - (iii) Reactions at the support.

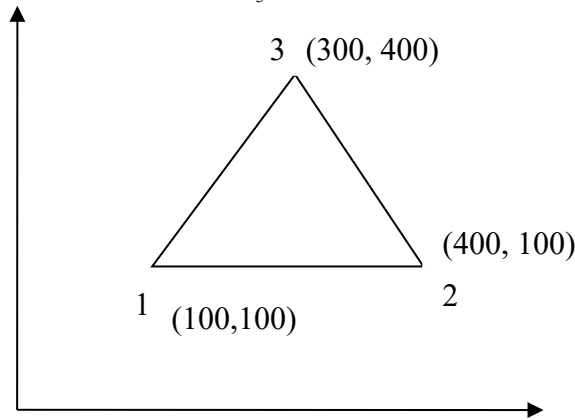


4 a What are the elements commonly used in the analysis of 2-Dimensional problem? [04M]

b Derive Strain-Displacement matrix for the 3-noded triangular element. [10M]

5 For the plane stress element shown in figure the nodal displacements are [14M]

$$\begin{array}{ll} U_1 = 2 \text{ mm} & V_1 = 1 \text{ mm} \\ U_2 = 1 \text{ mm} & V_2 = 1.5 \text{ mm} \\ U_3 = 2.5 \text{ mm} & V_3 = 0.5 \text{ mm} \end{array}$$



Determine the element stresses. Assume  $E=200\text{GN/m}^2$ ,  $\nu = 0.3$ ,  $t= 10\text{mm}$ .

6 Use Gaussian Quadrature to obtain the exact value for the following integral. [14M]

$$\int_{-1}^1 (r^3 - 1)(s^2 + s) dr \cdot ds$$

7 A wall consists of 4cm thick wood, 10cm thick glass fiber insulation and 1cm thick plaster. If the temperature on the wood and plaster faces are  $20^\circ\text{C}$  and  $-20^\circ\text{C}$  respectively. Determine the temperature distribution in the wall with 1D linear element approach. Assume thermal conductivity of wood, glass and plaster as 0.17, 0.035 and 0.5  $\text{W/m}^\circ\text{C}$ . The convective heat transfer coefficient on the colder side of the wall as  $25\text{W/m}^2\text{-}^\circ\text{C}$ . [14M]

8 Write short note on

(a) Formulation of Finite Element model in dynamic analysis [4M]

(b) Eigen vectors for a stepped bar. [10M]

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Code No: R17A0321

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, February 2021

Heat Transfer

(ME)

Roll No									
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Time: 2 hours 30 min

Max. Marks: 70

Answer Any Five Questions  
All Questions carries equal marks.

\*\*\*

**NOTE: Data Books are permitted.**

- 1 a) Explain briefly the various modes of heat transfer. [4M]  
b) Derive general heat conduction equation in Cartesian coordinates. [10M]
- 2 a) What is the difference between thermodynamics and heat transfer. [4M]  
b) Derive general heat conduction equation in Cylindrical coordinates. [10M]
- 3 a) What is meant by transient heat conduction? [4M]  
b) A 50 cm X 50 cm copper slab 6.25 mm thick has a uniform temperature of 300<sup>0</sup> C. Its temperature is suddenly lowered to 36<sup>0</sup> C. Calculate the time required for the plate to reach the temperature of 108<sup>0</sup> C. Take Density of copper slab is 9000 kg/m<sup>3</sup>; c = 0.38 kJ/kg<sup>0</sup>C; k = 370 W/m<sup>0</sup>C and h = 90 W/m<sup>2</sup><sup>0</sup>C. [10M]
- 4 a) What are the Heisler charts? [4M]  
b) A sphere of 200 mm diameter made of cast iron initially at uniform temperature of 400<sup>0</sup> C is quenched into oil. The oil bath temperature is 40<sup>0</sup> C. If the temperature of sphere is 100<sup>0</sup> C after 5 minutes, find the heat transfer coefficient on the surface of the sphere. Take density of cast iron is 7000 kg/m<sup>3</sup>, C<sub>p</sub> = 0.32 kJ/kg<sup>0</sup>C; Neglect internal thermal resistance. [10M]
- 5 a) Differentiate an ideal fluid and real fluid. [4M]  
b) Derive an energy equation for thermal boundary layer over a flat plate. [10M]
- 6 a) What are the uses of dimensional analysis? [4M]  
b) Derive momentum equation for hydrodynamic boundary layer over a flat plate. [10M]
- 7 a) How are heat exchangers classified? [4M]  
b) Derive expressions for effectiveness by number of transfer units method for i) Parallel flow, and ii) Counter flow heat exchangers. [10M]
- 8 a) State and prove Kirchhoffs law of radiation. [4M]  
b) A small sphere (outside diameter = 50 mm) with a surface temperature of 227<sup>0</sup> C is located at the geometric centre of a large sphere (inside diameter = 250 mm) with an inner surface temperature of 7<sup>0</sup> C. Calculate how much of emission from the inner surface of the large sphere is incident upon the outer surface of the small sphere: assume that both sides approach black body behaviour. [10M]

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Code No: R17A0319

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, February 2022

Machine Design - II

(ME)

Roll No									

Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

\*\*\*

**SECTION-I**

- 1 Design a full hydrodynamic bearing based on the following data: [14M]  
Radial load= 30 kN  
Journal speed = 500 rpm  
Diameter of the journal = 120mm  
Minimum film thickness 0.025  
Assume suitable data and state the assumptions made.

OR

- 2 Classify bearings and Differentiate hydrostatic and hydrodynamic bearings. [14M]

**SECTION-II**

- 3 Design the connecting rod of I-section for a single cylinder IC engine using the following specifications; diameter of the piston=100mm; mass of the reciprocating parts=2.25Kg; length of the connecting rod=300mm; stroke length=125mm; speed=1200rpm; maximum explosion pressure = 3.5N/mm<sup>2</sup>; compression ratio=6; factor of safety = 5; density of the rod material = 8000 Kg/m<sup>3</sup>; yield stress in compression = 330MPa. [14M]

OR

- 4 Design a cast iron piston for a single acting four stroke IC engine for the following specifications [14M]  
Cylinder bore = 100mm, stroke length = 120mm, maximum gas pressure= 6Mpa, brake mean effective pressure= 0.7Mpa, fuel consumption = 0.24Kg/K/W/hr, speed=2200rpm.

**SECTION-III**

- 5 Design a cast iron driven pulley to transmit 20 kW at 300 r.p.m. The diameter of the pulley is 500 mm and the angle of lap is 180°. The pulley has four arms of elliptical cross-section with major axis twice the minor axis. The coefficient of friction between the belt and the pulley surface is 0.3. The allowable tension per metre width of the belt is 2.5 N. The following allowable stresses may be taken Shear stress for the shaft material = 50 MPa, and Bending stress for the pulley arms = 15 MPa. [14M]

OR

- 6 A closed coil helical compression spring subjected to a service load ranging from [14M]

2250N to 2750N. The axial deflection of the spring for the load range is 6mm. Assume a spring index of 5. The permissible shear stress intensity is 420MPa and modulus of rigidity= 84KN/mm<sup>2</sup>. Design a closed coil helical compression spring by considering

- i) Curvature effect    ii) without curvature effect.

**SECTION-IV**

- 7 Design a pair of spur gears with stub teeth to transmit 60 kW from a 180 mm pinion running at 2400 r.p.m. to a gear running at 1500 r.p.m. Both the gears are made of steel having BHN 260. Design gear and also find dynamic and wear loads acting on the gear. [14M]

OR

- 8 A pair of spur gears consists of 24 teeth pinion rotating at 1000 rpm and transmitting power to a 48 teeth gear. The module is 6 mm while the face width is 60 mm. both gears are made of steel with an ultimate tensile strength of 450N/mm<sup>2</sup>. They are heat treated to a surface hardness of 250 BHN. Assume that velocity factor accounts for the dynamic load  
Calculate the following [14M]

- i) Beam strength  
ii) wear strength  
iii) the rated power that the gears can transmit.

**SECTION-V**

- 9 With help of neat sketches explain different Thread Forms for Power Screws [14M]

OR

- 10 A horizontally fixed nut carries a vertical screw of square thread whose mean diameter is 50 mm, and the pitch is 10 mm. On the top of the screw a circular disc 100 N weight and 100 mm diameter is fixed and this disc has radial hole into which a rod of 1 .I m is fixed such that 1 m length is out of the disc. If at the end of this rod an effort of 280 N is required to lift a load placed on the disc, calculate the load. The coefficient of friction between the threads of the screw and nut is 0.1. [14M]

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Code No: R17A0553

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, February 2022

Data Structures Using Python

(EEE, ME, ECE & AE)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

\*\*\*

**SECTION-I**

1 List and explain various fundamental data types supported by python including examples. [14M]

OR

2 Analyze the precedence of operators in python? Explain with examples. [14M]

**SECTION-II**

3 Explain about various looping statements in Python using examples. [14M]

OR

4 Prepare a python code for the following : [14M]

i) Snippet to print the following format.

P

PP

PPP

PP

P

ii) To display list of squares and cubes up to given range.

**SECTION-III**

5 Differentiate between Keyword arguments and Default arguments in the Python with examples. [14M]

OR

6 How lambda function is useful in Python? Explain with example. [14M]

**SECTION-IV**

7 Consider the list L=[ 1, 2, 3,4,5,6,7,8 ] generate the output of the following commands: [14M]

(i) L[0:3] (ii) L[0:-1] (iii) L[ :: -1]

(iv) L[-1 : -4] (v) L[:] (vi) L[ :4 ] (vii) L[1::-1]

OR

8 What do you mean by Sets data structure? Explain operations supported by Sets in python? [14M]

**SECTION-V**

9 Explain about Quick Sort technique and write a python code to sort the elements using Quick Sort technique. [14M]

OR

10 Brief about Queue and its operations supported by Python using example program. [14M]

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Code No: R17A0323

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, February 2022

Automobile Engineering

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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**SECTION-I**

1 Describe the pressurized lubrication system with neat sketch. [14M]

OR

2 Explain the concept of supercharging of in S.I and C.I engines. [14M]

**SECTION-II**

3 Explain the working principle of clutch. Describe the construction and working principle of a multi-plate clutch and centrifugal clutch. [14M]

OR

4 Write about oil pumps and explain about its working principle. [14M]

**SECTION-III**

5 Describe the working principle of differential rear axle with neat sketch. [14M]

OR

6 Elaborate the construction and working principle of a fluid flywheel. List the advantages of fluid flywheel over the other types of clutches. [14M]

**SECTION-IV**

7 Explain Ackerman steering mechanism with the help of a schematic diagram. [14M]

OR

8 Explain the functioning of independent front wheel suspension system with torsion bar in an automobile. [14M]

**SECTION-V**

9 Describe the emission standards of Bharat stage-IV and Bharat stage –VI engines. [14M]

OR

10 Distinguish the engine modifications to be done in SI and CI engines for various alternate fuels. [14M]

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Code No: R17A0322

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, February 2022

CAD/CAM

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

\*\*\*

**SECTION-I**

1 With a neat sketch describe the product life cycle in a computerized manufacturing environment and design process. [14M]

OR

2 A triangle is defined in a two dimensional coordinate system by its vertices (0, 2), (0, 3) and (1, 2). Construct the following transformations on this triangle: (i) Rotate the triangle by  $45^\circ$  about the origin (ii) Rotate the triangle by  $45^\circ$  about (-1,-1). [14M]

**SECTION-II**

3 Explain what is meant by a synthetic curve. Give some types of synthetic curves and their properties [14M]

OR

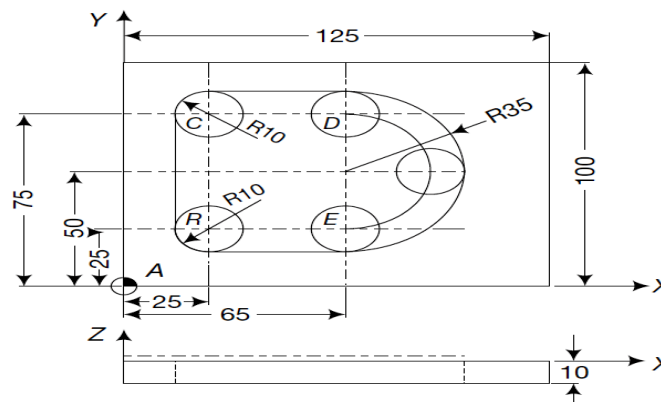
4 Explain the Constructive solid geometry (CSG) method of solid modelling [14M]

**SECTION-III**

5 What is numerical control? Illustrate various elements of NC with a neat diagram. [14M]

OR

6 The component to be machined is shown in Fig.1. It is assumed that the pocket is through and hence only outside is to be machined as a finish cut of the pocket. The tool to be used is a 20 mm diameter slot drill. The setting is done with point A as reference (0, 0, 0) and the reference axes are along X and Y directions. Build NC part program for machining the component. [14M]



**SECTION-IV**

7 What are the methods of grouping parts into part families? Explain [14M]  
OR

8 Differentiate retrieval type and generative type CAPP? [14M]

**SECTION-V**

9 What is machine vision? Explain how it can be used for CAQC. [14M]  
OR

10 Give a brief note on the following non-optical non-contact inspection methods.

i) Electric field technique [5M]

ii) Radiation techniques [5M]

iii) Ultrasonic's [4M]

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Code No: R17A0320

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, February 2022

Finite Element Method

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

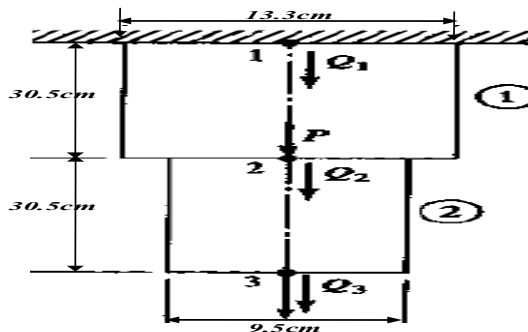
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**SECTION-I**

- 1 Describe Potential Energy Theory? Derive the Potential Energy equation for 3-D elastic body. [14M]

OR

- 2 The plate has uniform thickness of 1cm, Young's Modulus is  $2.06 \times 10^{11} \text{ N/m}^2$ , and weight density  $\rho = 7850 \text{ kg/m}^3$ . In addition to its self-weight, the plate is subjected to a point load of 4.5N at its midpoint as shown in the Figure. Assemble the global stiffness matrix  $[K]$  and find the displacements at each node. [14M]

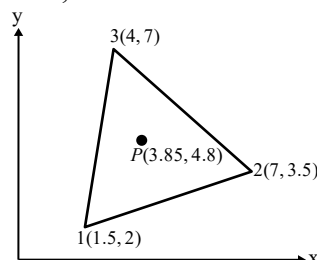


**SECTION-II**

- 3 Derive the element stiffness matrix for a Constant Strain Triangular Element (CST). [14M]

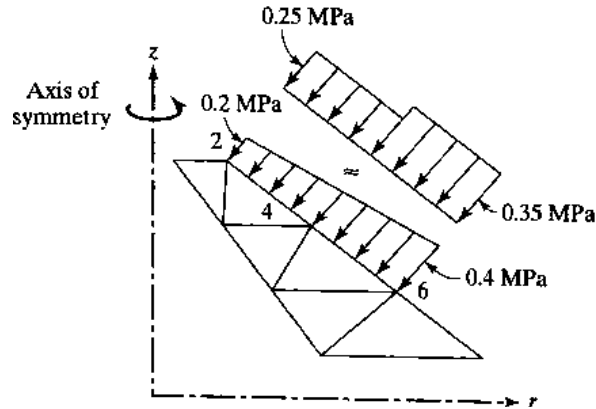
OR

- 4 Evaluate the shape functions  $N_1$ ,  $N_2$  and  $N_3$ , at the interior point  $P$  for a Triangular element as shown in Figure. Also, determine the Jacobian of the transformation,  $J$ . [14M]



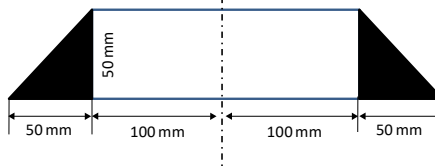
**SECTION-III**

- 5 An axisymmetric body with a linearly distributed load on the conical surface as shown in Figure. Determine the equivalent point loads at nodes 2, 4 and 6. [14M]



OR

- 6 An axisymmetric link element is shown in Figure. Evaluate the matrices  $[B]$  and  $[D]$ . Take  $E = 2 \times 10^5 \text{ N/mm}^2$  and  $\mu = 0.33$ . [14M]

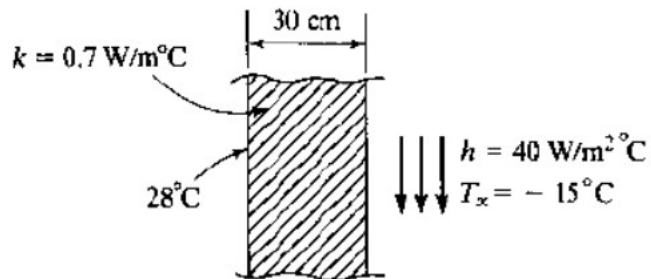


**SECTION-IV**

- 7 Consider a beam element of length 1m from its fixed end. The point load of  $20 \text{ kN}$  is applied on a beam at a length of  $0.5 \text{ m}$  from its fixed end. Calculate the deflection under the load and the stresses in the elements.  $E = 20 \times 10^{10} \text{ N/m}^2$  and  $I = 2500 \times 10^{-8} \text{ m}^4$ . (Hint:  $u_1 = u_2 = u_5 = 0$ ). [14M]

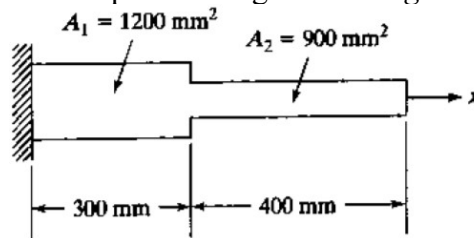
OR

- 8 Consider a brick wall of thickness  $L = 30 \text{ cm}$ ,  $k = 0.8 \text{ W/m}^\circ\text{C}$ . The inner surface is at  $28^\circ\text{C}$  and the outer surface is exposed to cold air at  $-15^\circ\text{C}$ . The heat transfer coefficient is associated with the outside surface is  $h = 40 \text{ W/m}^2 \text{ }^\circ\text{C}$ . Determine the steady state temperature distribution within the wall as shown in the Figure. Use a two-element model. [14M]



**SECTION-V**

- 9 Evaluate the Eigen values and Eigen vectors for the stepped bar as shown in the Figure. Take  $E=200GPa$  and specific weight=  $7850 kg/m^3$ . [14M]



- 10 What is an Eigen Vector? Write the properties of Eigen Vector and also write the steps involved in solving the Eigen vector problem. [14M]

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Code No: R17A0321

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**  
(Autonomous Institution – UGC, Govt. of India)

**R17**

**III B.Tech II Semester Supplementary Examinations, February 2022**

**Heat Transfer**

(ME)

<b>Roll No</b>									
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**Time: 3 hours**

**Max. Marks: 70**

**Note:** This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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**SECTION-I**

- 1 Derive general differential heat conduction equation in Cartesian co-ordinates. [14M]  
Write the special case of heat conduction equation for steady state case with no internal heat generation in 2D.

OR

- 2 A hollow cylinder of 5cm inner diameter and 40cm outer diameter has an inner surface temperature of 200°C and an outer surface temperature of 100°C. Determine the temperature of the point half way between the inner and outer surfaces. If the thermal conductivity of the cylinder material is 70 W/mK, determine the heat flow through the cylinder per linear meter. [14M]

**SECTION-II**

- 3 A very long 25mm diameter copper rod ( $k=380\text{W/m}^\circ\text{C}$ ) extends horizontally from a plane heated wall at 150°C. Temperature of surrounding air is 30°C and heat transfer coefficient between the surface of the rod and the surroundings is 10W/m<sup>2</sup>K. (i) Determine the rate of heat loss from the rod. (ii) How long the rod should be to be considered as infinite? [14M]

OR

- 4 A steel plate of  $\alpha=1.2\times 10^{-5}\text{m}^2/\text{s}$ ,  $k=43\text{W/m}^\circ\text{C}$  of thickness  $2L=10\text{cm}$ , initially at a uniform temperature of 250°C is suddenly immersed in an oil bath of temperature 45°C. Convective heat transfer coefficient between the fluid and the surface is 700W/m<sup>2</sup>°C. (i) How long will it take for the plane to cool to 100°C? [14M]

**SECTION-III**

- 5 A flat plate 1.0m wide and 1.0m long is placed in a wind tunnel. The temperature and velocity of free stream air are 10°C and 80 m/s respectively. The flow over the whole length of the plate is made turbulent with the help of a turbulizing grid placed upstream of the plate. Determine the thickness of the boundary layer at the trailing edge of the plate. Also calculate the mean value of the heat transfer coefficient (h). [14M]

OR

- 6 Air at 20°C and atmospheric pressure is flowing with a velocity of 3m/s along the length of a flat plate maintained at 60°C. (i) Calculate the hydrodynamic boundary layer thickness at 20cm and 40cm from the leading edge (ii) Heat transferred from the first 40cm of the plate. [14M]

**SECTION-IV**

- 7 Hot oil with a capacity rate of 2500 W/k flow through a double pipe heat exchanger. It enters at 360°C and leaves at 300°C. Cold fluid enters at 30°C and leaves 200°C. If the overall heat transfer coefficient is 800 W/m<sup>2</sup>K, determine the heat exchanger area required for (a) Parallel flow and (b) Counter flow. [14M]

OR

- 8 Describe the Single shell pass, two tube passes heat exchange with neat sketch. [14M]

**SECTION-V**

- 9 (i) Describe the following (a) Absorptivity,  $Q_a$  (b) Reflectivity,  $Q_r$  (c) Transmissivity,  $Q_t$  [14M]  
(ii) Differentiate between Black body, White body, Perfect black body and Transparent body.

OR

- 10 Two circular discs of diameter 20cm each are placed 2m apart. Calculate the radiant heat exchange for these plates if these are maintained at 800°C and 300°C respectively. Their respective emissivities are 0.3 and 0.5. [14M]

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Code No: R17A0319

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, June 2022

Machine Design - II

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Answer Any Five Questions

All Questions carries equal marks.

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**Note: Design data book are permitted.**

- 1 a Discuss various desirable characteristics of the bearing materials. [4M]  
b Discuss the mechanism of Hydro dynamic lubrication with neat sketches. [10M]
- 2 a Define static load carrying capacity of the bearing. [2M]  
b A single row deep groove ball bearing is subjected to a radial load of 2KN and axial load of 3KN. The shaft rotates at 1200 RPM with expected life of the bearing is 20000 hrs. The acceptable diameter of the shaft is 75 mm. Select suitable ball bearings for this application. [12M]
- 3 a What are the commonly used materials for the connecting rod? [2M]  
b The connecting rod of petrol engine is designed for the following data. [12M]  
Piston diameter=80mm, Stroke= 120mm, Weigh of reciprocating parts = 15N, Length of connecting rod = 240mm, Maximum speed= 2800 RPM, Explosion pressure corresponding to  $10^\circ$  of crank angle is 3 MPa, Factor of safety=6, If the connecting rod is to be made of 40Cr steel, find the dimensions of I-section connecting rod.
- 4 a What is the function of a piston? [2M]  
b Design a connecting rod for a petrol engine form the following data: [12M]  
Diameter of the piston : 110 mm, Mass of the reciprocating parts : 2kg  
Length of the connecting rod: 325 mm, Stroke: 150 mm, Speed: 1500 rpm.  
Maximum explosion pressure: 2.5MPa.
- 5 a What are the commonly used materials for the belts? [2M]  
b A V-belt drive with 10 belts and a belt speed of 25 m /s transmits 120 kW. The angle of lap for each belt is  $160^\circ$  and the groove angle is  $35^\circ$ . The coefficient of friction between the belt and pulley is 0.2. Assuming that the belts are just on the point of slipping. Find the tensions in the tight and slack side of the belt, the mass of the belt is 0.65kg/m. [12M]
- 6 a Define spring stiffness. [2M]  
b A helical torsion spring of mean diameter 60mm is made of a round wire of [12M]



6mm diameter. If a torque of 6 N-m is applied in the spring. Find the bending stress induced and the angular deflection of the spring. The spring index is 10 and the modulus of elasticity for the spring material is 200 kN/mm<sup>2</sup>. number of effective turns may be taken as 5.5.

- 7 A helical cast steel gear with 30° helix angle has to transmit 25 kW at 2000 r.p.m if the gear has 25 teeth, determine the necessary module and face width of the gear. The tooth profile is 20° full depth involute and static strength of the gear material is 56 MPa. Take the face width of the gear as 3 time the normal pitch and velocity factor (Cv) , =  $\frac{15}{15+v}$  where v is the pitch line velocity in m/s [14M]
- 8 a What is meant by self-locking property of threads, and where it is desirable? [2M]  
b A triple start square threaded screw is used to raise a load of 50kN. The screw has a nominal diameter of 50mm and the pitch is 8mm. The height of the nut is 40mm. The coefficient of friction between the screw and nut is 0.12 and there is no collar friction. Find the maximum shear stress induced in the screw, transverse shear stress induced in the screw and nut threads and the bearing pressure between the screw and nut. [12M]

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Code No: R17A0323

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, June 2022

Automobile Engineering

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Answer Any Five Questions

All Questions carries equal marks.

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- 1 (a). Differentiate between front wheel drive and Rear wheel drive systems. Also [7M]  
Mention some applications of four-wheel drive systems.  
(b). Explain the working of variable valve timing with diagram. [7M]
- 2 (a). What are the considerations to be considered in Vehicle aerodynamics [7M]  
(b). Give detailed classifications of auto mobile vehicles. [7M]
- 3 (a). Illustrate the working of Electronically controlled gasoline injection system [7M]  
for SI engine.  
(b). What is a transistorized ignition coil? Explain the working of transistorized [7M]  
ignition coil with neat sketch
- 4 With help of a neat sketch explain How does capacitive discharge ignition work? [14M]
- 5 (a). Explain about the working of Multi Plate clutch with neat diagram? [7M]  
(b). With a neat sketch, Demonstrate the working of constant mesh gear box. [7M]
- 6 (a). Illustrate the working of fluid flywheel with neat sketch. [7M]  
(b). Explain the working of a centrifugal clutch with a suitable sketch. [7M]
- 7 (a). Specify the requirements & functions of steering system. [7M]  
(b). Demonstrate the principle of operation of Hydraulic brakes. [7M]
- 8 (a). Discuss different energy alternatives with their merits and demerits. [7M]  
(b). Differentiate between Electric and Hybrid vehicles. [7M]

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Time: 3 hours

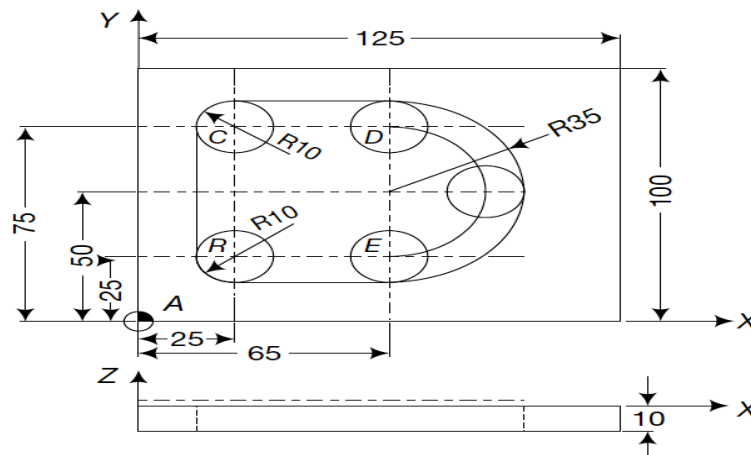
Max. Marks: 70

Answer Any Five Questions

All Questions carries equal marks.

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- 1 With a neat sketch describe the product life cycle in a computerized manufacturing environment and software configuration of graphics system. [14M]
- 2 Explain Raster-scan graphics system and CRT with neat diagrams. [14M]
- 3 What is meant by Wireframe modelling? Distinguish between parametric and analytic representation of curves. [14M]
- 4 Explain the CSG (constructive solid geometry) method of solid modelling. [14M]
- 5 What is numerical control? Illustrate various elements of NC with a neat diagram.. [14M]
- 6 The component to be machined is shown in Fig. It is assumed that the pocket is through and hence only outside is to be machined as a finish cut of the pocket. The tool to be used is a 20 mm diameter slot drill. The setting is done with point A as reference (0, 0, 0) and the reference axes are along X and Y directions. Build NC part program for machining the component. [14M]



- 7 Explain the need of CAPP and distinguish between Retrieval type and Generative type. [14M]
- 8 What is a CMM (Coordinate Measuring Machine) ? Classify various types of CMM with neat sketches. [14M]

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Code No: R17A0553

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**III B.Tech II Semester Supplementary Examinations, June 2022****Data Structures Using Python**

(EEE, ME, ECE &amp; AE)

<b>Roll No</b>										
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**Time: 3 hours****Max. Marks: 70**Answer Any **Five** Questions

All Questions carries equal marks.

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1. a) Describe the features and applications of Python. (7 M)  
b) Write in detail about various numeric data types in Python. (7 M)
2. a) Illustrate the use of numerical literals and string literals with an example python script. (7M)  
b) Explain different arithmetic operators supported by Python and also discuss about their order of precedence. (7M)
3. a) Illustrate different types of control flow statements available in Python with flowcharts. (7M)  
b) Write a python program to print all the prime numbers between 100 and 200. (7M)
4. a) Write a python script to check whether the given string is palindrome or not.(7M)  
b) Write a python program to print the following pattern: (7M)
 

```

5 5 5 5 5
4 4 4 4
3 3 3
2 2
1

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5. a)What is Lambda function? What are the characteristics of Lambda function? Give suitable example. (7M)  
b) Explain about different ways of passing arguments to a function in python. (7M)
6. a) What are fruitful functions? Explain their usage with the help of a python program. (7M)  
b) Write a function which accepts variable number of strings as arguments and count the number of strings. (7M)
7. a) What are built-in dictionary functions? Explain their use with an example. (7M)  
b) Distinguish among lists, tuples, dictionaries and sets. (7 M)
8. a) Discuss various applications of Stacks and Queues. (7M)  
b) Discuss the differences between single linked list and double linked list in terms of memory usage and operation complexity. (7M)

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Code No: R17A0320

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, June 2022

Finite Element Method

(ME)

Roll No									
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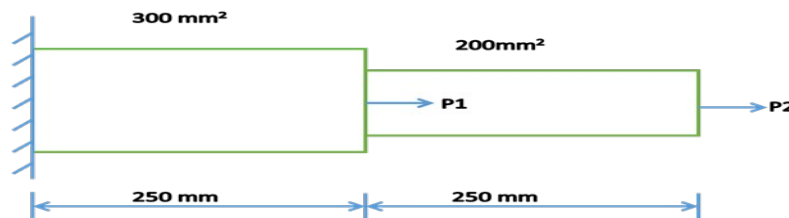
Time: 3 hours

Max. Marks: 70

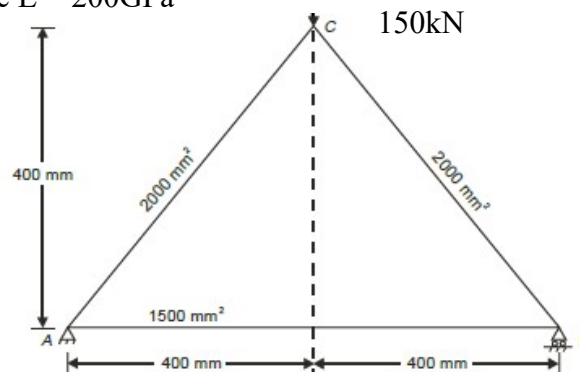
Answer Any Five Questions  
All Questions carries equal marks.

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- 1 Discuss the shape function and derive the shape functions for one dimensional bar element. [14M]
- 2 Estimate the nodal displacements, stresses and reaction at the support in the stepped bar subjected to an axial load of  $P_1=3000\text{N}$  and  $P_2= 2000\text{N}$  as shown in figure.  $E= 2.1 \times 10^5 \text{ MPa}$ . [14M]



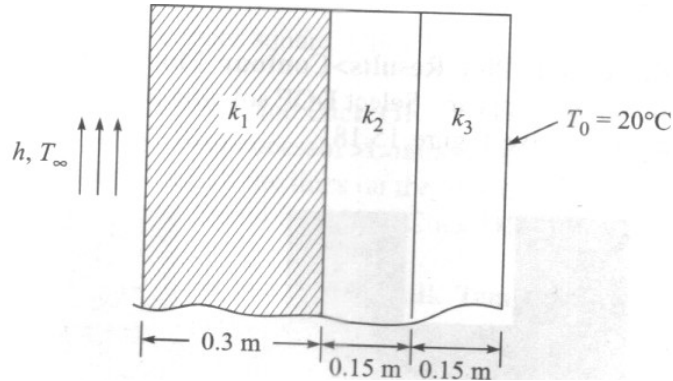
- 3 Derive the Strain displacement matrix [B] for CST Element [14M]
- 4 Determine the Nodal displacements and stresses in each member of a truss as shown in fig. Take  $E = 200\text{GPa}$  [14M]



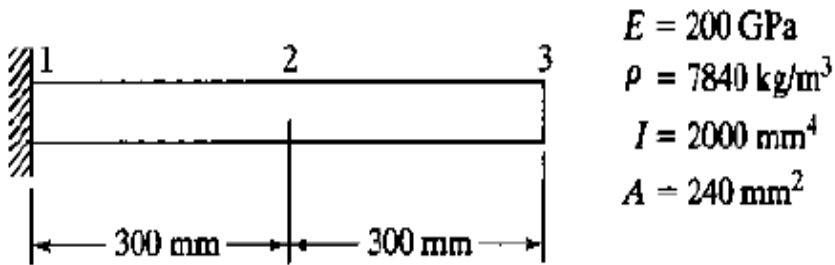
- 5 The nodal coordinates for an axi-symmetric element are (1,3),(6,8) and (4,6). [14M]  
Evaluate strain-displacement matrix for the element at centroid.
- 6 Compute the strain displacement matrix [B] and also the strains of an axi- [14M]

symmetric triangular element with the coordinates  $r_1 = 3$  cm,  $z_1 = 4$  cm,  $r_2 = 6$  cm,  $z_2 = 5$  cm,  $r_3 = 5$  cm,  $z_3 = 8$  cm. The nodal displacement values are  $q_1 = 0.01$  mm,  $q_2 = 0.01$  mm,  $q_3 = 0.01$  mm,  $q_4 = -0.04$  mm,  $q_5 = -0.03$  mm,  $q_6 = 0.07$  mm.

- 7 A composite wall consists of three materials shown in figure. The outer temperature is  $200^\circ\text{C}$ . Convection heat transfer takes place on the inner surface of the wall with  $h=20$  W/cm<sup>2</sup> °C and  $T_\infty=1000^\circ\text{C}$ . Determine the temperature in the wall  $k_1=20$  W/cm<sup>0</sup>C,  $K_2=30$  W/cm<sup>0</sup>C,  $k_3=40$  W/cm<sup>0</sup>C [14M]



- 8 Evaluate the lowest eigenvalue and the corresponding Eigen mode for the beam shown in Fig [14M]



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**R17**

Code No: R17A0321

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**III B.Tech II Semester Supplementary Examinations, June 2022****Heat Transfer**

(ME)

<b>Roll No</b>										
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**Time: 3 hours****Max. Marks: 70**Answer Any **Five** Questions

All Questions carries equal marks.

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- 1 a) What are the basic modes of Heat transfer? Explain with examples [08M]  
b) What is difference between thermodynamics and Heat Transfer? [06M]
- 2 a) Derive General heat conduction equation in Cylindrical coordinates. [08M]  
b) Enumerate the basic laws which govern the heat transfer. [06M]
- 3 a) An egg with mean diameter of 40 mm and initially at 20 °C is placed in a boiling water pan for 4 minutes and found to be boiled to the consumers taste. For how long should a similar egg for same consumer be boiled when taken from a refrigerator at 5 °C. Take the following properties of egg: Thermal conductivity =10 W/m °C Density = 1200 kg/m<sup>3</sup> Specific heat =2 KJ/kg °C and heat transfer coefficient = 100 W/m<sup>2</sup> °C, Use lump theory. [10M]  
b) What are the assumptions for lumped capacity analysis? [04M]
- 4 A 6 mm thick stainless steel plate (density=7800kg/m<sup>3</sup>,c=460 J/kg °C, k=55W/m °C) is used to form the nose section of missile. It is held initially at a uniform temperature of 30 °C. When the missile enters the denser layer of the atmosphere at a very high velocity the effective temperature of air surrounding the nose region attains the value 2150 °C, the surface convective heat transfer coefficient is estimated as 3395W/m<sup>2</sup> °C. if the maximum metal temperature is not to exceed 1100 °C, determine:  
(i) Maximum possible time in these surroundings. [14M]  
(ii) Inside surface temperature under these conditions.
- 5 a) Calculate the rate of heat transfer by free convection from a 20cmX30cm horizontal plate 150 °C facing upwards to air at 40 °C. [10M]  
b) Can the problems relating turbulent flow be solved easily analytically, if not, why, and also state how are these solved [04M]
- 6 a) Air at 20 °C flows across an elliptical tube 60×120 mm, perpendicular to minor [10M]

axis with a velocity of 2.8m/s. The surface of the tube is maintained 60°C.  
Determine the value of convection coefficient.

- b Define the Nusselt number and Prandtl number? **[04M]**
- 7 a Explain briefly the various regimes of saturated pool boiling. **[10M]**  
b Enumerate the applications of boiling heat transfer. **[04M]**
- 8 a Derive the Stefan- Boltzmann's constant. **[08M]**  
b Explain the concept of black body. **[06M]**

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Code No: R17A0326

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Regular Examinations, February 2021

Power Plant Engineering

(ME)

Roll No										
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Time: 2 hours 30 min

Max. Marks: 70

Answer Any Five Questions  
All Questions carries equal marks.

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- 1 Explain the working principle of steam power plant with neat sketch by mentioning all the components? [14M]
- 2 Explain the working principle of ash handling system with neat sketch? [14M]
- 3 Describe the working principle of diesel power plant with neat sketch? [14M]
- 4 (a) How diesel power plant is different from gas turbine power plant? Explain? [8M]
- 4 (b) Derive the efficiency of Braton cycle with aid of T-s plot? [6M]
- 5 (a) What are various safety measures need to be taken in nuclear power plants? Explain? [7M]
- 5 (b) Explain the significance of control rods in nuclear power plants? [7M]
- 6 Classify nuclear reactors? Explain Boiling Water Reactor (BWR) with neat sketch? [14M]
- 7 (a) Explain the characteristics of solar energy and hydro - electric energy [7M]
- 7 (b) Explain about (i). Pondage, (ii). Silting, and (iii). Spillways [7M]
- 8 Explain the following (i). Capacity factor, (ii). Diversity factor, and (iii). Load factor. [14M]

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Code No: R17A0327

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Regular Examinations, February 2021

Automation and Control Engineering

(ME)

Roll No									
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Time: 2 hours 30 min

Max. Marks: 70

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

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- 1 Define Automation? and explain different types automation with examples. [14M]
- 2 Discuss in detail about trends in mechatronics [14M]
- 3 Explain briefly about the pressure transducer with neat sketch and its applications [14M]
- 4 Explain about position and velocity sensors with neat sketch [14M]
- 5 Briefly Explain various drive systems with neat sketches and also compare their advantages and disadvantages. [14M]
- 6 Explain in detail about the pneumatic actuators with neat sketch [14M]
- 7 Briefly explain about the control system components with neat sketches. [14M]
- 8 Explain in detail about P-I and PD controllers and its applications [14M]

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Code No: R17A0331

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY **R17**

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Regular Examinations, February 2021

Heating, Ventilation and Air Conditioning

(ME)

Roll No									
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Time: 2 hours 30 min

Max. Marks: 70

Answer Any Five Questions  
All Questions carries equal marks.

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**NOTE: Steam Tables and psychrometric charts are allowed.**

- 1(a) Explain the working of vapor compression cycle with schematic and p-h diagrams? [7M]
- (b) Discuss different mode of heat transfer? [7M]
- 2 Classify various types of compressors? Explain any two with neat sketches. [14M]
- 3 Explain the working principle of window A/C with neat sketch? Also explain the advantages and disadvantages of window A/C? [14M]
- 4 With the help of explain the working principle of duct type split A/C system? [14M]
- 5 Discuss all the psychrometric process with help of psychrometric chart? [14M]
- 6 Moist air at 1 atm. pressure has a dry bulb temperature of 32°C and a wet bulb temperature of 26°C. Calculate a) the partial pressure of water vapour, b) humidity ratio, c) relative humidity, d) dew point temperature, e) density of dry air in the mixture, f) density of water vapour in the mixture and g) enthalpy of moist air using perfect gas law model and psychrometric equations. [14M]
- 7 A 100% outdoor summer air conditioning system has a room sensible heat load of 400 kW and a room latent heat load of 100 kW. The required inside conditions are 24°C and 50% RH, and the outdoor design conditions are 34°C and 40% RH. The air is supplied to the room at a dry bulb temperature of 14°C. Find i) the required mass flow rate of air ii) moisture content of supply air, iii) Sensible, latent heat loads on the coil, and iv) The required cooling capacity of the coil, Coil Sensible Heat Factor and coil ADP if the by-pass factor of the coil is 0.2. Barometric pressure = 1 atm. [14M]
- 8 How do you select a pump? Explain pump head calculation step by step? [14M]

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Code No: R17A0328

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****IV B.Tech I Semester Regular Examinations, February 2021****Mechanical Measurements and Instrumentation****(ME)**

<b>Roll No</b>									
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**Time: 2 hours 30 min****Max. Marks: 70**

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

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- |          |  |                            |
|----------|--|----------------------------|
| <b>1</b> | (a) Define measurement. Explain the process of measurement.  | <b>[5M]</b>                |
|          | (b) With a block diagram, explain the three stages of a generalized measurement system giving suitable examples. | <b>[9M]</b>                |
| <b>2</b> | (a) Define the following:<br>Sensitivity, Repeatability and Range of a Measurement.                              | <b>[6M]</b><br><b>[8M]</b> |
|          | (b) With a neat sketch, explain about the working principle and construction of a piezo electric transducer.     |                            |
| <b>3</b> | (a) With a neat diagram, discuss an industrial U-tube manometer.   | <b>[5M]</b>                |
|          | (b) Briefly discuss the working of a McLeod gauge with a neat sketch.  | <b>[9M]</b>                |
| <b>4</b> | (a) Define the measurement of level. Give the classification for methods of level measurement.                   | <b>[6M]</b><br><b>[8M]</b> |
|          | (b) With neat sketches, explain any two methods in direct method of level measurement.                           |                            |
| <b>5</b> | (a) Explain the calibration of flowmeters.   | <b>[7M]</b>                |
|          | (b) With a neat sketch, explain about Laser Doppler Anemometer (LDA).  | <b>[7M]</b>                |
| <b>6</b> | (a) Write a short note on piezo electric type accelerometer for the measurement of acceleration.                 | <b>[8M]</b><br><b>[6M]</b> |
|          | (b) Explain how the stroboscope can play the role of the instrument to be used for speed measurement.            |                            |
| <b>7</b> | (a) Explain the working principle and construction of a sling type psychrometer.                                 | <b>[6M]</b><br><b>[8M]</b> |
|          | (b) Explain briefly about the dewpoint meter.  |                            |
| <b>8</b> | Explain briefly about the open loop and closed loop control systems.   | <b>[14M]</b>               |



Code No: R17A0333

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY **R17**

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Regular Examinations, February 2021

Operations Research

(ME)

Roll No									
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Time: 2 hours 30 min

Max. Marks: 70

Answer Any Five Questions  
All Questions carries equal marks.

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- 1 Describe various operations research models elaborately? [14M]
- 2 Use Simplex Method To minimize  $Z = x_1 - 2x_2 + 3x_3$  [14M]  
Subject to the constraints  
 $-2x_1 + x_2 + 3x_3 = 2$   
 $2x_1 + 3x_2 + 4x_3 = 1$   
 $x_1, x_2, x_3 \geq 0$
- 3 Solve the following transportation problem, in which cell entries represent unit costs [14M]

		To			Available
		A	B	C	
From	I	2	7	4	5
	II	3	3	1	8
	III	5	4	7	7
	IV	1	6	2	14
	Reqd.	7	9	18	34

- 4 Solve the following transportation problem for optimum transportation cost. [14M]

	Destination				Available
	A	B	C	D	
1	19	30	50	10	7
2	70	30	40	60	9
3	40	8	70	20	18
Demand	5	8	7	14	

- 5 Consider (two persons, zero sum) game matrix which represents pay off to the player 'A'. Find the optimal strategy, if any. [14M]

		Player B		
		I	II	III
Player A	I	-3	-2	6
	II	2	0	2
	III	5	-2	-4

- 6 Find game value of the following payoff matrix. [14M]

	Player B			
Player A	18	4	6	4
	6	2	13	7
	11	5	17	3
	7	6	12	2

- 7 A stock list has to supply 400 units of a product every Monday to his customers. [14M]  
He gets the product at Rs. 50 per unit from the manufacturer. The cost of ordering and transportation from the manufacturer is Rs.75 per order. The cost of carrying inventory is 7.5% per year of the product. Find
- The economic lot size
  - The total optimal cost(including the capital cost).
- 8(a) What is simulation? Explain the phases of simulation? [7M]
- (b) What are the features of simulation languages? Explain? [7M]
- \*\*\*\*\*

Code No: R17A0329

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Regular Examinations, February 2021

Production and Operations Management

(ME)

Roll No									
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Time: 2 hours 30 min

Max. Marks: 70

Answer Any Five Questions  
All Questions carries equal marks.

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- 1 (a) Define production and operations management. [5M]  
(b) Discuss different types of production systems with suitable examples. [9M]
- 2 (a) Discuss the steps in process planning. [7M]  
(b) List and explain the steps in product design. [7M]
- 3 (a) What do you mean by aggregate planning? [5M]  
(b) Explain Plant layout and types of layout. [9M]
- 4 (a) What is master production scheduling. Explain it with an example. [7M]  
(b) Distinguish between aggregate planning and master production scheduling. [7M]
- 5 (a) What are the factors affecting forecasting? [6M]  
(b) List and explain the types of forecasting in decision making. [8M]
- 6 (a) Define forecasting. Discuss the applications of forecasting. [6M]  
(b) compute the adjusted exponential forecast for the first week of march for a firm with the following data. Assume the forecast for the first week of January ( $F_0$ ) as 600 and corresponding initial trend ( $T_0$ ) as 0. Let  $\alpha=0.1$  and  $\beta=0.2$ . [8M]

	Month							
	Jan.				Feb.			
Week	1	2	3	4	1	2	3	4
Demand	650	600	550	650	625	675	700	710

- 7 (a) What is MRP? What are some of the benefits of MRP? Identify the specific requirements of an effective MRP system. [7M]  
(b) What are the basic inputs for MRP? Explain. [7M]
- 8 (a) What is meant by store management? What are its objectives? [7M]  
(b) Explain briefly about the functions of a store management. [7M]

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