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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
IV B.Tech I Semester Regular Examinations, October/November 2023
Maintenance and Safety Engineering
(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.

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SECTION-I

1	A	What are the objectives of maintenance engineering? Explain	**[7M]**
	B	How the maintenance department improves the quality and efficiency of production?	**[7M]**

OR

2	A	Explain the role of Maintenance Manual and the modules involved.	**[7M]**
	B	Describe the following Maintenance Management Control Indices-Reliability and machine availability -downtime-MTBF and MTTR.	**[7M]**

SECTION-II

3	A	What are the various elements of preventive maintenance and explain the characteristics?	**[7M]**
	B	Define preventive maintenance. What is its primary goal? How do you evaluate a preventive maintenance program? Explain	**[7M]**

OR

4	A	Explain why Corrective Maintenance Measures are required? Explain	**[7M]**
	B	Differentiate between preventive maintenance and Corrective maintenance	**[7M]**

SECTION-III

5	A	Discuss the Principles and methods of lubrication.	**[7M]**
	B	\Discuss the Repair Methods for spindles, gears, lead screws and bearings.	**[7M]**

OR

6	A	Discuss the Wear debris analysis in maintenance.	**[7M]**
	B	Write the limitations of Failure mode and effect analysis (FEMA).	**[7M]**

SECTION-IV

7	A	With an example explain Equipment Life Cycle Maintenance and Cost Estimation	**[7M]**
	B	Explain the Use of Quality Control Charts in Maintenance Work Sampling?	**[7M]**

OR

8		Describe the role of safety officer in maintenance work. Explain the guidelines to improve safety in maintenance work.	**[14M]**

SECTION-V

9	A	List the different types of hazards for the safety of industrial workers.	**[6M]**
	B	Discuss the Feature of Factory Act, ESI Act and Explosive Act.	**[8M]**

OR

10	A	Discuss the Methods for Industrial Noise Control.	**[7M]**
	B	Write a note on Industrial hygiene, Diseases prevention and Ergonomics	**[7M]**

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MALLA REDDY COLLEGE OF ENGINEERING & TECH   **GY**
(Autonomous Institution – UGC, Govt. of India)
IV B.Tech I Semester Regular Examinations, October/November 2023
Refrigeration & Air Conditioning
(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.
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Note: Refrigeration and Psychometric charts are permitted
SECTION-I

1	A	Derive an equation of COP for Bell-Coleman Air-refrigerator show different processes on P-V and T-S Diagram.	**[7M]**
	B	A refrigerator working on Bell Coleman cycle operates between pressure limits of 1.05 bar and 8.5 bar. Air is drawn from the cold chamber at 10^0C. Air coming out of compressor is cooled to 30^0C before entering the expansion cylinder. Expansion and compression follow the law $PV^{1.35} = $ constant. Determine C.O.P. of the system. Take $\gamma = 1.4$ and $Cp = 1$ kJ/kg k for air.	**[7M]**

OR

2	A	Explain the working of simple air cooling system used for aircrafts.	**[7M]**
	B	Draw the schematic of a boot-strap cycle of air refrigeration system, and show the cycle on T-s diagram.	**[7M]**

SECTION-II

3	A	Explain the effect of superheating with the help of p-h & T-s diagrams on the performance of vapour compression system.	**[7M]**
	B	A refrigeration machine using R-12 as refrigerant operates between the pressures 2.5 bar and 9 bar. The compression is isentropic and there is no under cooling in the condenser. The vapour is in dry saturated condition at the beginning of the compression Estimate the theoretical coefficient of performance. If the actual coefficient of performance is 0.65 of theoretical value, calculate the net cooling produced per hour. The refrigerant flow is 5 kg per minute. Properties of refrigerant are	**[7M]**

Pressure, bar	Saturation temperature, ^{0}C	Enthalpy, kJ/kg Liquid	Enthalpy, kJ/kg Vapour	Entropy of saturated vapour, kj/kg K
9.0	36	70.55	201.8	0.6836
2.5	-7	29.62	184.5	0.7001

OR

4	Explain the working of simple vapour compression refrigeration system with help of T-S diagram.	**[14M]**

SECTION-III

5	A	Describe the working of evaporative condenser with a neat sketch.	**[7M]**
	B	How can you classify the refrigerants? Explain them briefly.	**[7M]**

OR

| 6 | A | Explain the working of shell and tube condenser with a neat sketch. | [7M] |
| | B | Explain the working of thermostatic expansion device with a neat sketch | [7M] |

SECTION-IV

| 7 | A | Explain the working principle of steam jet refrigeration with a neat sketch. | [7M] |
| | B | Explain the working of simple vapour absorption system with a sketch. | [7M] |

OR

| 8 | A | What is the function of following components in an absorption system? (i) Absorber (ii) Rectifier (iii) Heat exchanger | [7M] |
| | B | Compare lithium bromide system and three fluid refrigeration system. | [7M] |

SECTION-V

| 9 | | 39.6 m3/min of a mixture of re-circulated room air and outdoor air enters a cooling coil at 31°C dry bulb temperature and 18.5°C wet bulb temperature. The effective surface temperature of the coil is 4.4°C. The surface area of the coil is such as would give 12.5 kW of refrigeration with the given entering air state. Determine the dry and wet bulb temperatures of the air leaving the coil and the by-pass factor. | [14M] |

OR

| 10 | A | Explain the procedure to draw a grand sensible heat factor line on psychrometric chart. | [7M] |
| | B | Illustrate the following terms with suitable sketch on psychrometry chart. a. Dry bulb temperature b. Wet bulb temperature c. Dew point temperature | [7M] |

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MALLA REDDY COLLEGE OF ENGINEERING & TECH~~NOLO~~GY
(Autonomous Institution – UGC, Govt. of India)
IV B.Tech I Semester Regular Examinations, October/November 2023
CAD/CAM
(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.

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SECTION-I

1 A Describe the stages of the product cycle in industrial manufacturing. How does each stage benefit from computerization? **[7M]**

   B Describe the fundamentals of LCD (Liquid Crystal Display) technology. What are its advantages over CRT displays? **[7M]**

OR

2 A Explain how a Cathode Ray Tube (CRT) display functions. What are its advantages and disadvantages in computer graphics? **[7M]**

   B Explain about different Graphic Exchange Standards ? **[7M]**

SECTION-II

3 A Write DDA Algorithm for Line generation? **[7M]**

   B Discuss the advantages and limitations of the DDA algorithm in comparison to other line-drawing algorithms. **[7M]**

OR

4 A Explain properties, equation and blending of Bezier curves? **[7M]**

   B Define a cubic spline and explain its significance in curve representation? **[7M]**

SECTION-III

5 A Explain the fundamental difference between geometry and topology in the context of solid modeling? **[7M]**

   B Explain about the Wireframe modeling.? **[7M]**

OR

6 A Explain the concept of B-rep (Boundary Representation) in solid modeling. What are its advantages and limitations? **[7M]**

   B Compare and contrast various representation schemes for solid modeling in terms of their efficiency and accuracy? **[7M]**

SECTION-IV

7 A A triangle ABC with vertices at A (0, 0), B (4, 0) and C (2, 3) is given. Perform the following operations for it. (a) Translation through 4 and 2 units along X and Y direction respectively, (b) Rotation through 90° in counter clockwise direction about the new position of point C. **[7M]**

   B Explain the concept of orthographic projection in 3D graphics. How does it differ from perspective projection? **[7M]**

OR

8 A Explain about shearing in 2D? **[7M]**

   B Explain about translation, scaling, rotation and reflecion? **[7M]**

SECTION-V

9   A   Explain the concept of hidden-line removal in computer graphics?   **[7M]**

     B   Explain about visual realism in detail?   **[7M]**

OR

10   A   Write Algorithm for hidden line removal?   **[7M]**

     B   Define shading in computer graphics. How does shading enhance the realism   **[7M]**
         of rendered objects?

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MALLA REDDY COLLEGE OF ENGINEERING & TECH‌‌**GY**
(Autonomous Institution – UGC, Govt. of India)
IV B.Tech I Semester Regular Examinations, October/November 2023
Finite Element Analysis
(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.
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SECTION-I

1	A	Describe the strain-displacement relations in the context of FEM	[7M]
	B	How do you define and calculate stress in one-dimensional FEM problems?	[7M]

OR

2	Consider a bar as shown in fig. an axial load of 200kN is applied at a point P. Take A_1=2400 mm^2 , E_1=70x10^9 N/mm^2 A_2=600 mm^2 and E_2 = 200x10^9 N/mm^2 . Calculate the nodal displacement at point, P	[14M]
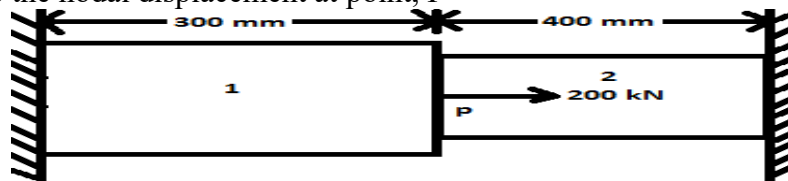
SECTION-II

|		
3	For the two bar truss shown in the fig., Estimate the displacements of node 1 and the stress in the all members.	[14M]
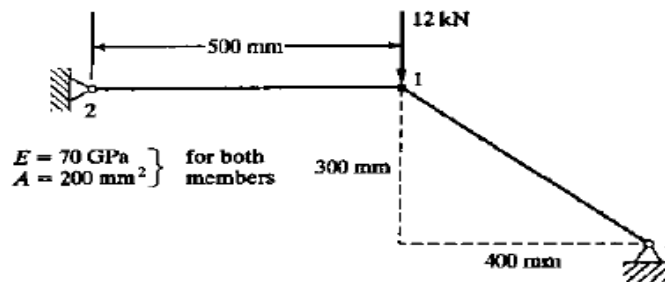
OR

4	A	What are the Hermite shape functions and Draw the mode shapes of them.	[4M]
	B	Evaluate slopes at node 2 and 3 for beam as shown in the fig. Take E=200GPa, I=4X10^6 mm^4.	[10M]
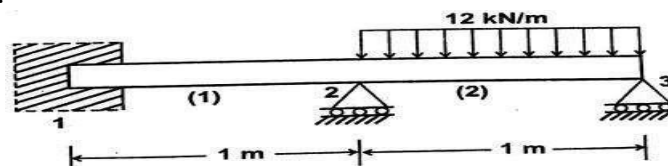
SECTION-III

5 **A** Explain Finite Element modelling of Constant Strain Triangle (CST) element. **[7M]**

   B For a four noded rectangular element shown in fig. Estimate the Jacobian **[7M]** matrix at $\xi = 0.5$ and $\eta = 0.5$
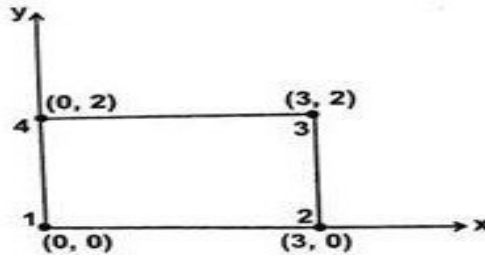

OR

6 **A** The nodal coordinates for an axi-symmetric element are (1,3), (6,8) and (4,6). **[7M]** Evaluate strain-displacement matrix for the element at centroid.

   B What is an axisymmetric element? Mention its characteristics. **[7M]**

SECTION-IV

7 **A** Explain one dimensional gauss rules for numerical integration. **[4M]**

   B Evaluate Jacobian matrix, strain displacement matrix [B] for a Four-node **[10M]** Quadrilateral element with nodal coordinates given as (1,1) (5,1) (6,6) (1,4) at $\xi=0$ & $\eta=0$

OR

8 Consider a brick wall shown in Figure with thickness L = 30 cm, K = 0.7 **[14M]** W/m°C. The inner surface is at 28°C and the outer surface is exposed to cold air at - 15°C. The heat-transfer coefficient associated with the outside surface is h = 40 W/m^2 ^{0}c. Determine the steady state temperature distribution within the wall and the heat flux through the wall. Use a two-element model. and obtain the solution by hand calculations. Assume one dimensional flow.
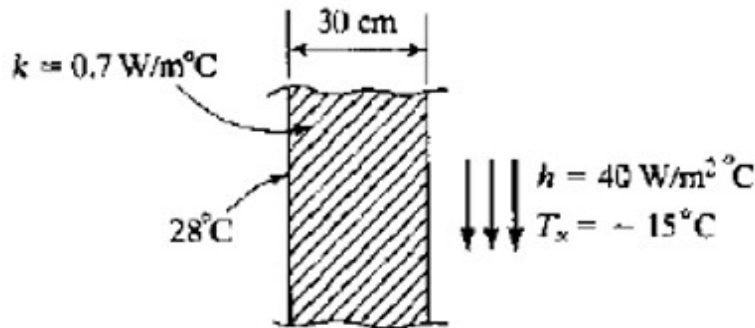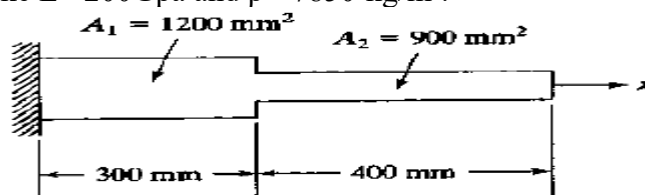

SECTION-V

9 **A** Differentiate the static and Dynamic Analysis of structural problems **[4M]**

   B Derive the elemental mass matrix for bar and beam elements. **[10M]**

OR

10 Estimate the eigenvalues and eigenvectors for the stepped bar shown in Fig. **[14M]** Take E= 200Gpa and ρ= 7850 kg/m^3.

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MALLA REDDY COLLEGE OF ENGINEERING & TECH~~NOLO~~GY
(Autonomous Institution – UGC, Govt. of India)
IV B.Tech I Semester Regular Examinations, October/November 2023
Mechanical Measurements & Instrumentation
(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.

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SECTION-I

1	A	Discuss generalized measurement system along with functional elements?	**[7M]**
	B	Define transducer? Explain the functions of transducer?	**[7M]**

OR

2	A	What are the different types of direct methods of measurements? Explain the working of any one with neat diagram.	**[7M]**
	B	Discuss the classification of measurement system.	**[7M]**

SECTION-II

3	A	Explain "pressure measurement"? Discuss Bourdon pressure tube gauge? List out its advantages?	**[7M]**
	B	Discuss bubbler level indicator with a neat sketch? Mention its advantages and disadvantages?	**[7M]**

OR

4	A	Define and classify pyrometer? Discuss any one in detail?	**[7M]**
	B	Explain Optical pyrometer with neat sketch?	**[7M]**

SECTION-III

5	A	Differentiate mechanical tachometers and electrical tachometers?	**[7M]**
	B	Define and classify mechanical tachometers? Discuss any one type of mechanical tachometer with neat sketch?	**[7M]**

OR

6	A	Discuss the measurement of liquid level? Explain methods involved in it?	**[7M]**
	B	Explain the Principles of Seismic instruments? Differentiate Vibrometer and accelerometer?	**[7M]**

SECTION-IV

7	A	Describe axial strain and transverse strain with example?	**[7M]**
	B	Explain electrical resistance strain gage along with its applications?	**[7M]**

OR

8	A	How does a measuring system works? Explain with the help of a diagram? List out general parameters to be measured?	**[7M]**
	B	Explain Sling Pyschrometer along with its applications?	**[7M]**

SECTION-V

9	A	Discuss load cells and dynamo meters?	**[7M]**
	B	Explain various speed control systems?	**[7M]**

OR

10	A	How to measure force? Mention the methods involved in measuring the force?	**[7M]**
	B	Explain Torque measurement using strain gauge?	**[7M]**

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