Code No: R20DHS53

R20

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOL

(Autonomous Institution – UGC, Govt. of India)

M.Tech I Year I Semester Supplementary Examinations, November 2022

Research Methodology

(MD, TE, CSE, VLSIES & ASP)

Roll No										

Time: 3 hours **Max. Marks: 70**

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

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1	A	What do you mean by Research? Explain its significance in modern times.	**[7M]**
	B	Explain the Research process with a suitable diagram.	**[7M]**
2	A	"Research is much concerned with proper fact finding analysis and evaluation". Do you agree with this statement- Justify.	**[7M]**
	B	Explain different types of research studies.	**[7M]**
3	A	Explain the necessity of defining a Research Problem.	**[7M]**
	B	What are the various means of conducting literature survey in modern times?	**[7M]**
4	A	Explain essentials that are to be considered by a researcher while formulating Research Problem.	**[7M]**
	B	What is a Research Problem? Explain Components of Research Problem.	**[7M]**
5	A	What is a Questionnaire? Explain the process of construction of a questionnaire.	**[7M]**
	B	Evaluate the different methods of Collecting Secondary data.	**[7M]**
6	A	What is the significance of Questionnaire in data collection.	**[7M]**
	B	What is the importance of tabulation in data collection? Explain the different parts of a table.	**[7M]**
7	A	Write a detailed note on sampling and its design.	**[7M]**
	B	Describe the various measures of relationships often used in context of research studies.	**[7M]**
8	A	What is Hypothesis? What is the significance of formulating the hypothesis in research work?	**[7M]**
	B	Discuss the steps in preparation of Report.	**[7M]**

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Code No: R20D1506

R20

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
M.Tech I Year I Semester Supplementary Examinations, November 2022
Advanced Mechanics of Composite Materials
(MD)

Roll No										

Time: 3 hours **Max. Marks: 70**

Answer Any **Five** Questions
All Questions carries equal marks.
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1	A	Write any six engineering applications of composite materials.	**[7M]**
	B	Explain the functions of continuous and discontinuous phases of a composite.	**[7M]**
2	A	List out the reasons, why polymers are preferred in making laminated composites.	**[7M]**
	B	Explain the aerospace and structural applications of composite material	**[7M]**
3	A	Discuss the characterization of composite properties.	**[7M]**
	B	Explain the concept of mechanics of materials approach to strength.	**[7M]**
4	A	Explain Resin transfer molding (RTM) and hand layup methods.	**[7M]**
	B	Discuss properties of typical composite materials.	**[7M]**
5	A	Derive the compliance relations for an off-axis lamina.	**[7M]**
	B	How Hooke's law is applicable for two-dimensional unidirectional plane.	**[7M]**
6	A	Discuss the relationship between engineering constants.	**[7M]**
	B	Explain Hooke's law for different types of materials.	**[7M]**
7	A	Explain the concept of strength of a lamina subjected to tension stress.	**[7M]**
	B	Derive the expression of E_1, G_{12} in terms of constituent properties using micromechanics principles.	**[7M]**
8		State and derive the thin plate theory.	**[14M]**

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Code No: R20D1503

R20

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOL

(Autonomous Institution – UGC, Govt. of India)

M.Tech I Year I Semester Supplementary Examinations, November 2022

Advanced Finite Element Analysis

(MD)

Roll No										

Time: 3 hours **Max. Marks: 70**

Answer Any **Five** Questions
All Questions carries equal marks.
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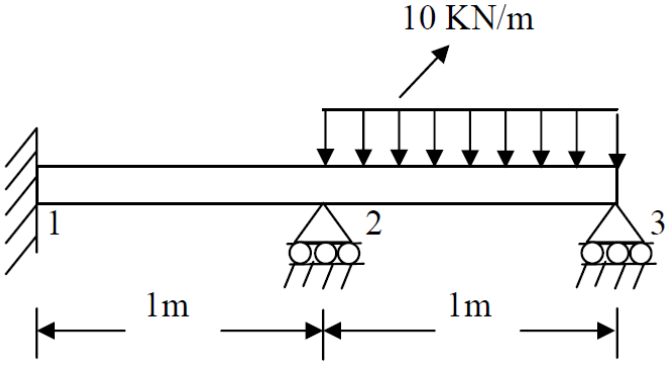
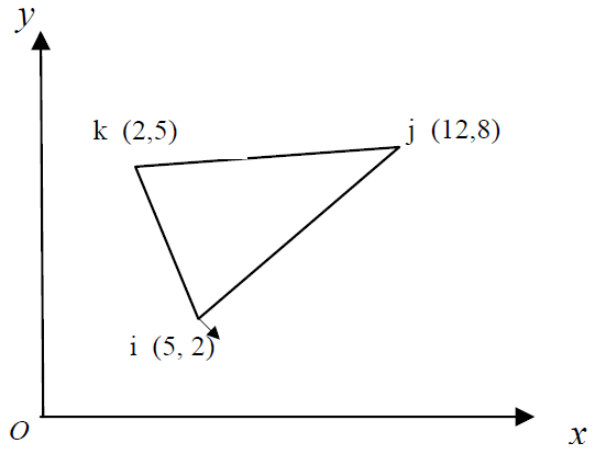
1	A	Explain the steps of FEM with the help of an example.	**[7M]**
	B	Explain about interpolation functions, local and global coordinates.	**[7M]**
2	A	Write the advantages, disadvantages and applications of FEM.	**[7M]**
	B	Explain the importance of (i) Node numbering (ii) Mesh generation	**[7M]**
3		Derive the stiffness matrix of a beam element. Also derive the load vector for uniformly distributed loading condition.	**[14M]**
4		For a beam and loading shown in below figure, determine the slopes at 2 and 3 and the vertical deflection at the midpoint of the distributed load.	**[7M]**

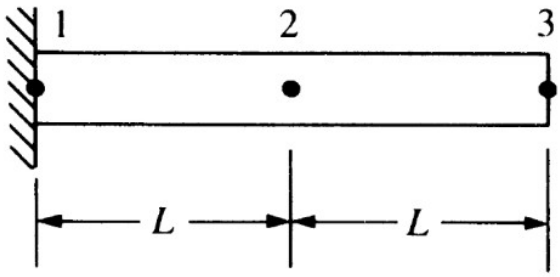


5	A	Differentiate between CST and LST with respect to the triangular element.	**[7M]**
	B	Derive the stiffness matrix for the four noded quadrilateral element in terms of natural coordinate system.	**[7M]**
6	A	Derive the stiffness matrix of one dimension quadratic element.	**[7M]**
	B	Discuss the Isoparametric, subparametric and super parametric elements.	**[7M]**
7		Formulate the finite element equations for triangular torsion element shown in below figure.	**[14M]**



8 Determine the Eigen values and Eigen vectors of the bar shown in below figure. **[14M]**

Take E=200 GPa, ρ = 2800 kg/m3, A=0.258 m2, and L=0.4 m.



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Code No: R20D1502

R20

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOL

(Autonomous Institution – UGC, Govt. of India)

M.Tech I Year I Semester Supplementary Examinations, November 2022

Mechanical Behaviour of Materials

(MD)

Roll No										

Time: 3 hours **Max. Marks: 70**

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

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1	A	Explain solid solution and work hardening strengthening mechanisms.	**[7M]**
	B	Discuss the effect of strain and strain rate on plastic behavior.	**[7M]**
2	A	Explain how strengthening is done by combination of precipitation and dispersion hardening	**[7M]**
	B	Explain how ductile to brittle transition takes place in a mild steel material.	**[7M]**
3	A	How to influence the effective crack length in effective stress intensity factor? Explain in-detail.	**[7M]**
	B	Discuss about safe life and fail-safe design approaches.	**[7M]**
4	A	Explain the fracture toughness in ductile materials.	**[7M]**
	B	Discuss the effect of metallurgical parameters on fatigue.	**[7M]**
5	A	Explain the method of selection of materials on the basis of cost and service requirements.	**[7M]**
	B	With a case study explain the selection of materials for aero applications.	**[7M]**
6	A	Explain the method of selection of materials on the basis of corrosion and wear resistance.	**[7M]**
	B	With a case study explain the selection of materials for marine applications.	**[7M]**
7	A	Explain the composition, characteristics and application of maraging steel.	**[7M]**
	B	Discuss about shape memory alloys.	**[7M]**
8	A	List out the properties of any three engineering polymers.	**[7M]**
	B	Discuss the processing of any two structural ceramics.	**[7M]**

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Code No: R20D1501

R20

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

M.Tech I Year I Semester Supplementary Examinations, November 2022

Advanced Mechanical Engineering Design

(MD)

Roll No										

Time: 3 hours **Max. Marks: 70**

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

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1	A	Distinguish between the Asimov model and Shigley model	**[7M]**
	B	Explain the need analysis by stating its significance.	**[7M]**
2	A	Mention the various creative techniques with reference to design philosophy.	**[7M]**
	B	State the differences between Shigley model and Norton model.	**[7M]**
3	A	Discuss the product design for forging designs from the point of view of design for manufacturing.	**[7M]**
	B	Explain the mathematical modeling similitude relations in product design.	**[7M]**
4	A	Explain the design guidelines for non-metallic parts.	**[7M]**
	B	Explain the following terms: 1. Product specification; 2. Product planning; 3. Product strategies.	 **[2M]** **[2M]** **[3M]**
5		The force acting on a bolt consists of two components – an axial pull of 12 kN, and a transverse shear force of 6 kN. The bolt is made of steel FeE 310 (S_{yt} = 310 N/mm^2), and the factor of safety is 2.5. Determine the diameter of the bolt using the maximum shear stress theory of failure.	**[14M]**
6		What are the different fatigue failure models? Explain with suitable examples.	**[14M]**
7	A	List the reasons for surface fatigue failures.	**[7M]**
	B	State the role of fatigue strength in surface failures.	**[7M]**
8	A	Define Ergonomics. And explain various human engineering considerations with reference to the design process.	**[7M]**
	B	Mention the significance of modern approaches in design.	**[7M]**

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