

**R18**

Code No: 158AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech IV Year II Semester Examinations, July/August - 2022

COMPOSITE MATERIALS

(Mechanical Engineering)

Time: 3 Hours

Max.Marks:75

Answer any five questions

All questions carry equal marks

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1. Explain the characteristics of particulate, fibrous and laminated composites. [15]
- 2.a) What fiber factors contribute to the mechanical properties of a composite. Explain each.  
b) Give the advantages of composite materials. [8+7]
- 3.a) Describe the fabrication process of glass fibers with a neat sketch.  
b) Highlight the desirable properties of carbon and aramid fibers. [8+7]
- 4.a) Explain the interfacial interactions occur in composites.  
b) Discuss properties and applications of carbon fibers. [7+8]
5. With neat sketches explain the following processes:  
a) filament winding  
b) pultrusion. [8+7]
- 6.a) Explain the liquid infiltration technique used for manufacturing of CMCs.  
b) Discuss on toughness of CMCs. [8+7]
- 7.a) Explain how the MMCs are produced using the In Situ process.  
b) Highlight important applications MMCs. [7+8]
- 8.a) Derive rule of mixtures for predicting Young's Modulus of a composite in terms of volume fractions and elastic modulus of fiber and matrix.  
b) Calculate the longitudinal modulus and tensile strength of a unidirectional composite containing 55 percent by volume of Sisal fibers in epoxy matrix. The modulus and strength of fiber is 30 GPa and 600 MPa respectively and the same for matrix is 3.5GPa and 100MPa respectively. Calculate  
i) elastic Modulus of composite  
ii) the fraction of load taken by fibers in the composite. [8+7]

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