Total No. of Questions : 8]

SEAT No. :

PF5029

[Total No. of Pages : 2

[6626]-167
T.E. (Mechanical)
COMPOSITE MATERIALS
(2019 Pattern) (Semester-VI) (302052-A) (Elective-II)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7or Q8.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Assume suitable data, if necessary.*

Q1) a) What do you mean by metal matrix composites? Give the advantages and drawbacks of metal matrix composites over polymer matrix composites. **[8]**

b) Which are the different types of MMC based on the reinforcements and matrix materials. Discuss one example of elemental fiber, ceramic fiber and whiskers as reinforcement for MMC. **[9]**

OR

Q2) a) Diffusion bonding: what is it? Describe the metal matrix composites that are made with diffusion bonding methods. **[9]**

b) Explain with neat diagram liquid infiltration and stir casting process. **[8]**

Q3) a) Derive an expression for the volume and weight fraction of composites. **[8]**

b) Write short note on **[9]**

i) Fatigue of composite materials

ii) Failure of composite materials and design

iii) Void fraction

OR

Q4) a) Write briefly on flexural testing of unidirectional composites. **[8]**

b) Find the ultimate transverse tensile strength for a unidirectional glass/epoxy lamina with a 70% fiber volume fraction. Assume that the fibers are circular and arranged in a square array. E_f=young's modulus of fiber, E_m= young's modulus of matrix, $\sigma_{f(ult)}$=Ultimate strength of fiber, $\sigma_{m(ult)}$=Ultimate strength of matrix. E_f=85 GPa, E_m=3.4 GPa, $\sigma_{f(ult)}$=1550 MPa, $\sigma_{m(ult)}$=72 MPa **[9]**

P.T.O.

Q5) a) What is significance of bond strength and ply Adhesion? Explain ASTM F904. **[9]**

b) Explain in brief the testing techniques of Double Cantilever Beams? **[9]**

OR

Q6) a) Explain ultrasonic testing of composites mentioning its merits & Demerits. **[9]**

b) Enlist the ISO & ASTM standards for composite materials? **[9]**

Q7) a) Explain in brief the application of composite materials in Automobile sector. **[9]**

b) Explain in brief the applications of composite materials in Aircraft fields. **[9]**

OR

Q8) a) Explain in brief the application of composite materials in Marine industry. **[9]**

b) Explain in brief the application of composite materials in protective equipment's. **[9]**



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