

Total No. of Questions : 8]

SEAT No. :

PD-4368

[Total No. of Pages : 2

[6403]-167

T.E. Mechanical Engg.

COMPOSITE MATERIALS

(2019 Pattern) (Semester - VI) (302052-A) (Elective - II)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidate:

- 1) Solve Q1 or Q2, Q3 or Q4, Q5 or Q6 and Q7 or 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) Explain metal matrix composites along with its important characteristics. **[9]**

b) Explain classification of metal matrix composites. Elaborate any one. **[9]**

OR

Q2) a) What is meant by In-situ fabrication of metal matrix composites? Also state its advantages and disadvantages. **[9]**

b) What are major discontinuities at interfaces in MMCs? Explain each in short. **[9]**

Q3) a) A thermoplastic matrix contains 30 wt.% glass fibers. If the density of the matrix $P_m = 1.2 \text{ g/cm}^3$ while that of glass fiber $\rho_f = 2.8 \text{ g/cm}^3$, what is the density of the composites? Assume that no voids are present. **[8]**

b) Write a note on 1. Large particle composites, 2. Fatigue and long-term strength **[9]**

OR

P.T.O.

Q4) a) Write a note on flexural testing of composites and explain how flexural strength is predicted? [8]

b) A simply supported composite beam of span 5m is subjected to the downward point load of 20kN at 2m from the left end. The cross-section area of beam is 200 mm x 300 mm deep. Calculate maximum bending stress developed in cross-section. [9]

Q5) a) How tensile test is conducted on material? What is output of tensile test? [8]

b) What are testing techniques for double cantilever beams? Explain in brief. [9]

OR

Q6) a) What is thermographic testing of composites? Explain any practical application. [9]

b) What are ASTM and ISO standards for composite materials? [8]

Q7) a) List down various composite materials used for aerospace industry. What are advantages of these materials over conventional materials? [9]

b) What are application of composite materials for transportation industry? [9]

OR

Q8) a) What do you mean of composite materials in protective equipment explain in brief with brief explanation. [9]

b) Enumerate and discuss the uses of composite in the energy industry. [9]

