

Total No. of Questions : 8]

**PE2630**

SEAT No. :

[Total No. of Pages : 2

[6583]-162

**T.E. (Mechanical)**

**COMPOSITE MATERIALS**

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

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) Solve Q.1 or Q.2, Q.3 or Q.4, Q5 or Q6, Q7 or Q8.
- 2) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Assume suitable data if necessary.

**Q1) a) What is MMC? Explain their mechanical properties. [9]**

b) What are the different types of reinforcement in MMC? Explain any two in details. [9]

OR

**Q2) a) What is the Powder Metallurgy Process for MMC? What are the steps of Powder Metallurgy Process? [9]**

b) Write Short Note on [9]

i) Squeeze casting

ii) A spray process

**Q3) a) Write Short Note On [8]**

i) Micromechanics of a Lamina

ii) Unidirectional continuous fiber

b) The following data is obtained from the burn-out test conducted in a glass- epoxy composite. Weight of empty crucible is 46.5 g. Weight of crucible and composite is 66.3 g. Weight of crucible and glass fiber is 58.6 g. Find the volume fraction of fiber and actual density of composite. Take density of glass fiber as 2.49 g/cm<sup>3</sup> and that of matrix as 1.1 g/cm<sup>3</sup>. [9]

OR

**P.T.O.**

- Q4) a)** Find the major and minor Poisson's ratio of a glass/epoxy lamina with a 70% fiber volume fraction. Take Poisson's ratio of fiber ( $0.2 = \nu_f$ ;  $\nu_m = 0.3$ ,  $E_f = 85$  GPa;  $E_m = 3.4$  GPa). [9]
- b) Explain any four ultimate strength parameters for a unidirectional lamina. [8]

- Q5) a)** List and explain any four types of mechanical test in short. [8]
- b) Write Short Note on [9]
- Ply adhesion ASTM F904
  - Double cantilever beam test
  - End notch flexure test and its purpose

OR

- Q6) a)** Explain nondestructive inspection of composites. What are the most commonly used NDT methods in composites with short description? [9]
- b) How are ASTM and ISO standards for a composite material classified? [8]

- Q7) a)** Write a short note: [9]
- multi-material technology
  - applications of Composite for the Transportation Sector
  - applications of Composite for the Automobile Industry
- b) Describe in detail the Light Combat Helicopter (LCH) and Light Combat Aircraft (LCA). Also, List the numerous uses of composite materials in the aerospace sector. [9]

OR

- Q8) a)** What are the advantages and applications of composites in the sport industry? [9]
- b) List & describe the applications of composite for the energy sector. [9]

