17652

11920

3 Hours / 100 Marks   Seat No. ☐☐☐☐☐☐☐

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

(8) Use of Steam tables, logarithmic, Mollier's chart is permitted.

Marks

1.   **Attempt any <u>TEN</u> of the following:**   **20**

a) Define composite. List the components of composites.

b) Write the function of coupling agent. Name any one coupling agent.

c) Name any one inhibitor. Why inhibitors is used in resin?

d) List the types of curing system used for epoxy resin.

e) Define initiator. Name any two initiator used for unsaturated polyester.

f) Write properties of glass fiber.

g) State important properties of carbon fiber.

h) Name any two natural fiber used in composite and any one composite product from natural fiber.

Marks

   i)   Define hybrid composite. How does it differ from conventional composite?

   j)   List the types of orientation used in composites.

   k)   Name any two product manufactured by resin transfer molding.

   l)   State Gibbs free energy equation used for miscibity of polymer blend.

  m) Name any two commercial polymer blend and state one application of each.

   n)   List the properties used to measure blend performances.

2.   **Attempt any FOUR of the following:**   **16**

   a)   Write preparation of unsaturated polyester resin and list its types.

   b)   Write properties and application of epoxy resin.

   c)   Draw neat sketch of sheet molding compound manufacturing process and explain it in brief.

   d)   State the thermoplastic resin used in composite, write advantages and limitation of it.

   e)   Explain curing system used for unsaturated polyester.

   f)   State necessity of using thermoset resins.

3.   **Attempt any FOUR of the following:**   **16**

   a)   Explain manufacturing of glass fiber with neat and labelled sketch.

   b)   Name the different forms of glasses fiber. How glasses are classified on the basis of its use in composite.

   c)   Distinguish between carbon fiber and boron fiber.

   d)   List the different type of core materials used in polymer composite and explain any one in brief.

   e)   State and explain effect of orientation of fiber on properties of composites with one example.

   f)   Discuss Aramid fiber manufacturing process.

Marks

4. Attempt any FOUR of the following: **16**

   a) Explain with neat sketch hand lay techniques. Write it's advantages and disadvantages.

   b) Explain the process used for making pressure vessel with neat sketch.

   c) Describe the pultrusion process with neat sketch.

   d) Suggest suitable method to manufacture blade of wind mill and explain it in detail.

   e) Write troubleshooting guide for spray lay up technique. (four defects)

   f) Write the properties and application of PPO/PS blend.

5. Attempt any FOUR of the following: **16**

   a) Define polymer blend. State its classification.

   b) State the types, of compatibiliser. Write the function of compatibiliser.

   c) List the different method of compatibilisation and explain any one method with example.

   d) Compare miscibility and compatibility of polymer blend.

   e) Explain the impact modification of brittle polymer using elastomer.

   f) Write two properties and applications of PVC/ ABS blend.

6. Attempt any FOUR of the following: **16**

   a) Differentiate between polymer blend and polymer alloy.

   b) Discuss method by which performance of polymer blend is determine.

   c) Explain with flow sheet manufacturing of commercial polymer blend process in detail.

   d) Write the properties and application of PP / EPDM blend.

   e) Explain in brief how economy concept is important during polymer blending along with blend performance.

   f) Define prepregs. State its importance in composites.

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