Nirma University

Institute of Technology

Semester End Examination (IR), December - 2021

B. Tech. in CL / CH / EE / EC / CSE, Semester-VII

2CLOE03 Composite Materials

Roll / Exam No. [   ]　　　Supervisor's initial with date [   ]

Time: 2 Hours　　　　　　　　　　　　　　　　　　　　　Max. Marks: 50

Instructions:
1. Attempt all the questions.
2. Figures to right indicate full marks.
3. Draw neat sketches wherever necessary.
4. Use of non-programmable calculator is permitted.
5. Assume additional data whenever required and mention the same

Q-1 CO1　Answer the following questions: (Any Five)　　　　　　　　[20]

[1]　BL3　Classify engineered composites and Explain particulate composites in detail.　[04]

[2]　BL2　Explain the manufacturing process of graphite fibers from PAN based precursor with necessary sketch.　[04]

[3]　BL2　Enlist two properties and two limitations of High Performance Polyethylene Fibers　[04]

[4]　BL2　Explain two properties and two uses of ceramic matrix materials　[04]

[5]　BL2　Explain two uses and two properties of structural ceramics　[04]

[6]　BL3　Discuss any one method of non-traditional machining of Ceramic Matrix Composites with sketch.　[04]

Q-2 CO2　Answer the following questions: (Any Three)　　　　　　　[12]

[1]　BL2　What do you understand by physical testing of composites? Explain at least one method of physical testing of composites in detail with near sketch.　[04]

[2]　BL3　What do you understand by mechanical testing of composites? Explain at least one method of mechanical testing in detail with near sketch.　[04]

[3]　BL3　Explain pultrusion process for manufacturing of Polymer matrix composites with sketch.　[04]

[4]　BL3　Explain thermoforming and injection moulding technique for manufacturing of polymer matrix composites with neat sketch　[04]

Q-3 CO3　Answer the following questions:　　　　　　　　　　　　[18]

[1]　BL4　A lamina with E_1= 180 MPa, E_2= 10 MPa μ_{12} = 0.28 and $E_2 = E_3$, G_{12}= 7 MPa, G_{23} = 4 MPa, G_{13} = 4 MPa is subjected to $\sigma_1 = 20$ Mpa, $\sigma_2 = 20$ Mpa, $\sigma_3 = 40$ Mpa, $e_{12} = 20$ Mpa, $e_{23} = 0$, $e_{31} = 0$. Find the strains.　[05]

OR

[1] BL3 Discuss the mechanical behavior of orthotropic material.   [05]

[2] BL4 Compare the nature of compliance matrix of orthotropic material in   [08]
          terms of engineering constants.

[3] BL3 Discuss the applications of carbon carbon matrix composites.   [02]

[4] BL4 Compare any two properties of vinylesters and pheolics   [03]