

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Examination (Regular and Supplementary), December 2020

Course Code: AO407**Course Name: COMPOSITE MATERIALS**

Max. Marks: 100

Duration: 3 Hours

PART A*Answer any three full questions, each carries 10 marks.*

Marks

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|---|---|------|
| 1 | a) Differentiate between alloys and composites. | (5) |
| | b) Define Strength ratio. | (2) |
| | c) Give the upper limit of operating temperatures of polymer, metal, and ceramic composites. | (3) |
| 2 | Define a composite material and explain the classifications of composites according to reinforcement and matrix used. | (10) |
| 3 | a) Illustrate the variation of stress and strain in a composite laminate with suitable diagram. | (4) |
| | b) Write the Hooke's law for isotropic Material in the form of Stiffness matrix and compliance matrix. | (6) |
| 4 | Show the reduction of Anisotropic Material Stress-Strain Equation to those of Monoclinic Stress-Strain Equation. | (10) |

PART B*Answer any three full questions, each carries 10 marks.*

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| 5 | Derive the extensional [A], coupling [B], and bending [D] stiffness matrices for the force and Moment Resultants Related to Mid-plane Strains and Curvatures in a Laminates. | (10) |
| 6 | Compute [A] matrix for [0 / ±45] laminate with the following laminate properties. $E_1=145\text{GPa}$, $E_2=10.5\text{GPa}$, $\nu_{12}=0.28$ and $G_{12}=7.5\text{GPa}$. Thickness of each lamina is 0.25mm | (10) |
| 7 | Explain the different types of repair techniques used in composite materials. | (10) |
| 8 | Explain centrifugal casting and continuous lamination technique process of FRP with appropriate diagram. | (10) |

PART C

Answer any four full questions, each carries 10 marks.

- 9 Explain the following manufacturing techniques of HCS panels (5)
- a) Expansion Process (5)
 - b) Corrugated Process (5)
- 10 Explain the cell configuration in honeycomb cores. (10)
- 11 a) Explain basic design concept of sandwich construction. (4)
- b) Why honeycomb structure is used as core material in sandwich construction? (3)
 - c) Write the advantages and limitations of using sandwich construction. (3)
- 12 a) Write the advantages and limitation of chemical vapour deposition process. (5)
- b) Write the advantages and limitation of Sol gel manufacturing technique. (5)
- 13 a) How carbon fibres are produced by chemical vapour deposition method? (7)
- b) Discuss the application of composite materials in space technology. (3)
- 14 Write the advantages and limitation of Carbon/ Carbon Composites. (10)
