**Name:**

**Enrolment No:**

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**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**
**Online End Semester Examination, May 2021**

**Course: Composite Material** **Semester: VIII**
**Program: B. Tech ASE** **Time 03 hrs.**
**Course Code: ASEG 4009** **Max. Marks: 100**

**Instructions: Q1-Q3 are TRUE/FALSE**

**SECTION A**

| S. No. | | Marks | CO |
|---|---|---|---|
| Q 1 | a) Composite mechanical properties can be tailred based on application (2 M)<br>b) Both fibre and matrix are ceramic material in CMC ( 3M) | **5** | **CO1** |
| Q 2 | a) Fiber fracture occur first in metal matrix composite. ( 2M)<br>b) Longitudinal modulus of lamina is greater in Transverse direction than in longitudinal direction for a given fibre volume fraction. ( 3M) | **5** | **CO1** |
| Q 3. | a) Preform is an impregnated fibre. (2 M)<br>b) Liquid is used to pressurised the material in hot iso-static pressing. (3 M) | **5** | **CO1** |
| Q 4 | Is alloys can be considered as composite material at microscopic scale? Support your answer with a reason. | **5** | **CO2** |
| Q 5 | State the reason of fictitious increase in diameter of fibre in CVI process | **5** | **CO2** |
| Q 6 | List out the controlling parameters of blending process of powder metallurgy. | **5** | **CO2** |
| | **SECTION B** | | |
| Q 7 | Define RVE, and state the main failure process in unidirectional lamina. | **10** | **CO2** |
| Q 8 | a) Determine the longitudinal young modulus of lamina in the terms of modulus of fibre and matrix (draw the required diagram)<br>**OR**<br>b) Determine the transverse young modulus of lamina in the terms of modulus of fibre and matrix (draw the required diagram) | **10** | **CO3** |
| Q 9 | Difference between Sol and Slurry elements in ceramic manufacturing process<br><br>Note: Do not draw the diagram, answer the difference in tabulated form | **10** | **CO3** |
| Q 10 | As a engineer you want to fabricate a small cylindrical pipe of composite material for water (at room temperature) flow. Which composite and manufacturing process you will choose for fabrication of the component. Highlight the main steps of the fabrication process (no need to draw the diagram). | **10** | **CO5** |

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|---|---|---|---|
| Q 11 | A researcher wants to replace the high compressor rotor with composite material in order to reduce the overall weight of the engine. Which composite and manufacturing process he/she should choose for the fabrication method. | **10** | **CO5** |
| | | | |
| Q 12 | Explain the steps in CVD process of making CMCs. State is advantage over other fabrication process of CMC.<br>**OR**<br>Explain the steps in diffusion bonding process of making MMCs. State is advantage over other fabrication process of MMC. | **20** | **CO4** |