PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JUN 2023

Semester : Semester VI - 2020
Course Code : MEC3049
Course Name : Sem VI - MEC3049 - Mechanics of Composite Materials
Program : MEC

Date : 19-JUN-2023
Time : 10.00AM - 1.00PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS   **(5 X 2 = 10M)**

1. Write a short note on stir casting method.

                                                          (CO4) [Knowledge]

2. What are composites?

                                                          (CO2) [Knowledge]

3. Write a short note on Autoclave method.

                                                          (CO1) [Knowledge]

4. Define strength ratio of composites.

                                                          (CO3) [Knowledge]

5. Write a short note on vacuum bagging method.

                                                          (CO5) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS   **(6 X 10 = 60M)**

6. With the help of Flow chart/Sketches explain the injection moulding method for production of fiber reinforced composites.

                                                          (CO1) [Comprehension]

7. With suitable diagram explain stress- strain relation for an istropoc material.

(CO1) [Comprehension]

8. Young's modulus is a measure of the ability of a material to withstand changes in length when under lengthwise tension or compression.With suitable diagram expalin Longitudinal Young's Modulus of composites.

(CO4) [Comprehension]

9. During the manufacture of a composite, voids are introduced in the composite, this causes the theoretical density of the composite to be higher than the actual density. Also, the void content of a composite is detrimental to its mechanical properties. What is the relation between volume fraction in terms of void content?

(CO2) [Comprehension]

10. Process in which preform made of desired fiber is placed inside a mold and liquid resin such as epoxy or polyester is injected into the mold by means of a pump. Identify the fabrication method and explain with suitable diagram.

(CO2) [Comprehension]

11. The major Poisson's ratio is defined as the negative of the ratio of the normal strain in the transverse direction to the normal strain in the longitudinal direction, when a normal load is applied in the longitudinal direction. With suitable equations explain major Poisson's ratio.

(CO3) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS   (2 X 15 = 30M)

12. A carbon/polyster lamina consists of a 60% fiber volume fraction. Density of carbon and polyester are 1200 kg/m3 and2400 kg/m3 respectively. Determine ,Density of lamina ,Mass fractions of the Carbon and polyester and Volume of composite lamina if the mass of the lamina is 4 kg.

(CO3) [Application]

13. The failure theories are based on first finding the stresses in the local axes and then using these five strength parameters of a unidirectional lamina to find whether a lamina has failed. With suitable equations explain Tsai-Hill failure theory.

(CO4) [Application]