Exam.Code:1016
Sub. Code: 35234

2124

M.E. (Mechanical Engineering)
Third Semester
Elective - III
MME-302 (f): Material Design

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, selecting atleast two questions from each Part.

x-x-x

PART A

Q-1)

1) How is the general thermal behavior of amorphous thermoplastic different from crystalline thermoplastic?
2) For fabricating which type of composite materials, is melt mixing process recommended?

(5,5)

Q-2)

1) Explain creep phenomena in metals.
2) For which applications is ceramic widely used in dentistry and why?

(5,5)

Q-3)

1) Differentiate between particle and fibre strengthening of composites.
2) What is meant by swelling of polymers?

(5,5)

Q-4)

1) Which materials can be suggested for manufacturing an artificial lower limb prosthetic and why?
2) How is vacuum forming different from thermoforming? What are the applications of these processes?

(5,5)

PART B

Q-5)

Differentiate between a digital twin and a virtual twin with examples

(10)

P.T.O.

Q-6)

1) What are the desirable characteristics for a body implant?
2) Explain different methods for increasing strength and stiffness of polymers.

(5,5)

Q-7)

1) Under what circumstances is an Electron Microscopy technique preferred over spectroscopy?
2) Graphite has poor strength, while carbon fibres exhibit high strength. Explain.

(5,5)

Q-8)

1) How the elements for meshing in Finite Element Modelling are selected. Describe various elements used in finite element analysis of 2-D problems?
2) Illustrate and explain mechanical twinning.

(5,5)

x-x-x