

Instructions:

1. Figures to right indicate full marks.
2. Draw neat figures wherever required.
3. Use of non-programmable calculator is allowed
4. Answers to both the sections should be written in two separate Answer sheet.

SECTION - I

(50)

1. Answer the Following:

(10)

1. Time dependent permanent deformation is called _____.
(a) Plastic deformation (b) Elastic deformation (c) Creep (d) An elastic deformation.
2. If a material is subjected to two incremental true strains namely ϵ_1 and ϵ_2 , then the total true strain is
(a) $\epsilon_1 * \epsilon_2$ (b) $\epsilon_1 - \epsilon_2$ (c) $\epsilon_1 + \epsilon_2$ (d) ϵ_1 / ϵ_2
3. Plastic deformation results from the following
(a) Slip (b) Twinning (c) Both (d) None
4. Toughness of a material is equal to area under _____ part of the stress-strain curve.
(a) Elastic (b) Plastic (c) Both (d) None
5. Which of the following feature promotes least corrosion?
(a) entrapment of moisture (b) crevices (c) shape (d) thickness of metal used

2. Answer the Following:

(10)

- a. Explain in detail about material selection for an automotive component using Ashby charts with a case study.

3. Answer the following:

(10)

- a. Discuss the noise sources & structural responses in an automotive engine.
- b. Discuss the failure modes of valves and guides.

4. Answer the following:

(20)

- a. Explain Global Manufacturing with a case study.
- b. Discuss LOM with a neat sketch along with its Merits & demerits.
- c. Explain in detail about Stereo-lithography.
- d. What is Powder Manufacturing? How it is related to RPT?

SECTION - II

(50)

5. Answer the Following:

(10)

- a. Which of the following is a positional average?
a. Median b. Arithmetic Mean c. Range d. Harmonic average
- b. Which of the following is the central tendency?
a. Kurtosis b. Dispersion c. Mean d. Skewness

- c. Which of dispersion term is widely used?
 a. Mean b. Standard Deviation c. Mode d. Range
- d. Regression Analysis attempts to:
 a. Study the relationship between the variables
 b. Predict the average value of one variable for a given value of another variable
- e. Correlation co-efficient lies between -1 & 1. [True/False]
- f. Three dimensional molecules with cross links are formed in the case of ____.
 a. Thermoplastic b. Thermosetting plastic c. Both d. None
- g. The monomer of poly vinyl chloride (PVC) is
 a. ethylene dichloride b. chloroethane c. chloroform d. ethyl chloride
- h. Cellulose is the main constituent of most _____ fibres.
 a. spandex b. synthetic c. natural d. acrylic
- i. Automobile steering wheels are normally made of _____.
 a. cellulose acetate b. cellulose nitrate c. high density polythene d. PVC
- j. _____ resins are produced by the condensation polymerisation of formaldehyde with urea or melamine.
 a. Alkyd b. Epoxy c. Amino d. Phenolic

6. Answer ANY TWO of the following:

(10)

- a. Define Composites. List the technical & non-technical advantages of it over metals.
 b. Define bioplastics and list its advantages over petro-plastics.
 c. Explain in brief about the natural fiber composite by its construction, layers & mechanics.

7. Answer ANY TWO the following:

(10)

- a. List the Manufacturing processes of FRP.
 b. How will you select the Materials for creating a FRP for a particular process?
 c. Discuss about Nano-Composites in terms of engine & powertrain applications.

8. Answer the following:

(20)

- a. Give the formulation for the continuous as well as discrete series.
 b. How do you calculate Median & Mode? What is the use of it towards time series modeling?
 c. Compute the Spearman's co-efficient for the following time series: What is your interpretation? For the assessment of the steel hardness by two similar instruments: the two instruments assigned ranks as follows:

Sample ID	Instrument A	Instrument B
1	5	6
2	6	4
3	4	5
4	3	1
5	2	2
6	7	7
7	1	3

- d. For the given time series, compute at least three dispersion measures. Given data represent numbers of units certified OK in a batch: 25,37,40,23,58,75,89,20,81, 95.

XXXXX-----All the Best-----XXXXX