MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : ES- ROB401/ES-ME401 Materials Engineering

UPID : 004425

Time Allotted : 3 Hours *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following : [1 x 10 = 10]

(I) Why carbon is necessary in steel production?

(II) Why heat treatment is required?

(III) Give few examples of super alloys.

(IV) What is the most important alloying element for stainless steel?

(V) What is the measure of ductility?

(VI) What do you mean by endurance limit?

(VII) Define: fatigue property of materials .

(VIII) What is fluctuating stress?

(IX) What is about the cooling process of full annealing?

(X) What is Ferrite?

(XI) What is 2D defect?

(XII) What is the relation between true and engineering stress-strain curve?

Group-B (Short Answer Type Question)

Answer any three of the following : [5 x 3 = 15]

2. Explain: Engineering stress-strain curve for mild steel & cast iron. [5]
3. Write the name of the stages in the cup & cone fracture. [5]
4. Describe: Knoop and Vickers microhardness. [5]
5. Explain: Creep testing of materials. [5]
6. Describe the three methods of flame hardening. [5]

Group-C (Long Answer Type Question)

Answer any three of the following : [15 x 3 = 45]

7. What is point defects? Discuss any three types of it. [15]
8. (a) Describe: Resilience & Proof Resilience. [5]
   (b) A wrought iron bar 50 mm in diameter and 2.5 m long transmits shock energy of 100N-m. Find maximum instantaneous stress and the the elongation. Take E= 200GN)m^2. [10]
9. (a) What is line defects? What are its types? [5]
   (b) Describe: Edge & Screw dislocations. [10]
10. (a) Define the FOS for both brittle & ductile material. [5]
    (b) A shaft is transmitting 100 kW at 160 r.p.m. Find a suitable diameter for the shaft, if the maximum torque transmitted exceeds the mean by 25%. Take allowable shear stress as 70 MPa. [10]
11. (a) Write short notes on the followings irons. [10]
    Malleable Cast Iron, Nodular Cast Iron, Grey Cast Iron, White Cast Iron.
    (b) Write about cast iron and explain the factors which affect the structure of cast iron. [5]

*** END OF PAPER ***