TED (15) – 4053

(REVISION — 2015)

Reg. No. .....

Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

MATERIAL SCIENCE AND STRENGTH OF MATERIALS

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Define heat treatment.
2. Interpret ultimate stress.
3. State the relation between stress and strain.
4. Define bending moment in beams.
5. Identify coefficient of friction.

(5×2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. Write the procedure for preparing shear force and bending moment diagrams.
2. Define radius of gyration.
3. Explain angle of friction.
4. Differentiate caulking and fullering.
5. State different types of stresses.
6. List and explain applications of composite materials.
7. Describe annealing process.

(5×6 = 30)

PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

III (a) Explain different types of case hardening process. 8

(b) Describe about the need and effect of alloying on properties of steels. 7

OR

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Marks

IV (a) Illustrate cooling curve for pure iron. 8

(b) Describe different types of plastics. 7

UNIT — II

V (a) Differentiate percentage elongation and percentage reduction in area. 8

(b) Two plates of 100mm × 6mm size are joined by a triple riveted lap joint such that each row consists of 3 rivets of 16.5 mm nominal diameter and 30mm pitch. If the allowable stresses in the rivets in shearing and bearing are 130N/mm^2 and 350 N/mm^2 respectively, and the allowable tensile stress of plates is 120N/mm^2. Find strength of the joint and its efficiency. 7

OR

VI (a) Explain modulus of elasticity and yield point. 8

(b) State the advantages of welded joints over riveted joints. 7

UNIT — III

VII (a) A body resting on a rough horizontal plane required a pull of 200N inclined at 30° to the plane just to move it. It was also found that a push of 240N inclined at 30° to the plane just moved the body. Determine weight of the body and coefficient of friction. 8

(b) Determine the moment of inertia of a triangular section having base 120mm wide and height 45mm about its centroidal axis XX and about base. 7

OR

VIII (a) State the laws of dry friction. 8

(b) Find the moment of inertia of a I section with flanges 15cm × 2cm and web 10cm × 2cm about the centroidal axis parallel to the flange and the web. 7

UNIT — IV

IX (a) A cantilever 2m long carries point loads of 4kN, 5kN and 3kN at distances 1m, 1.5m and 2m respectively from the fixed end side. Draw the shear force and bending moment diagrams for the beam. 8

(b) State the assumptions made in the theory of simple bending. 7

OR

X (a) A simply supported beam 8m long carrying a uniformly distributed load of 3kN/m over a length of 5m from the left support. Draw shear force and bending moment diagrams. 8

(b) Find the power that can be transmitted by a shaft of 60mm diameter at a speed of 100 RPM, if the permissible shear stress is 50 Nmm^2. 7