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(Revision- 2015)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE – NOVEMBER -2020.

MATERIAL SCIENCE AND STRENGTH OF MATERIALS

(Maximum Marks: 75) [Time: 2.15 hours]

PART–A

Marks

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

1. State Shortness.
2. Define Carburizing.
3. Define Youngs modulus of elasticity.
4. State Normal reaction.
5. State Moment of Resistance. (3x2=6)

PART - B

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

1. Narrate the factors promoting fine grain.
2. Explain the salient points on a stress-strain curve.
3. List any six advantages of welded joints over riveted joints.
4. Differentiate between centroid and centre of gravity.
5. State the laws of dry friction.
6. Sketch the shear force and bending moment diagram of a cantilever with a point load at the middle of the span.
7. Explain the Torsion equation and describe the notations used with simple sketch.

[4x6 =24]

PART - C

(Answer **any of the three units** from the following. Each full question carries 15 marks)

UNIT I

III (a) Explain the allotropic forms of pure iron with a neat sketch. (8)

(b) Discuss the advantages and disadvantages of nitriding. (7)

OR

IV (a) List the objectives of tempering and briefly describe the classification of tempering. (8)

(b) Describe the advantages of plastics. (7)

UNIT- II

V (a) Describe the different types of riveted joints. (8)

(b) Two plates of 18 mm thick are joined by a double riveted lap joint. The pitch of raw of rivets is 9cm. The rivets are 24 mm in diameter. The permissible stresses are as follows. Tension=1350 kg/cm^2, shear=1200kg/cm^2, bearing =2400kg/cm^2. Determine the maximum tensile force permissible on the joint and calculate the efficiency of the joint. (7)

OR

VI (a) The following data refers to a tension test on MS bar: Diameter =50 mm
Gauge length = 300 mm, Extension at a load of 200KN is 0.125mm
Load at the elastic limit = 300 KN, Maximum load= 350 KN
Total extension = 50 mm. Find (i) Strain at 200KN load (ii)Ultimate stress (iii)Young's modulus (iv) Elastic limit stress. (8)

(b) Discuss caulking and fullering with neat sketches. (7)

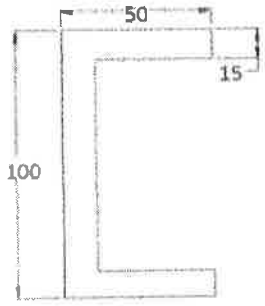
UNIT- III

VII (a) A body resting on a rough horizontal plane required a pull of 180N inclined at an angle of 30^0 to the plane just to move it. It was found that a push of 220N inclined at 30^0 to the plane just moved the body. Determine the weight of the body and coefficient of friction. (8)

(b) Illustrate the method of moments to find the coordinates of centre of gravity. (7)

OR

VIII (a) Find the centre of gravity of the channel section 100mmx50mmx15mm given below.



(8)

(b) Derive the equation for moment of intertia of a Rectangular Lamina about the Centroidal Axis. (7)

UNIT – IV

IX (a) A cantilever beam AB 2m long carries a uniformly distributed load 1.5KN/m over a length of 1.6m from the free end. Draw the shear force and bending moment diagrams for the beam. (8)

(b) State the assumptions made and equation for the theory of simple bending with necessary sketch. (7)

OR

X (a) Describe the conventions and guidelines in sketching shear force and bending moment diagrams. (8)

(b) The driving shaft of the propeller on a ship is to transmit 75 kw at 30 rad/s. compute the torsional shear stress in the hollow shaft of 60 mm outside diameter and 30 mm internal diameter. (7)

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