TED (15) – 6013

(REVISION — 2015)

Reg. No. .....

Signature .....

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

STRUCTURAL DESIGN - II

[*Time* : 3 hours

(Maximum marks : 100)

[*Note* :— Use of IS-800-2007, IS 1905, IS 875- Part 3 and Steel table are permitted.]

PART — A

(Maximum marks : 10)

Marks

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

1. List any two mechanical properties of steel.
2. Define 'pitch' of the bolt.
3. List any two mode of failure of a tension member.
4. Define the term 'beam'.
5. List the loads acting on a roof truss.

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. List out any six advantages of welded connections.
2. Calculate the shear strength of a 16 mm diameter bolt of grade 4.6 used for a lap joint of 10 mm thick plates of Fe 410.
3. Write the expressions for determine 'design strength of a tension member'.
   (a) Due to yielding of gross section.
   (b) Due to rupture.
4. Define the following terms of a compression member.
   (a) Actual length (b) Effective length (c) Slenderness ratio.
5. An ISWB 400 @ 667N/m carries maximum shear force 100 KN, check the safety of the beam in shear, with fy = 250 MPa.
6. (a) Write the situations under which 'plate girders' are used.
   (b) Write any six component parts of a plate girder.
7. Write short notes on 'Effective height' and 'Effective length' of wall.

(5×6 = 30)

Marks

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) List out any four advantages and three disadvantages of steel structures. 7

(b) Calculate the safe load transmitted by a shop welded joint, if the size of weld is 6 mm and its length is 330mm, the ultimate stress is 410 MPa. 8

OR

IV (a) Explain the Design Philosophy of steel structures. 7

(b) Find the strength of a lap joint of Fe 415 steel plates of width 250 mm, thickness 20 mm connected by means of 3 numbers 20mm dia bolts of 4.6 grade at a spacing of 50 mm. 8

UNIT — II

V (a) Explain the use of Lug angle and it's any four specifications as per IS 800. 7

(b) A single angle ISA 9060, 6 mm thick is connected to a gusset plate of 10 mm thick by fillet weld of 4 mm size. Given fy = 250N/mm^2, fu = 410 N/mm^2 and length of weld is 200 mm. Determine tensile strength in yielding and rupture. 8

OR

VI (a) Design a single angle strut connected to gusset plate carry a factored load of 200 KN. The length of member is 3 m, fy = 250 MPa. 7

(b) Explain the procedure for determination of 'design strength' of a single angle tension member. 8

UNIT — III

VII (a) Explain plastic moment carrying capacity of a beam section. 7

(b) Determine the design bending moment of a laterally supported beam ISMB 350@524N/m, fy = 250 MPa. 8

OR

VIII (a) Write short notes on classifications of beam section. 7

(b) An ISMB 500@869N/m carries a uniformly distributed load over an effective span of 6.50m. If the beam is restrained laterally, what udl the beam can carry, considering bending condition only, take fy = 250 N/mm^2. 8

UNIT — IV

IX (a) List any seven component parts of a roof truss. 7

(b) A masonry wall carrying an axial load of 10KN/m is of 3.30 m effective length. It is not braced by cross walls. The effective height of wall is 3.0m. Design the masonry wall. Given fb = 0.50 N/mm^2, Ka = 1, Ks = 0.84, Kp =1.20. 8

OR

X (a) Write the design considerations of a masonry wall. 7

(b) A roof truss shed is to be built in Lucknow for an industry. The size of shed is 24 m × 40 m. The height of building is 12m at the eves. Determine the basic wind pressure. Given basic wind pressure at Lucknow = 47 m/sec. 8