SUBJECT CODE NO:- P-3
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(CIVIL) Examination May/June 2017
Design of Structure - I (Steel)
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Question No.1 and Q.No.6 are compulsory.
 ii) Attempt any two questions from the remaining questions in section A and B each
 iii) Use of IS 800-2007, IS 875, steel table and non-programmable calculator are allowed.
 iv) Assume suitable data where required and mention it clearly in the answer sheet.

Section A

Q.1 Attempt any five of the following. 10
 a. State various types of load acting on structure.
 b. Explain why net area is to be considered in tension member
 c. What is effective length in case of strut.
 d. How to calculate live load for trusses.
 e. Explain failure of bolts.
 f. How to decide spacing of purlins.

Q.2 a. Two plates 12mm thick are connected by a double bolted lap joint. Use 16mm diameter and 70mm pitch is 12
 provided. Find the load carrying capacity and efficiency of joint.
 b. Explain in detail, how the strength of weld is determined? 03

Q.3 Design a tie member consists of two equal angle sections connected on same side of gusset plate 10mm thick 15
 to carry an axial load of 350 kN. Length of member is 2.75m. Also design end connection. Draw neat sketch
 showing design details. Take fy=250MPa.

Q.4 A column of 8m effective length has to support a load of 1200 kN. Design the column with two channel section 15
 or two I sections. Design the lacing system for column. Draw the sketch.

Q.5 A column section ISHB 350 carries an axial load of 500 kN. Design a slab base if M20 concrete and SBC of soil is 15
 220kN/m^2. Draw the plan and section of the same.

Section-B

Q.6 Attempt any five of the following. 10
 a. Write a note on web buckling
 b. Explain in detail vertical stiffener
 c. Why purlins are provided, State whether purlin is a tension member, compression member or flexural
  member.
 d. State the factors affecting plastic moment capacity.
 e. Differentiate between bending and buckling of beam.
 f. Enlist different types of trusses.

Q.7 Design laterally restrained beam to working load of 40 kN/m. The beam is simply supported for a length of 15
 4.5m. The width of support is 300mm. Design the beam. Check for shear deflection, web buckling and
 crippling.

Q.8 Design a plate girder of span 15m carrying loading inclusive self-weight of 65kN/m. The lateral supports are 15
 provided at point of support.

Q.9 a. Explain procedure for design of gantry girder. 08
 b. A truss for a factory building is spaced at 4 m c/c. And purlins are a spaced at 2.1 m c/c. The span of truss 07

2017

37ED6181055A6753ACCEA0355EB62C7E

is 16m. If the vertical load from the roof sheets are equal to 170 MPa, While wind load on roof surface normal to roof is equal to 1200 Mpa. Design the angle purlin.

Q.10   A pratt truss for an industrial building for following data, Span=18 m, height of building =6m, length=30m,   15
location of building: Aurangabad, type of connection: welding, roofing material is AC sheets.
Carry out the preliminary sizing of the truss Which includes all the preliminary dimensions. Also calculate dead and live load at intermediate and end panel points. Draw a neat sketch.

2017