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Roll No. :

320711(20)

**B. E. (Seventh Semester) Examination,
April-May 2020**

(Old Course)

(Civil Engg. Branch)

STRUCTURAL ENGINEERING DESIGN-III

Time Allowed : Four hours

Maximum Marks : 80

Minimum Pass Marks : 28

***Note : Part (a) of each question is compulsory. Solve
any one part from (b) and (c) carrying equal
marks.***

Unit-I

1. (a) What are the basic assumptions of designing plate girder?

2

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- (b) Design the welded plate girder is simply supported over an effective span 20 m. It carries a live load of 80 kN/m and dead load 40 kN/m. 14
- (c) Design the riveted plate girder is simply supported over and effective span 18 m. It carries a uniformly distributed load of 60 kN/m including self-weight. 14

Unit-II

2. (a) Discuss the moment resistant connection. 2
- (b) (i) Explain the design procedure for unstiffened seated connection. 7
- (ii) An ISMB 450 @ 72.4 kg/m transmit a shear of 150 kN and a moment of 130 kN.m to the flange of a steel column ISHB 400 @ 82.2 kg/m. Design a suitable beam-column shop welded connection. 7
- (c) (i) Draw the typical sketch to show the following beam column connection : 7
- (x) stiffened seated connection
- (y) Unstiffened seated connection

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- (ii) A beam ISMB 400 @ 61.6 kg/m transmits and end reaction of 200 kN and an end moment of 40 kN.m to flange of ISHB 300 @ 58.8 kg/m. Design a suitable moment resistant connection. 7

Unit-III

3. (a) Describe the term Gouging. 2
- (b) (i) What are the various type of distortion which develop in steel member during welding. 7
- (ii) Explain each process of fabrication of steel structure. 7
- (c) (i) Explain the various process of joining and its advantage. 7
- (ii) What are the Codal provisions for tolerance and deviations. 7

Unit-IV

4. (a) What are the various components of an industrial building? 2

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- (b) Design a gantry girder to carry an electrically operated head crane for the following data : 14

| | |
|---|---------|
| Span of gantry girder - | 6 m |
| Crane capacity - | 200 kN |
| distance between centres of gantry girder - | 16 m |
| Weight of crane girder - | 120 kN |
| Weight of crab - | 50 kN |
| Minimum hook approach - | 1 m |
| distance between centres of wheels - | 3.8 m |
| Height of rail section - | 80 mm |
| Mass of rail section - | 30 kg/m |

Take $f_y = 250 \text{ N/mm}^2$

- (c) Design a roof truss for a factory building for a span of 20 m and a pitch of 1/5. The height of the truss at eye level is 10 m. The spacing of the trusses is 4.5 m. The factory building which is 36 m long.
($f_y = 250 \text{ N/mm}^2$) 14

Unit-V

5. (a) What are the merits of steel bridges? 2

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- (b) Sketch the component details of a deck type and through type plate girder railway bridge and differentiate between deck type and through type bridges. 14

- (c) Design a through type truss girder bridge to carry a single track B.G loading, for the following data 14
- effective span - 39 m
 - c/c spacing of stringer - 1.9 m
 - sleepers and their spacings -
 - 250 mm × 150 mm × 2.8 m @ 0.4 m c/c
 - Density of timber - 7.4 kN/m³
 - Weight of stock rails - 0.44 kN/m
 - Weight of guard rails - 0.26 kN/m
 - Weight of fastenings - 0.28 kN/m of track