

320611(20)

B. E. (Sixth Semester) Examination, 2020

(Old Scheme)

(Civil Engg. Branch)

STRUCTURAL ENGINEERING-DESIGN-II

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) is compulsory and attempt any one from rest parts (b) and (c). Use of IS 800 is permitted.

Unit-I

1. (a) What is shape factor? (2)
(b) Draw stress-strain curve for mild steel and explain its salient features. 14

- (c) A simply supported beam of rectangular section and span 'L' carries a concentrated load at the centre. Find at the stage of collapse and what part of the beam is fully elastic. 14

Unit-II

2. (a) Define pitch and gauge. 2
- (b) (i) Write advantages and disadvantages of a welded connection.
- (ii) Write various failures modes of a riveted joint. 14
- (c) Design a tension member of a single T-section 2.75 m long to carry an axial load of 275 kN. Design also the connection of the member of 10 mm thick gusset plate with 18 mm dia. rivets. 14

Unit-III

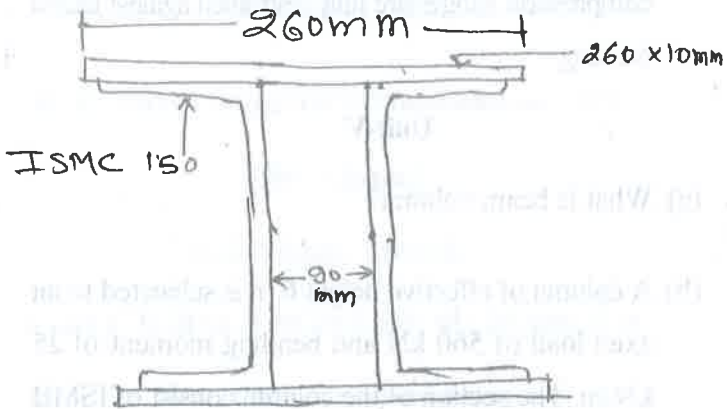
3. (a) Define column bases. 2
- (b) A column of 2.75 m effective length consists of two

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channels with cover plates as shown in fig. calculate two safe axial compressive load on the column.

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

14



- (c) Design a slab base plate for a steel column ISHB 350 @ 67.4 kg/m, carrying a total load of 900 kN. Bearing strength of concrete may be taken as 4 N/mm².

14

Unit-IV

4. (a) Define Laterally Supported beams.
- (b) A simply supported beam has an effective span of 7 m carries a Udl of 50 kN/m. Taking $f_y = 250 \text{ N/mm}^2$ and $E = 2 \times 10^5 \text{ N/mm}^2$. Design the beam if it is laterally supported.

2

14

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- (c) Redesign the beam of above example (Q. 4 b) if it is laterally unsupported. Each end the beam is restrained against torsion and ends of the compression flanges are fully restrained against lateral bending. 14

Unit-V

5. (a) What is beam column? 2
- (b) A column of effective height 6 m is subjected to an axial load of 560 kN and bending moment of 25 kN-m. The section of the column consist of ISMB 600 @ 122.6 kg/m. Check the adequacy of the section. Take $C_m = 0.85$. 14
- (c) A beam-column of effective length of 6 m carries an axial load of 450 kN and equal and moments of 50 kN-m each about the major axis. Design the H-section of the column. Assume that the frame falls under case (b) and the column bends either in single or double curvature. 14