

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. winter 2019 - 20 Examination

Semester: 5

Subject Code: 03104303

Subject Name: Structural Design-I

Date: 28/11/2019

Time: 10:30am to 1:00pm

Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions (Each of one mark) (15)

1. For RCC design, which code we are using?
 A) IS 800: 2007 B) IS 1893: 2002 C) IS 875 (Part-): 2015 D) IS 456: 2000
2. In singly reinforced beam, reinforcements are in which zone?
 A) Compression B) Tension C) Tension and Compression both D) None
3. Basic value of span to depth ratio for simply supported beam up to 10 m span is _____
 A) 7 B) 20 C) 26 D) None
4. What is minimum percentage of longitudinal reinforcement in column?
 A) 0.8%bD B) 6%bD C) 0.4%bD D) 8%bD
5. Nominal cover for very severe exposure condition is _____ mm.
 A) 20 B) 30 C) 45 D) 50
6. Ultimate Tensile Strain for concrete is _____.
7. Full form of HYSD is _____.
8. For HYSD bars, minimum percentage of distribution steel is _____.
9. Factor of safety for Steel is _____.
10. Unit of ultimate tensile strength is _____.
11. In M35 grade concrete, what is characteristic compressive strength of concrete?
12. What is shrinkage?
13. Define: Doubly reinforced beam.
14. What is one way slab?
15. What is compression Member?

Q.2 Answer the following questions. (Attempt any three) (15)

- A) Write down assumptions and merits of Working stress method.
- B) A rectangular beam 200 mm wide and 450 mm effective depth is reinforced with 3 no. 16 mm diameter bars. Find out the depth of N.A. and specify the type of beam. The materials are M20 and Fe415. Also find out depth of N.A. if the reinforcement increased to 3 no. 20 mm diameter bars. Determine M_u for both cases.
- C) Determine development length for 20 mm diameter bars. Fe 415 grade steel is in compression. Grade of concrete is M20.
- D) Explain Braced and Unbraced columns.

Q.3 A) Explain in detail with neat sketch about stress-strain behavior of mild steel. (07)

- B) Design the footing for an R.C.C. wall 200 mm thick and carrying a total working load of 400 kN/m. The SBC on soil is 200 kN/m². The materials are M20 and Fe415. (08)

OR

- B) A R.C.C. column of size 350 mm x 350 mm reinforced with 8 no. 16 mm diameter bars carries a characteristic load of 800 kN. The SBC on soil is 200 kN/m². The materials are M20 and Fe415 for both column and footing. (08)

Q.4 A) A singly reinforced rectangular beam of 5 m span is simply supported and carries a (07)

- characteristic dead load of 18 kN/m and live load of 12 kN/m in addition to its self-weight. Design the beam for flexure at mid span. Use M20 and Fe415.

OR

- A) A simply supported rectangular beam of 8 m span carries a udl of 23 kN/m inclusive of its self-weight. Determine the reinforcement for flexure. Use M30 and Fe 415. (07)

- B) Design the slab of the room for residential building of size 3 m x 6.5 m clear. The slab is supported on masonry walls of thickness 350 mm. Live load shall be 2 kN/m². Materials are M20 and Fe415. No need to perform checks. (08)