

Bachelor of Architecture - Third Year - Second Semester-22**Design of Structures-II**

Time: Three Hours

Full Marks 100

[IS 456:2000, IS 800:2007 code, Steel Table and SP 16 handbook are allowed]

Assume the missing data properly as per the requirement

No. of questions	(Question No. 1 compulsory. Answer any 4 questions from the rest.)	Marks (5X20=50)
1 (a)	Distinguish between the different design philosophies viz. working stress, limit state and ultimate load method	10
(b)	What are the basic assumptions for limit state design of RCC along with schematic diagram?	10
2(a)	Write short note on short column and long column. Also mention effective length according to different end conditions..	8
(b)	How beams are different from column? List the classifications of flexure member as per its end conditions.	12
3	Design a laced built up column with two channels placed back to back to carry factored axial load of 900 kN. The column is 8 m long and is restrained in position but not in direction at both the ends. Provide single lacing system with bolted connection. Assumed steel of grade Fe 410 and bolts of grade 4.6. Assume any other data if required.	10 10
4(a)	Calculate the value of the least radius of gyration for a compound column consisting of ISHB 300 @ 580 N/m with one cover plate 300mm X 20mm on each flange.	10
(b)	Obtain factored axial load on the column section ISHB400. The height of the column is 3.0m and it is pin-ended. [$f_y = 250 \text{ N/mm}^2$; $E = 2 \times 10^5 \text{ N/mm}^2$; $\gamma_m = 1.10$]	10
5	Design a slab over a room of (5.5 m X 3.5 m) as per I.S. code standards. The edges of the slab are simply supported. The live load of the slab is 5 KN/m^2 . The slab is supported on 300 mm thick brickwork. Use M20 grade of concrete and Fe415 steel..	20
6 (a)	What is flexure member (beam) ? Classify flexure member as per its structural applications.	20
(b)	Design a simply supported beam of section 400mm x 400 mm if the beam has to carry a factored moment of 400 kNm. Use M 20 grade of concrete & Fe 415 grade of steel bars. Show the design details of reinforcement clearly	
7	Design a rectangular beam of clear span 4m and cross section of (300 mm X 300 mm) which is subjected to a dead load of 25 KN/m and live load of 3 KN/m. The beam is supported over a 300mm thick wall. Use M25 grade concrete and Fe415 steel.	20