Bachelor of Architecture - Third Year - Second Semester 2019
Design of Structures-II

Time: Three Hours

Full Marks 100

[IS 456:2000, IS 800:2007code, 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)	Differentiate between working stress, limit state and ultimate stress method	10
(b)	Illustrate the basic assumptions for limit state design of RCC along with schematic diagram.	10
2(a)	Define Beam. Classify beam as per its structural applications.	8
(b)	Design a simply supported beam of section 300mm x 350 mm if the beam has to carry a factored moment of 250 kNm and 120 kN. Use M 20 grade of concrete & Fe 415 grade of steel bars. Show the design details of reinforcement clearly	12
3 (a)	Differentiate between short column and long column. Also mention effective length according to different end conditions.	10
(b)	How flexure members are different from compression. List the classifications of flexure member as per structural applications.	10
4(a)	Calculate the value of the least radius of gyration for a compound column consisting of ISHB 250 @ 536.6 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 N/mm2 ; E = 2 x105 N/mm2 ; γ_m = 1.10]	10
5	Design a laced built up column with two channels placed back to back to carry factored axial load of 1080 kN. The column is 10 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.	20

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No. of questions	(Question No. 1 compulsory. Answer any 4 questions from the rest.)	Marks (5X20=50)
6	Design a rectangular beam of clear span 3m and cross section of (250 X 300)mm which is subjected to a dead load of 20 KN/m and live load of 2 KN/m. The beam is supported over a 300mm thick wall . Use M25 grade concrete and Fe415 steel.	20
7	Design a slab over a room of (5.5 X 3.5)m as per I.S. code standards. The edge of the slab are simply supported . The live load of the slab is $3KN/m^2$. The slab is supported on 250mm thick brickwork. Use M20 grade of concrete and Fe415 steel.	20