

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2021

Programme Name: B.Tech. Civil Engineering

Semester : VI

Course Name : Design of Concrete Structure I

Time : 03 hrs

Course Code : CIVL 3031

Max. Marks : 100

Nos. of page(s) : 2

Instructions:

Answer all questions of Section A, B & C
IS 456 & SP 16 are allowed to use in the exam.

S. No.	SECTION A	Marks	CO
Q 1	What are the guidelines to be followed while lapping the bars?	5	CO1
Q 2	Explain the limit state philosophy as detailed in the current IS code.	5	CO1
Q 3	Briefly explain the classification of columns	5	CO1
Q 4	What are the important factors affecting the shear resistance of a Reinforced concrete member without shear reinforcement?	5	CO1
Q 5	How can you classify one way and two way slabs?	5	CO1
Q 6	What is the function of columns and how they are differ from beams.	5	CO1
SECTION B			
Q 7	Design a simply supported rectangular RC beam, having a span of 5.5 m, subjected to a uniformly distributed load of 33.8 kN/m. Compute the required reinforcement, assuming the breadth of beam as 230 mm and the effective cover for compression and tension reinforcement as 50 mm. Assume that the beam is supported by load-bearing masonry of thickness 230 mm. Use M20 concrete and Fe 415 grade steel.	10	CO2 CO4
Q 8	Design a Staircase flight for an office type building to suit the following data: Height between floors = 4 Mid landing is cantilevered out and the width is 1.5m Tread = 300mm Rise = 150mm Adopt M20 grade concrete and Fe 415 steel Sketch the details of reinforcements in the stair flight.	10	CO3 CO4
Q 9	Determine the area of required steel for the T-beam with the following dimensions: Df = 200 mm, bw = 300 mm, bf = 1500 mm, and d = 650 mm. It is required to carry a factored moment of 1200 kNm. Assume Fe 415 steel and M30 concrete.	10	CO2 CO4
Q 10	The slab of a residential building of size 4.3 m × 6 m is simply supported on all the four sides on 230 mm walls. Assuming an imposed load of 2 kN/m ² and load due to finishes of 1.0 kN/m ² , design the floor slab. Use M25 concrete and Fe 415 steel. Assume mild exposure.	10	CO2 CO4

Q 11	<p>Design a column of height 3 m, which is effectively held in position and restrained against rotation at bottom and effectively restrained against rotation but not held in position at top. It is subjected to an axial load of 1650 kN under dead and live load condition. Use M25 concrete, Fe 415 steel, and assume moderate environment.</p> <p style="text-align: center;"><u>OR</u></p> <p>Design the longitudinal reinforcements in a rectangular reinforced concrete column of size 300mm by 600 mm subjected to a factored load of 1600 kN and a factored moment of 300 kNm with respect to major axis. Adopt M20 grade concrete and Fe 415 HYSD bars.</p>	10	CO2 CO4
SECTION-C			
Q 12	<p>Design an isolated footing for a square column of size 400 mm x 400 mm, supporting a service load of 2200 kN. Assume SBC of soil as 250 kN/m² at a depth of 1.5 m below the ground. Use M20 concrete and Fe 415 steel for the footing and M30 concrete and Fe 415 steel for the column. Assume that the column is reinforced with eight 25 mm bars.</p> <p style="text-align: center;"><u>OR</u></p> <p>Design an isolated footing for a circular column of size 400 mm, supporting a service load of 2200 kN. Assume SBC of soil as 250 kN/m² at a depth of 1.5 m below the ground. Use M20 concrete and Fe 415 steel for the footing and M30 concrete and Fe 415 steel for the column. Assume that the column is reinforced with eight 25 mm bars.</p>	20	CO3 CO4