

<b>Name:</b>	 <b>UPES</b> UNIVERSITY WITH A PURPOSE
<b>Enrolment No:</b>	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, December 2019**

**Course: Design of Concrete Structure**

**Semester: V**

**Program: B.Tech. Civil Engineering**

**Time 03 hrs.**

**Course Code: CIVL 3002**

**Max. Marks: 100**

**Instructions:**

**Answer all questions of Section A, B & C**

**(Assume all the necessary data if necessary) (Internal Choice is there in Q 3-Section B and Q 5-Section C)**

*.....Note: IS 456:2000 & SP 16 should be Allowed/Provided.....*

**SECTION A**

S. No.		Marks	CO
Q 1	Explain: a) Characteristic Strength of concrete b) Tensile strength of concrete c) Modulus of elasticity of concrete d) Shrinkage of concrete e) Creep of concrete	4 4 4 4 4	CO1

**SECTION B**

Q 2	A three span continuous beam is to be designed to support an imposed dead load 15 kN/m and a service live load of 15 kN/m. The three spans are 8m each. Adopt suitable load factors as specified in IS 456:2000 and design the beam, using M20 grade concrete and Fe 415 HYSD bars.	10 10	CO2 CO4
Q 3	A rectangular slab of 8m x 4m side length is simply supported along the edges. The slab is required to support a uniformly distributed load of 3.5 kN/m <sup>2</sup> . Using the yield line theory, design the slab using M25 grade concrete and Fe 415. <p style="text-align: center;"><u>Or</u></p> A square slab of 4m side length is simply supported along the edges. The slab is required to support a uniformly distributed load of 4 kN/m <sup>2</sup> . Using the yield line theory, design the slab using M20 grade concrete and Fe 415.	10 10	CO2 CO4

**SECTION-C**

Q 4	Design a suitable reinforced concrete column of square section to support an axial service load of 1000kN. The size of the column is 400mm by 400mm. Design a suitable footing for the column. The safe bearing capacity of the soil at site is 200 kN/m <sup>2</sup> . Adopt M20 grade concrete and Fe 415 HYSD bars. Sketch the details of reinforced in the column and footing.	10 10	CO2 CO4
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Q 5	<p>Design a reinforced concrete circular footing for a circular column of 300 mm diameter supporting a design ultimate load of 750 kN. The safe bearing capacity of soil at site is 200 kN/m<sup>2</sup>. Adopt M20 grade concrete and Fe 415 HYSD bars.</p> <p style="text-align: center;"><u>Or</u></p> <p>A staircase flight comprises of independent cantilevered slabs from a reinforced concrete wall. Assuming the risers of 150mm and treads of 300 mm, width of flight as 1.7m, design a typical tread slab. Assume the live loads specified in IS 875 code loading standards for an office building. Use M20 grade concrete and Fe 415 grade reinforcements.</p>	<b>10</b> <b>10</b>	<b>CO3</b> <b>CO4</b>
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