

Name:	 UPES UNIVERSITY WITH A PURPOSE
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: Advanced Concrete Structures
Program: M.Tech. (Structural Engineering)
Course Code: CIVL 7005

Semester: I
Time 03 hrs.
Max. Marks: 100

Instructions: Attempt all Questions. Assume and state clearly any data considered necessary, but not given.

SECTION A

S. No.	Question	Marks	CO
Q 1	Explain why is nominal non prestressed reinforcement is provided in prestressed concrete beams.	4	CO1
Q 2	In case of in a multistoreyed frame, the corner columns are usually prestressed. Explain why is it so.	4	CO2
Q 3	Explain through a figure how shear walls can be provided in a multistoreyed frame, and what is their use.	4	CO3
Q 4	In case of a cantilever retaining wall, how is the thickness of stem fixed at the base. Explain.	4	CO4
Q 5	Sketch how reinforcement can be provided in the stem of a counterfort retaining wall.	4	CO5

SECTION B

Q 6	<p>A class room 15 x 20m is to be constructed in an educational building having beams at clear spacing of 2.5m c/c. Precast slabs are filled in between the beams. Design the slabs using M30 concrete and 8mm wires having UTS of 1600MPa.</p> <p>The slabs are cast and prestressed in factory, and are later transported and erected at site. Assume 15% losses and live load as per IS code. Assume live load of 3KN/m² on classroom.</p> <p style="text-align: center;">Or</p> <p>Design the slab, if the slab in above building is cast, cured ,prestressed and immediately lifted to site. Live load is applied much later.</p>	10	CO1
Q 7	The end column of a concrete framed building is subjected to an axial force of 200KN and moments in the x directions as 85 KNm. Calculate the initial prestressing force required so that no tensile stress is developed in the column. Assume losses as 20%.	10	CO2
Q 8	To control lateral drift in a multistoreyed building, bracings may be provided concentrically or eccentrically. Explain through sketches these configurations..	10	CO3

Q 9	A counterfort retaining wall 6m high provided for basement of a building carries a lateral force of 400KN per metre run of wall due to earth filled level behind it.. It is provided with steel wire anchors that are placed at 3m c/c. If steel wires of 8mm diameter having UTS of 1500 MPa are available for making the anchors, design the anchors to carry at least 40% of the lateral force. Provide the anchors at two levels and show them in a sketch.	10	CO5
SECTION-C			
Q 10	<p>A prestressed post tensioned concrete beam is to be provided in the hall of a merchantile building 10m wide and 15 m long. The beam spaced 3m is simply supported over 10 m span and carries slabs 100mm thick overfull span. The beam has to be erected on the supports immediately after prestressing due to space limitations and live load is applied much later. HT wires of 5mm diameter having UTS of 2200 MPa are available for prestressing.</p> <p>Design the beam using M40 concrete assuming that wires are prestressed upto 80% of UTS initially and losses are 20%. Live load on merchantile building may be taken as 4KN/m².</p> <p style="text-align: center;">or</p> <p>Design the above beam assuming that it has been stored at site after prestressing, and erected on supports much later.</p>	20	CO2
Q 11	<p>A cantilever retaining wall is provided along a highway to retain earth 5m high at one side. Design the wall..</p> <p>Following data may be used:</p> <ol style="list-style-type: none"> a. Density of soil = 18 KN/m³ b. Angle of repose = 30⁰ c. Coefficient of friction between concrete and earth = 0.65 d. Safe bearing capacity = 160KN/m² <p>Use M20 concrete and Fe 415 steel.</p>	20	CO5