Name:
Enrolment No:

UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
END SEMESTER EXAM, DEC-2022

Course: Advanced Concrete structures **Semester: I**
Program: M. Tech (Structures) **PAPER- II**
Max. Marks: 100 **Time: 3Hrs**

S. No.		Marks	CO
Q.1	Briefly explain the concept of Moment Redistribution	**4M**	**CO1**
Q.2	What is the purpose of skin reinforcement for design of deep beams	**4M**	**CO2**
Q.3	Explain the concept of stability in the design of retaining walls.	**4M**	**CO1**
Q.4	Draw the diagram of water tank with proper detailing.	**4M**	**CO3**
Q.5	Briefly explain the advantage of PSC over RCC Construction.	**4M**	**CO3**
	SECTION B		
Q.6	Design a single span deep beam for the following data: Effective length = 6m, Overall depth = 6m, Width of support = 0.6m, Width of Beam = 0.4m, Total load on beam including self-weight is 400kN/m. Use M25/Fe500	**10M**	**CO2**
Q.7	For a layered backfill behind a 10m high retaining wall with a smooth vertical backfill, Draw the active earth pressure distribution and its magnitude, and point of application. Use M25/HYSD 500 S. No | Depth | Backfill Properties 1 | 0-3 m | C= 30kN/m^2, $\varphi = 0^0, \gamma = 19kN/m^3$ 2 | 3-6 m | C= 30kN/m^2, $\varphi = 0^0, \gamma = 18kN/m^3$ 3 | 6-10m | C= 50kN/m^2, $\varphi = 0^0, \gamma = 17kN/m^3$	**10M**	**CO3**
Q.8	Design the side walls & hopper bottom of 4m diameter bunker to store 40T of coal. Density of coal is 9kN/m^3.Angle of repose = 30 Degrees. Use M25 & HYSD fe500 bars. Sketch the details of reinforcement	**10M**	**CO2**
Q.9	Design a Rectangular water tank of size 6m X 4m X 3m with flexible base for the following data: Diameter of tank = 3.5m, Depth of water = 3m, Use M25/fe250 **OR** Design a Rectangular water tank of size 6m X 4m X3m with rigid base for the following data: Diameter of tank = 3.5m, Depth of water = 3m, Use M25/fe415	**10M**	**CO3**
	SECTION-C		
Q.10	Analyze the two span pre-stressed continuous beam of span 6m & 8m each subjected to UDL of 40kN/m & point load of 30kN. The beam is fixed at one end. Design the beam considering 25% redistribution & check the adequacy of section. The depth of the beam is 275 X 450mm. Use M25/fe500	**20M**	**CO1**
Q.11	Design a circular steel silo of 12m height and 4m internal diameter to store a cement of bulk density 15.50kN/m3 with an angle of internal friction 25^0. the dimension of the silo is 4m diameter, cylindrical portion height is 12m and hopper bottom height is 3m with the diameter of hopper at the bottom as 0.6m, 8mm thick plate with stiffeners ISA 65x65x6mm. Use M25 & HYSD Steel bars **OR** A portal frame with ends hinged is to be analyzed for the following data:	**20M**	**CO2 & CO3**

	Spacing of Portal frame: 4m, Height of Columns = 4.5m, Distance b/w column centers = 9m, Live load on roof = 1.5kN/m^2, RCC slab is provided over the portal frames. Analyze the portal frame & find design moments & shear forces at critical sections. Use M25/fe415		