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Uni. Roll No. ….....

Program/Course: B. Tech.
Subject: Design of Concrete Structures - II
Subject Code: CE–310
Paper ID: A0622

Time Allowed: 03 Hours Max. Marks: 60

Note:

1. Section – A is compulsory.
2. Attempt any four questions from Section – B.
3. Attempt any two questions from Section – C.
4. Use of Indian Standards is allowed.
5. Any missing data may be assumed appropriately

Section – A

Q 1.	a)	Sketch correct way of reinforcement (horizontal) detailing at the junction of vertical walls of rectangular water tank.	2
	b)	How will you decide minimum reinforcement in case of water tank?	2
	c)	Under what conditions, you will recommend Raft Foundation?	2
	d)	Why Shell Structures are structurally more efficient and require less material.	2
	e)	Write, in brief, the procedure to design staging of OHSR.	2
	f)	Sketch detail of Flexible Joint between vertical wall and base slab of a circular water tank.	2
	g)	Discuss the loadings, which a designer has to consider for the design of vertical wall of rectangular underground tank.	2
	h)	Sketch “Strap Footing”, write conditions under which this type footing is the best solution.	2
	i)	What is the role of Shear Key in the “Retaining wall”? On what basis it is designed?	2
	j)	How design of water retaining structures differ from other reinforced structures?	2

Section – B

Q 2.	How one way and two way shear is calculated in case of isolated square footing of uniform thickness.	5
Q 3.	Write situations where designer has to go for beam curved in plan. How design of such beam differ from the design of straight beam?	5
Q 4.	Derive expressions for meridional and hoop stresses for a Spherical Dome subjected to u.d.l.	5
Q 5.	Show deflected shape of all components of Intze Tank Proper due to membrane action.	5
Q 6.	Under what circumstances Counterfort Retaining Wall is preferred over Cantilever Retaining Wall. Sketch Counterfort Retaining Wall, and label its various components.	5

Section – C

Q 7. Design a combined rectangular footing for two columns carrying axial loads of 1000 kN and 1200 kN. Columns are of size 400 mm x 400 mm and are spaced 4 m c/c. The projection of footing from the centre of lightly loaded column is 500 mm. The safe bearing capacity of soil is 120 kN / m^2 . Use M20 grade of concrete and Fe–415 grade of steel. 10

Q 8. Design of cantilever retaining wall to maintain a level difference of 3 m. The angle of repose of earth $\Phi = 30^o$, density is 18 kN / m^3, coefficient of friction (between concrete and soil) $\mu = 0.55$. Take safe bearing capacity of soil as 100 kN / m^2. 10

Q 9. Design a water tank using approximate method, circular in plan, with internal diameter 6 m, water height of 2.5 m. Take M20 concrete, Fe–415 steel, free board of 200 mm. The tank is resting on ground, the joint between wall and slab is monolithic. 10

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