PG

GLOBAL ACADEMY OF TECHNOLOGY
(Autonomous Institution, Affiliated to VTU)
SEE MODEL QUESTION PAPER
First Semester M.Tech. STRUCTURAL ENGINEERING
20MST12: ADVANCED DESIGN OF RC STRUCTURES

Time: 3HOURS.   Max. Marks: 100

Note: 1. Answer any FIVE full questions. Choosing one full question from each module.
*   2. Use of IS 456-2000 and SP-16 is permitted,*
*   3. Assume missing data suitably.*

Q. No.	Questions	Marks
	MODULE-1	
1a	Explain typical field line patterns in slabs with neat sketches.	04
1b	Design a rectangular slab of size 4m X 6m which is simply supported along the edges and has to carry a Service load of 4kN/m^2 .assume co-efficient of orthotropy μ=0.75.Use M25 Concrete and Fe-415 Steel.	16
	OR	
2a	Design a simply supported square slab of side 3.6m to carry a service load of 4kN/m^2.Use M25 Grade Concrete and Fe415 Steel.	10
2b	A Rectangular slab of Size 5mx6m is simply supported all around and reinforced with 10mm bars spaced at 200mmC/C, in shorter direction and 10mm bars spaced at 225mm in longer direction. Determine the Superimposed load on the slab can carry safely. Given: Effective depth of slab =120mm and Overall depth =150mm Use M25 Grade of Concrete and Fe415 Grade of Steel.	10
	MODULE-2	
3	A Hall measuring 16m x24m is to be provided with a grid slab. Design the grid slab for the following data: Live Load=4kN/m^2, Spacing of ribs is 2m C/C. Finishing load=1kN/m^2 Use M25 concrete and Fe415 steel. Sketch the reinforcement detailing. Use Rankine –Grashoff method.	20
	OR	
4	Design an interior panel of a flat slab with panel size 6mx6m supported by columns of size 500 mm x 500 mm.Provide suitable drop. Take Live load as 4kN/m^2.Use M25 grade of Concrete and Fe415 Steel.	20
	MODULE-3	

5	Design a rectangular water tank of size 5m x 4m x 3m deep resting on firm ground. Use M25 concrete and mild steel.	20
	OR	
6	Design a circular water tank with flexible base resting on the ground to store 50,000 litre of water. The depth of tank may be kept 4m. Use M25 concrete and Fe-415 Steel.	20
	MODULE-4	
7	Design a circular bunker to store 200kN of coal. Unit weight of coal is 9kN/m^3, Angle of repose=30°.Sketch details of reinforcement for the bunker. Use M20 Grade concrete and Fe 415 Steel.	20
	OR	
8	A silo built to store wheat with internal diameter 5.5m, height of cylindrical portion is 18 m and central opening is 0.5 m. Given : Unit Weight of wheat = 8.5kN/m^3 Angle of Internal friction=28^0 Angle of Wall friction =0.75φ while filling =0.60φ While emptying Pressure ratio = P_h/P_v =K=0.5 while filling. Use Janssen's theory for pressure calculation, M20 Grade concrete and Fe-415 steel for materials.	20
	MODULE-5	
9 a.	Write the specifications for longitudinal reinforcement and transverse reinforcement as per IS 13920-ductile Detailing of RC Structures subjected to Seismic force.	20

9 b.	Explain with Sketches:
	    i) Expansion Joint
	    ii) Contraction Joint	

	OR	
10a	Explain the main approach of designing and detailing of structures to resist earthquake forces.	06
10b	Explain the factors affecting ductility of structures.	06
10c	Explain with neat sketch, detailing of beam column joint to active larger ductility.	08