Reg. No. _____

Karunya University

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – November / December 2009

Subject Title: REINFORCED CONCRETE STRUCTURES - II **Time : 3 hours**
Subject Code: CE250 **Maximum Marks: 100**

(Use of IS 456-2000, IS 1893-2002, IS 3370-1965, SP – 16 and IRC Codes permitted
Assume M20 Concrete and Fe 415 Steel unless otherwise specified)

Answer ALL questions

PART – A (10 x 1 = 10 MARKS)

1. A dog legged stair waist slab is designed as
   a. slab spanning between the supports along the flight. b. a folded plate
   c. slab spanning perpendicular to the flight.
2. State the principal function of counterfort in a counterfort retaining wall.
3. Explain the behavior of a rectangular water tank with length to breadth ratio less than 2.
4. The circular wall of water tank fixed at base is subjected to
   a. predominantly hoop tension and some bending moment.
   b. predominantly bending moment and some hoop tension.
   c. Hoop tension only.
5. State the names of any road vehicles whose wheel loads are directly related to class AA tracked vehicle specified in IRC.
6. The support conditions of a slab bridge over a culvert is
   a. simply supported on four edges. b. simply supported on opposite edges.
   c. fixed on opposite edges.
7. Define ductility of a structural member.
8. State any two approximate methods used for lateral load analysis of multistorey frames.
9. For application of yield line method of analysis the slab has to be
   a. over reinforced b. supported on four edges c. under reinforced.
10. Sketch the yield line pattern of a square slab isotropically reinforced and simply supported along the edges.

PART – B (5 x 3 = 15 MARKS)

11. Draw a typical cross section of a cantilever retaining wall and indicate the location of tension reinforcement in all its components.
12. List the forces acting on the side walls of an underground water tank subjected to uplift.
13. What are the factors affecting the effective width of a concentrated load on a slab?
14. State the earthquake resistant design philosophy.
15. What are the assumptions made in the yield line method of analysis of slabs?

PART – C (5 x 15 = 75 MARKS)

16. a. Design the waist slab of a stair using the data given below: (12)

    Horizontal span : 4.65 m
    Width of stair : 1.5 m
    Riser : 150 mm
    Tread : 270 mm
    Floor finish : 20 mm
    Steps are of brick masonry of unit weight 19 kN/m^3
    Live load : 3 kN/m^2

    b. Draw a neat sketch showing the reinforcement details. (3)

(OR)

[P.T.O]

17. Design the depth of counterfort and the reinforcement required at the bottom using the following data: Check for shear also.

Depth of couterfort at top	:	400 mm
Thickness of counterfort	:	400 mm
Height of counterfort	:	6000 mm
Lateral Earth pressure at bottom	:	36 kN/m^2
Spacing of counterforts	:	3 m
Inclination of main steel with vertical	:	27^o.

18. Design the short wall of a rectangular water tank using the following data:

Plan dimensions of the tank	:	8 m x 3 m
Height of the tank	:	3 m
Grade of concrete	:	M30
Grade of Steel	:	Fe415

(OR)

19. Find the maximum compressive force in the columns of a water tank staging using the following data:

Plan dimensions of tank	:	4 m x 4 m
Height of the tank body	:	3 m
Height of staging upto bottom of tank	:	8 m
Thickness of side walls	:	200 mm
Thickness of base slab	:	300 mm
Thickness of roof slab	:	150 mm
Column dimensions	:	300 mm x 300 mm
Wind pressure	:	2 kN/m^2

Ignore the weight of bracings.

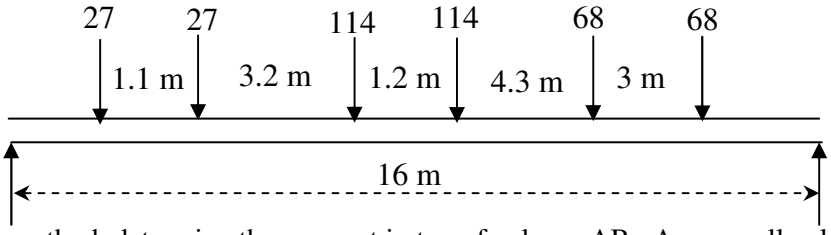
20. Design a simple slab bridge to the following requirements.

Clear span	:	5 m
Clear width of Carriage way	:	6.80 m
Live load	:	Class 'A' Loading
Concrete mix	:	M20
Grade of Steel	:	Fe 415
Thickness of wearing coat	:	80 mm @ unit weight of 24 kN/m^3

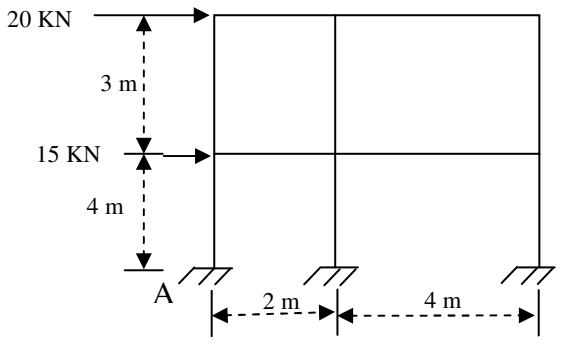
Two lanes of traffic permitted.
Design for bending only.

(OR)

21. Arrange the train of class 'A' loading given below on the girder of span 16 m and determine the maximum bending moment. All the loads are in kilo Newton's.



22. Using cantilever method, determine the moment in top of column AB. Assume all columns are of equal area of cross section.



[P.T.O]

(OR)

23. a. List the factors affecting the base shear of a multistorey building frame due to seismic forces.
    b. Explain the distribution of earthquake nodal forces in a rigid frame.
    c. Write a short note on response spectrum.

24. Design a rectangular slab of 6 m x 4 m simply supported on all edges. The live load is 5 kN/m^2. The moment capacity along the longer span is 50% of that of shorter span. Assume thickness of the slab 150 mm, and floor finish 1 kN/m^2.

(OR)

25. A simply supported two way slab with effective spans of 3.5 m and 4.5 m is reinforced with 10 mm bars @ 250 mm c/c along short direction and 10 mm bars @ 350 mm c/c along long direction. The total depth is 100 mm with floor finish of 1 kN/m^2. Determine the maximum imposed load the slab can support.