

2014

**STRUCTURES-V**

Paper : 5.5

Full Marks : 100

Time : 3 Hours

*The figures in the margin indicate full marks  
for the questions.*

1. Answer the following questions : (any 5) 3×5
  - a) What is characteristic load?
  - b) What is the difference between one way slab and two way slab?
  - c) What are the factors which affects the workability of concrete?
  - d) What is the water cement ratio for M15, M20 & M25 grade?
  - e) Write the different load combinations used in design?
  - f) What are the limiting values of the depth of neutral axis for different grades of steel?
  
2. Answer the following questions (any 3) : 5×3
  - a) What are the different types of reinforcement and grades?
  - b) What is short column? What is the maximum and minimum percentage of reinforcement is columns?
  - c) What are the properties of concrete?
  - d) Write the minimum cement content for different grades of concrete?
  
3. Describe and explain the following questions (any 5): 5×6
  - a) What are the assumptions in the design of a compression member?
  - b) Write the procedure for design mix of concrete.
  - c) What is the requirement of a good form-work?

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- d) What is the difference between a dog legged and open well staircase? Draw appropriate sections showing reinforcement details.
- e) What is cement concrete and its composition?
- f) Explain the slump test and write its values for different concrete?
- g) Explain the different methods of design with stress-strain graph?

4. Solve the following numerical (any 4) :

- a) Find the M.R. of a Singly reinforced concrete beam of size  $250 \times 450$  and reinforced with 3-16 diabar. Use M20 grade of concrete.
- b) Calculate the total design load coming on the foundations for a Residential building of size  $6 \times 8$ m and having 4 numbers of columns at edges of size  $350 \times 350$ mm, all roof beams of size  $250 \times 450$ mm and slab thickness=100mm. consider the floor height as 3m.
- c) Find the M.R of a singly reinforced concrete beam section of 200mm width and 400mm effective depth, reinforced with 4-20 dia rebar of grade Fe415. Use M15 grade of concrete. Redesign the beam if necessary.
- d) A singly reinforced beam section of size  $250 \times 450$ mm is having 3-20 dia+2-16 diameter Rebars. The concrete is of grade M-25 and the grade of steel is Fe415. Find out whether the section is under reinforced or over reinforced.
- e) What is design load and briefly explain the different design loads?

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