

**FACULTY OF CIVIL ENGINEERING**  
**T.E (Civil) Year Examination - June- 2015**  
**Design Of Structures-II(RCC)**  
**(Revised)**

[Time: Three Hours]

[Max. Marks: 80]

“Please check whether you have got the right question paper.”

**N.B**

- i) Question No.1 and 6 are compulsory.
- ii) Attempt any two questions from each section.
- iii) Assume suitable data if required and state it clearly.
- iv) Use IS: 456-2000 is allowed.

## SECTION-A

- Q.1 a) Explain in detail stress block parameter. 03  
 b) What is redistribution of moment? 03  
 c) What are the various types of shear failure in R.C. section? Explain in detail. 04
- Q.2 a) What are the types of deflection? Explain in detail. 03  
 b) Derive from first principle, the values of design parameters (constants)  $K_{umax}$ ,  $R_{umax}$ ,  $p_{tmax}$ . For a 04  
 balanced section of concrete of grade  $M_{25}$  and steel grade Fe 415.  
 c) An R.C.C beam 200MM  $\times$  400MM (effective) is reinforced with 3 bars of 16MM  $\phi$  bars of Fe415 08  
 steel. Find the ultimate uniformly distributed load which the beam can carry safely over a span of  
 5M. Take  $M_{20}$  grade of concrete.
- Q.3 a) What is mean by cracking? Explain the types of cracks. 03  
 b) A beam 250MM  $\times$  560MM effective is subjected to a factored bending moment 310KN. Determine 12  
 the area of steel for doubly reinforced section. Use  $M_{20}$  concrete and Fe250 steel. Assume  
 $d' = 60$ MM.
- Q.4 a) Why is the provision of minimum shear reinforcement compulsory in reinforced concrete beam? 03  
 b) An R.C beam 350MM wide and 500MM effective depth is reinforced with 4 bars of 25mm dia. It is 12  
 having a u. d. l of 75KN/M. over a span of 7.0m. Design the shear reinforcement using vertical  
 stirrups and bent up bars. Use  $M_{20}$  and Fe415 grades.
- Q.5 Design the T-beam having 8M clear span, simply supported on wall 230MM wide, is subjected to a 15  
 dead load of 23KN/M and a live load of 25KN/M. the width of flange = 1300MM, overall depth of  
 beam = 550MM. depth of beam is 110MM and width of web = 350MM. use  $M_{20}$  & Fe415 grades.
- SECTION -B
- Q.6 Explain the following terms 10  
 i) Development length and necessity of the check.  
 ii) Necessity of torsion reinforcement in the slab.  
 iii) Relationship for the load carrying capacity of an axially loaded short column.  
 iv) Unsupported length and buckling load in connection with column.  
 v) One-way slab and two-way slab.
- Q.7 Design a reinforcement concrete slab for a room 4M  $\times$  6.5M supported on a beam of width 250MM. 15  
 the slab is continuous over all supports, carrying a live load of 4KN/M<sup>2</sup> & float finish is 0.9KN/M<sup>2</sup>.  
 Assume mild exposure condition. Take  $M_{20}$  & Fe415 grades.

- Q.8 Design a dog legged stair-case for a residential building having a room size 5M×2.2M. Floor to floor height is 3M. The column size 230MM×380MM. take live load 3KN/M<sup>2</sup>& floor finish 1KN/M<sup>2</sup>. Use M<sub>20</sub> and Fe415 grades. 15
- Q.9 Design an isolated footing for a square column 450MM×450MM reinforcement with 8 bars of 25MM dia. And carrying a load of 2000KN S.B.C of soil is 300KN/M<sup>2</sup> at a depth of 1.5M below ground. Assume M<sub>20</sub> grade of concrete & Fe415 grade of steel. Show the detailed reinforcement. 03
- Q.10 a) State the guidelines for shear design as per the codes available for seismic design. 12  
b) Design a circular column of diameter 400MM subjected to a load of 1250KN. The column is having a spiral ties. The column is 3M long & effectively held in position at both ends but not restrained against rotation. Take M<sub>20</sub>& Fe415 grades.