

**CODE NO:- K-32**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**T.E. (CIVIL) Examination Nov/Dec 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) Q.No.1 and Q.No.6 are compulsory.
  - ii) Attempt any two questions from remaining of each section.
  - iii) Use IS: 456-2000 is allowed.
  - iv) Assume suitable data, if required and state it clearly.

## SECTION-A

- Q1. A Explain the following terms. 02
- i) Limit state method and working stress method. 02
  - ii) Necessity of using steel in compression region. 02
  - iii) Anchorage bond and development length. 04
- B Derive from first principle, the values of design parameters (constants)  $K_{umax}$ ,  $R_{umax}$  and  $p_{tmax}$  for a balance section of concrete grade M20 and steel grade Fe 500. 04
- Q.2 A What is redistribution of moments and what are the IS requirements for it. 03
- B A R.C.C beam of rectangular section 230mm×400mm width an effective cover 40mm. find the maximum imposed uniformly distributed load carrying capacity of beam if it is simply supported over a span of 3.5m. Use M20 and Fe415 grades. 12
- Q.3 A Explain the different types of crack. 03
- B Design a rectangular beam 230mm wide & 600mm deep with an effective span is 5m. The superimposed load on the beam is 45KN/m. use M20 and Fe415 grades. Assume the effective cover is 50mm. 12
- Q.4 A Write minimum percentage of reinforcement required in beams & slabs for crack control. 03
- B A T beam consists of a flange 1200×110mm. the depth of the beam is 600mm up to the centre of steel and width of web is 300mm. calculate the ultimate M.R of a T-beam, if area of tensile reinforcement is 2900mm<sup>2</sup>. Use M20 and Fe500 grades. 12
- Q.5 A Write short term & long term deflection. 03
- B Design a shear reinforcement for a beam with 230mm wide & 450mm deep (effectively). The beam is subjected to a shear of 150KN. The grade of concrete is M25 & grade of steel is Fe415 & the percentage of steel is 1.5. 12

## SECTION-B

- Q.6 A Write functions of longitudinal & transverse reinforcement in R.C.C column. 03
- B Explain importance of ductility in seismic design. Also write the names of IS code available related to earthquake. 04
- C Explain in detail the Pu-Mu interaction diagram. 03
- Q.7 Design a reinforced concrete slab for a room of clear dimensions 4m×5m. The slab is supported on walls of width 280mm. the slab is carrying a live load 4KN/m<sup>2</sup> & floor finish 0.8KN/m<sup>2</sup>. Use M20 and Fe415 grades. The corners of slab are held down. 15

- Q.8 A Explain the difference between short column & long column. 04  
B Design a short R.C.C column to carry an axial load of 1600KN. It is 4m long effectively held in position & restrained against rotation at both ends. Use M20 concrete & Fe415 steel. 11
- Q.9 Design a dog-legged staircase with the following data. 15  
i) Size of room =2m×4m  
ii) Column size =230mm×380mm  
iii) Floor to floor height =3m  
iv) Live load =3KN/m<sup>2</sup>.  
v) Floor finish=1KN/m<sup>2</sup>.  
Use M20 concrete & Fe415 steel.
- Q.10 Design an isolated square footing to carry a load of 1100KN from column. The columns having 230mm×450mm. S.B.C of soil is 280KN/m<sup>2</sup>. Use M20 grade of concrete & Fe 415 grade of steel. Show the detail reinforcements. 15