

SUBJECT CODE NO:- P-233
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (CIVIL) Examination May/June 2017
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

- Q.1
- a) What are the different types of limit states, on which basis they are classified. 03
 - b) Why is it undesirable to design over reinforced sections 03
 - c) What is redistribution of moments? State & explain IS code provision for the same 04
- Q.2
- a) Explain on zoning in shear design 03
 - b) A.R.C. beam 250mm wide and 460mm deep is to be reinforced with 0.75% steel of grade Fe500 12
with an effective cover of 40mm. If concrete grade M20, what maximum percentage of redistribution of moments could be allowed and what is the ultimate moment of resistance of the section.
- Q.3
- a) Explain in detail the causes of cracking in R.C.C. structures. Explain the bar detailing rules in detail. 03
 - b) A R.C.C. beam of rectangular section 230mm x 400mm with an effective cover is 35 mm. Find the 12
maximum imposed uniformity distributed load carrying capacity of beam if it is simply supported over a span of 3.2m. Use M20 grade of concrete & Fe415 grade of steel.
- Q.4
- a) Give the detailed design procedure for doubly reinforced rectangular section. 05
 - b) A rectangular beam section of 230mm width and 460mm overall depth is reinforced on tension side 10
with 6 bars of 16mm diameter out of which 2 bars are bent at 45° at ¼. Determine the shear resistance of bent up bars and also additional shear reinforcement required if it is subjected to a shear force of 280 KN. Use M20 & Fe 415 grades
- Q.5
- a) Derive the various design parameters (constants) for M25 and Fe 500 grade of concrete & steel 05
respectively
 - b) An isolated T beam having a span of 7m, width of flange = 90mm, thickness of flange = 110mm, 10
width of web=250mm, effective depth (d) = 530mm $A_{st} = 3700 \text{ mm}^2$. Use M20 & Fe 415 grades.
Determine the moment of resistance of the section.

Section B

- Q.6
- a) Explain reinforcement detailing in earthquake resistance structure. 03
 - b) What is the main difference in terms of structural behavior between a short column & long column 03
 - c) Explain in detail the Pu-Mu interaction diagram 04
- Q.7
- a) Derive the equation for ultimate capacity of an axially loaded short column 05
 - b) A rectangular column of section 300mm x 500mm is reinforced with 8 bars of 25mm ϕ . Determine 10
the load carrying capacity of column taking minimum eccentricity less than 0.05 times lateral dimensions. Take Fe 415 & M 20 grades.

- Q.8 Design a rectangular slab supported on its all the four edges over a hall of 5m x 6m. The slab is discontinuous of four sides & Take a live load of 4 KN/M² & Floor finish is 1 KN/m². Use M20 & Fe415 grades. Show the reinforcement details. 15
- Q.9 a) Explain the importance of ductility in seismic design. Also write the name of IS code available related to the earthquake 03
b) Design a dog legged staircase of clear size 2m x 4m. The columns are of size 230mm x 380mm. Floor to floor height is 3m. Live load is 3.5 KN/m² & floor finish is 1 KN/m² use M20 and Fe 415 grades. 12
- Q.10 Design a rectangular footing of uniform thickness for an axially loaded column of 300 x 600mm loaded 1250 KN. Take a S.B.C. of soil is 200 KN/m². Use M20 grade of concrete and Fe 415 grade of steel. 15