University of Mumbai

Civil Engineering Examination

Sub:CEC702/ Theory of Reinforced Concrete Structures **Year/Sem:- BE/ VII Sem**

Max. Marks: 80 **Duration: - 2Hrs**

Q1. Attempt all the MCQS **(20 X 2 mark= 40 marks)**

1. An RCC beam can have maximum tension reinforcement as:
   a. 6 % bD
   b. 2 % bD
   c. 3 % bD
   d. 4 % bD
2. The maximum depth of neutral axis for a beam with Fe 415 bars in limit state method of design
   a. 0.46 d
   b. 0.48 d
   c. 0.50 d d
   d. 0.53 d
3. The partial factor of safety for concrete is
   a. 1.15
   b. 1.5
   c. 1.95
   d. 2.0
4. The characteristic strength of concrete in the actual structure is taken as
   a. $\boldsymbol{fck}$
   b. 0.85 $\boldsymbol{fck}$
   c. 0.67 $\boldsymbol{fck}$
   d. 0.447 $\boldsymbol{fc}$k
5. Factor of safety is the ratio of _____.
   a. Yield stress to working stress.
   b. Tensile stress to working stress.
   c. Compressive stress to working stress.
   d. Bearing stress to working stress
6. The minimum percentage of shear reinforcement in R.C.C beams is
   a. **0. 85/fy**
   b. **0. 4**
   c. 4
   d. 40Sv/ 0.87 fy d
7. Spacing of stirrups in a rectangular beam, is
   a. Kept constant throughout the length
   b. Decreased towards the center of the beam
   c. Increased at the ends
   d. Increased at the centre of the beam

8. The limit of percentage of longitudinal reinforcement in a column is given by
   a. 0.15 - 2%
   b. 0.8 - 4%
   c. 0.8 - 6%
   d. 0.8 – 8%
9. Usually the thickness of floor slabs for buildings is not less than
   a. 90 mm
   b. 110 mm
   c. 115 mm
   d. 120mm
10. The diameter of transverse reinforcement of columns should be equal to one fourth of the diameter of the main steel rods but not less than
   a. 4mm
   b. 5mm
   c. 6mm
   d. 7mm
11. In case of a T-beam, the position of neutral axis
   a. Always lies somewhere in the web area
   b. Always lies somewhere in the flange area
   c. Is always outside the cross-sectional area
   d. May be anywhere in the cross-section
12. A column is a structural member designed primarily to take
   a. Torsional load
   b. Tensile load
   c. Compressive load
   d. Shear
13. Load Carrying capacity of column is increased by …… percent when helical reinforcement is provided as a transverse reinforcement

   a. 5%

   b. 4%

   c. 6%

   d. 0.05%

14. Footing is that portion of a foundation which transfers the load to the.

   a. column

   b. Slab

   c. Beam

   d. Soil

15. A footing which supports two or more columns is termed as

   a. Combined footings

   b. Raft footing

   c. Strap footing

d. Continuous footing

16. The weight of footings is assumed as …….. of the weight transferred to the column.

a. 5%

b. 10%

c.15%

d. 20%

17. The depth of a square footing should not be less than .
a. 90 mm
b. 100 mm
c.150 mm
d. 120 mm

18. Area of footing is calculated as
a. Total load / SBC
b. Total load x SBC
c. Total load - SBC
d. total + SBC

19. In case of footing, minimum nominal cover should be

a. 50 mm

b. 25 mm

c.10 mm

d. 20 mm

20. Strap footing is provided in case of

a. Exterior columns

b. Interior column

c. For aesthetics purpose

d. Pile foundation

Q2. Attempt any TWO **(2 X 10 marks= 20 marks)**

1. Calculate ultimate moment of resistance for RCC section 230 mm x 550 mm. deep overall and reinforced with 3–16 dia. Grade of steel Fe415 & grade of concrete M20.Take effective cover 30 mm. Use LSM
2. Determine reinforcement required on tension & compression side. The effective span of beam is 4.5m. if superimposed load is 40 KN/m and size is limited to 300mmx500mm overall, d'=50mm, use M20& Fe415. Use WSM
3. A beam 250mm x 550mm effective is subjected to a factored BM of 230 KNm. Determine area of steel required. Use M20 & Fe500.Assme d'=50mm Use LSM.

Q3. Attempt any TWO **(02 X 10 marks= 20 marks)**

1. Design a slab to cover a room of internal size 4m× 5m and 23 cm thick brick wall around. Assuming a superimposed load of 3.5 kN/m^2 & floor finish of 1 kN/m^2 design the slab use M-20 grade of concrete & HYSD steel of grade Fe 415.Assum that slab corners are prevented from lifting. Draw neat sketch of reinforcement.

2. Design circular column of dia 400 mm subjected to a load of 1100 KN , the column is having spiral reinforcement. The column is 3 m long and is effectively held in position at both ends but not restrained against rotation. Use M25 & Fe 415.
3. Design the Shear reinforcement for the rectangular beam of size 300mm x 500mm effective provided with 4-20 mm dia. In tension zone . the beam is subjected to UDL of 45 KN/m. over the span of 7 m. use M20 & Fe 415.