

No. of Printed Pages : 4  
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180751/030751/753

**5th Sem / Branch : Civil Brick Tech, Constr, Mgmt.  
Civil Engg (Spl Highway Engg.)**  
**Sub.: Reinforced Cement Concrete Design & Drawings**

Time : 6Hrs.

M.M. : 150

**SECTION-A**

- Note:** Multiple choice questions. All questions are compulsory(10x1=10)
- Q.1 The spacing of stirrups, near the support, is (CO3)  
a) Maximum b) 350 mm  
c) 300 mm d) Minimum
- Q.2 This method is referred to as “Deterministic” (CO2)  
a) LSM b) WSM  
c) (a) and (b) Both d) None of these
- Q.3 Effective depth of a beam is the distance from topmost compressive fibre to (CO5)  
a) Centre of tensile reinforcement  
b) Bottom of tensile reinforcement  
c) Bottom of beam  
d) Neutral axis
- Q.4 Neutral axis always passes through flange of a T-beam. (CO7)  
a) True b) False
- Q.5 The beam is designed as doubly reinforced when (CO6)  
a)  $M_u < M_{u,lim}$  b)  $M_u = M_{u,lim}$   
c)  $M_u > M_{u,lim}$  d) None of these
- Q.6 Distribution steel is provided perpendicular to main steel in a slab. (CO8)  
a) True b) False
- Q.7 The thickness of a two way slab as compared to one way slab is (CO8)  
a) More b) Equal  
c) Less d) None of these

- Q.8 If the ratio of Long Span / Short Span = 2, then two way slabs are provided (CO9)  
a) True b) False
- Q.9 Minimum number of longitudinal bars for circular column are (CO10)  
a) 4 b) 8  
c) 6 d) 12
- Q.10 Pre-stressed concrete helps in avoiding (CO11)  
a) Diagonal tension b) Excessive deflection  
c) Crack formation d) All of these

**SECTION-B**

- Note:** Objective type questions. All questions are compulsory.(10x1=10)
- Q.11 Hooks of stirrups must be provided in \_\_\_\_\_ zone. (CO3)
- Q.12 Under reinforced sections fail in \_\_\_\_\_. (CO4)
- Q.13 Check for depth of beam indicates limit state of \_\_\_\_\_. (CO5)
- Q.14 In singly reinforced beams \_\_\_\_\_ Zone is below the neutral axis. (CO5)
- Q.15 The portion of the beam consisting of slab is called \_\_\_\_\_. (CO6)
- Q.16 The structural member which have very less thickness as compared to other dimension is called as \_\_\_\_\_. (CO8)
- Q.17 The minimum area of reinforcement in a slab \_\_\_\_\_ of cross-sectional area for Fe 415 steel. (CO8)
- Q.18 If the two way slab has tension reinforcement at the corner, it is called as \_\_\_\_\_. (CO9)
- Q.19 When the corners of the two way slab are not held down it is known as \_\_\_\_\_. (CO9)
- Q.20 The major loss of pre-stress is caused due to \_\_\_\_\_. (CO11)

**SECTION-C**

- Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)
- Q.21 Write any five disadvantages of RCC. (CO1)
- Q.22 Draw the stress-strain curve for HYSD Steel as per IS: 456-2000. (CO2)
- Q.23 Why stirrups hooks are provided in compression zone? (CO3)
- Q.24 Write down the assumptions made in limit state of collapse in flexure. (CO4)

(1) 180751/030751/753

(2) 180751/030751/753

- Q.25 Write short note on over reinforced sections. (CO4)
- Q.26 Write down the IS specification for providing the steel reinforcements in singly reinforced beams. (CO5)
- Q.27 Write down the conditions under which the doubly reinforced beams are provided. (CO6)
- Q.28 How does a doubly reinforced beam is checked for development length? (CO6)
- Q.29 Find the ultimate moment of resistance of a doubly reinforced beam section 350mmX500mm. compression steel reinforcement = 2Nos of 12mm diameter. Tensile steel reinforcement = 5 Nos. of 25 mm diameter. Effective cover = 40 mm. Use M 20 grade of concrete. Fe 415 grade of steel. (CO6)
- Q.30 What criterion is adopted to find out the width of flange in case of T-Beam? (CO7)
- Q.31 Why main reinforcement is provided along the shorter span in one way slab? (CO8)
- Q.32 Why special tensional reinforcement is provided at corners of a two way slab? (CO9)
- Q.33 A short column 400 mm x 400 mm is reinforced with 4 bars of 20 mm diameter. Find the ultimate load carrying capacity of the coloum if the minimum eccentricity is less than 0.05 times the lateral dimension. Use M20 concrete and fe-415b steel. (CO10)
- Q.34 What are the functions of the longitudinal reinforcement in columns? (CO10)
- Q.35 Write any five advantage of pre-stressed concrete. (CO11)

#### SECTION-D

- Note:** Long answer type questions. Attempt any two questions out of three questions. (2x10=20)
- Q.36 Design a simply supported rectangular beam having clear span = 4.3 superimposed load = 5.75k N/m, use M20 concrete and Fe - 415 steel. (CO5)
- Q.37 Design a simply supported RCC one way slab to carry a factored load of 15.75 kN/m<sup>2</sup> (including self weight) on an effective span of 3.2 m. Bearing on wall = 300 mm. Use M20 concrete and Fe- 415 steel. (CO8)
- Q.38 Write down the specification for the design of restrained slabs as per IS: 456. (CO9)

(3)

180751/030751/753

#### SECTION-E (RCC Drawing)

- Note:** Attempt any two questions out of three questions. (25x2=50)
- Q.39 Draw the sectional plan and sectional elevation (assume suitable scale) of a RCC beam with the following data:  
Size of beam = 300 mm X 500 mm  
Clear span = 6200 mm  
Bearing on walls = 230 mm  
Main reinforcement = 5 - 20 mm Ø  
Anchor bars = 3 - 12 mm Ø  
Shear stirrups = 8 mm Ø 2 legged @ 200 mm c/c  
Side face reinforcement = 1 - 10 mm Ø on each face.
- Q.40 Draw the sectional plan and sectional elevation (assume suitable scale) of a simply supported one-way slab with the following data:  
Size of room = 4.0 m X 8.0 m  
Thickness of slab = 150 mm  
Thickness of walls = 230 mm  
Bearing on walls = 230 mm  
Main reinforcement = 12 mm Ø bars @ 200 mm c/c with alternate bars bent up  
Distribution steel = 10mm Ø bars @ 250 mm c/c
- Q.41 Draw the sectional plan and sectional elevation (assume suitable scale) for a circular column with isolated footing of uniform thickness with the following data:  
Diameter of coloumn = 450 mm  
Size of footing = 1100 mm x 1100 mm  
Thickness of footing = 350 mm  
Depth below ground level = 900 mm  
Plinth level above ground level = 300 mm  
Height of ceiling above plinth level = 3100 mm
- Footing reinforcement:**  
Reinforcement both sides = 16 mm Ø 250 mm c/c
- Column reinforcement :**  
Main longitudinal bars in column = 8 - 20 mm Ø  
Lateral ties in column = 10 mm Ø @ 230 mm c/c

(4120)

(4)

180751/030751/753