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5th Sem / Civil Engineering
Subject:- Reinforced Cement Concrete Design and Drawing

Time : 6Hrs. M.M. : 150

SECTION-A

Note: Multiple choice questions. All questions are compulsory (10x1=10)

Q.1 Near the mid span of the beam, the cracks are (CO3)
a) at 45° b) at 60°
c) Horizontal d) Vertical

Q.2 This method is referred to as "Non-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 The portion forming the flange of the T-beam is slab (CO7)
a) True b) False

Q.5 When the loads are reversing, the beam is designed as (CO6)
a) Under-reinforced b) Over-reinforced
c) Singly reinforced d) Doubly reinforced

Q.6 The main steel is provided along the longer span in one way 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) Less
c) Equal d) None of these

Q.8 Two way slabs are provided, if the Long Span/ Short Span ratio is (CO9)

a) Equal to 2 b) Greater than 2
c) Less than 2 d) none of these

Q.9 Shape of column can be (CO10)
a) Rectangular b) Square
c) Circular d) All of these

Q.10 Post-tensioning method is best suited for production of (CO11)
a) Electric poles b) Railway sleepers
c) Bridges d) All of these

SECTION-B

Note: Objective type questions. All questions are compulsory. (10x1=10)

Q.11 Diagonal cracks are also known as_____ (CO3)
Q.12 Over reinforced sections fail in _____ (CO4)
Q.13 Unit weight of R.C.C =_____ (CO5)
Q.14 In singly reinforced beams _____Zone is below the neutral axis. (CO5)
Q.15 _____ beams are designed when the dimensions of the beam are restricted. (CO6)
Q.16 The minimum area of reinforcement in a slab is ____ of cross-section area of mild steel (CO8)
Q.17 Distribution steel is provided_____ to the main steel. (CO8)
Q.18 In a two way slab bending takes place in_____ direction. (CO9)
Q.19 When the corners of the two way slab are held down it is known as_____ (CO9)
Q.20 Pre-stressing. (CO11)

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

Q.21 Write any five advantages of RCC. (CO1)
Q.22 Draw the stress-strain curve for concrete as per IS: 456 - 2000. (CO2)
Q.23 Name the factors affecting the shear resistance for RCC members. (CO3)
Q.24 Write short note on under-reinforced sections. (CO4)
Q.25 Write down the assumptions made in limit state of collapse in

flexure. (CO4)

Q.26 Write down the IS specifications for providing the steel reinforcements in singly reinforced beams. (CO5)

Q.27 Find the ultimate moment of resistance of a doubly reinforced beam section 300 mm X 500 mm. Compression steel reinforcement = 2 Nos. of 12mm diameter, tensile steel reinforcement = 4 Nos. of 25 mm diameter. Effective cover =40 mm. Use M 20 grade of concrete, Fe 415 grade of steel. (CO6)

Q.28 Under which conditions the doubly reinforced beams are provided . (CO6)

Q.29 How does a doubly reinforced beam is checked for shear strength ? (CO6)

Q.30 What is the necessity of providing a T-Beam? (CO7)

Q.31 Why distribution reinforcement is necessary in one way slab? (CO8)

Q.32 Why special tensional reinforcement is provided at corners of a two way slab? (CO9)

Q.33 What are the functions of the longitudinal reinforcement in columns? (CO10)

Q.34 Find the ultimate load carrying capacity for a short column of size 450 mm X 450 mm. the column is reinforced with 4 bars of 25 mm diameter. Use M20 concrete and HYSD steel of grade Fe-415. Assume $e_{min.} < 0.05D$. (CO10)

Q.35 Write any five advantages 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 = 4.5m, superimposed load = 5.5kN/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 15.25 kN/m^2 (including self weight) on an effective span of 3m. Bearing on wall = 300mm. 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)

SECTION-E

Note: Attempt any two questions. (25x2=50)

Q.39 Draw the sectional plan and sectional elevation (assume suitable scale) of a RCC cantilever beam with the following data :

Size of beam = 350 mm X 500 mm (at fixed end)
=350 mm X 250 mm (at free end)
Clear span = 3.75 m
Wall thickness = 350 mm
Main reinforcement = 5 - 16 mm Ø bars (out of which two bars are curtailed)
Anchor bars = 3- 12 mm Ø
Shear stirrups = 8 mm Ø 2 legged @ 250 mm c/c

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 = 3.5 m X 7.0 m
Thickness of slab = 125 mm
Thickness of walls = 230 mm
Bearing on walls = 230 mm
Main reinforcement = 12 mm Ø bars @ 180 mm c/c with alternate bars bent up Distribution steel = 10 mm Ø bars @ 230 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 Column = 500 mm
Size of footing = 1200 mm X 1200 mm
thickness of footing = 400 mm
Depth below ground level = 900 mm
Plinth level above ground level = 300 mm
Height of ceiling above plinth level = 3300 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 @ 250 mm c/c