

and Fe-415 grade steel, if the size of the column is 300mm x 300 mm.

Assume $e_{min} < 0.05D$ (CO10)

- Q.32 Explain pre-tensioning method of pre-stressing. (CO11)
- Q.33 Write a short note on loss in pre-stress explain any 3 causes briefly (CO11)
- Q.34 Why tensile steel is provided at bottom of simply supported beam & top in cantilever beams? (CO5)
- Q.35 a) How will you classify slabs?
b) Why two way slabs are considered economical (CO9)

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

- Q.36 a) Explain types of beam section with help of strain diagrams (CO5, CO9)
b) Explain the theory & design of two way slab when the corners not held down.
- Q.37 Design a simply supported rectangular beam with the following data clear span = 4.2 m & superimposed load = 6kN/m. Use M20 concrete & Fe-415 steel (CO6)
- Q.38 Design a simply supported slab to cover a room with the following details (CO8)
Size of room = 4m x 8m
Bearing on walls = 230 mm
Live load = 4000 N/m²
Load surface finishing = 1000N/m²
Clear cover & end cover = 20 mm
Grade of concrete = M20
Grade of steel = Fe-415
(**Note:** Course outcome/CO is for office use only)

No. of Printed Pages : 4
Roll No.

170745/120745

4th Sem / Civil, Constr. Mgmt., Highway Engg. Subject:- Reinforced Concrete Design

Time : 3Hrs.

M.M. : 100

SECTION-A

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

- Q.1 Minimum grade of concrete to be used in R.C.C works should not be less than (CO1)
a) M10 b) M20
c) M15 d) M25
- Q.2 In W.S.M factor of safety for concrete is (CO2)
a) 1.0 b) 3.0
c) 2.0 d) 4.0
- Q.3 Design values for material f_d are expressed as (CO3)
a) $f_d = f \times g_m$ b) $f_d = g_m / f$
c) $f = f_d \times g_m$ d) $f_d = f / g_m$
- Q.4 Shear reinforcement in beams may be provided as (CO4)
a) vertical stirrups
b) bent up bar
c) combination of vertical stirrups & bent up bar
d) all of these
- Q.5 Design compressive stress is taken as (CO5)
a) $0.25 f_{ck}$ b) $0.45 f_{ck}$
c) $0.35 f_{ck}$ d) $0.55 f_{ck}$
- Q.6 Maximum value for I/D ratio for cantilever beam is (CO6)
a) 5 b) 10

- c) 7 d) 20
Q.7 In a slab floor system, the end beams are called (CO7)
a) T-beams b) L-beams
c) Flat-beams d) None of these
- Q8 Shape of slab is (Co8)
a) square b) circular
c) rectangular d) all of these
- Q.9 In two way slabs with corners held down, the torsion steel is provided at (CO9)
a) top b) middle
c) Bottom d) both a & b
- Q.10 Minimum number of longitudinal bars required for circular column are (CO10)
a) 4 b) 8
c) 6 d) 12

SECTION-B

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

- Q.11 What are the different types of limit states? (CO2)
- Q.12 On which factor the location of neutral axis (N.A.) depends? (CO3)
- Q.13 Stirrups and bent up bars are provided in beams as shear reinforcement (True/False) (CO4)
- Q.14 What is the formula to calculate depth of neutral axis? (CO5)
- Q.15 In singly reinforced beam, main steel reinforcement is provided in _____ zone (CO6)
- Q.16 Neutral axis always passes through flange of a T-beam (True/False) (CO7)
- Q.17 Why slabs are generally safe in shear? (CO8)
- Q.18 When the length of slab is _____ than twice its width it is known as two way slab. (CO9)

- Q.19 What is the purpose of designing column? (CO10)
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 Give advantages & disadvantages of R.C.C (CO1)
- Q.22 Explain stress-strain curve for concrete (CO2)
- Q.23 Explain (CO3)
 - a) lever arm
 - b) neutral axis how are they calculated ?
- Q.24 An RCC beam has an effective depth of 700 mm & a width of 300 mm. It contains 6 bars of 25mm dia. Use M25 concrete & Fe-415 steel. Check whether shear reinforcement is required for a shear force of 250 KN. (CO4)
- Q.25 A singly reinforced beam of 250mm x 450mm (overall) is reinforced with steel bars of area 1300 mm^2 . Use M20 grade of concrete & Fe-415 steel. Calculate the ultimate moment of resistance of the beam section. (CO5)
- Q.26 What are doubly reinforced beams? Why they are required? (CO6)
- Q.27 What are T-beams? Explain its effective width of the flange and draw its detailed section. (CO7)
- Q.28 Why distribution steel is provided in one way slab but not in two way slabs? (CO8)
- Q.29 What are two way slabs? Draw its plan and section explaining types of reinforcement used in it (CO9)
- Q.30 Explain the types of reinforcement used in columns (CO10)
- Q.31 A short concrete column is reinforced with 4 bars of 20 mm diameter. Determine the ultimate load carrying capacity of the column. Using M20 grade of concrete