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

Time : 3Hrs.   M.M. : 100

SECTION-A

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

Q.1 _____ is the axis which stresses are 0 in the section of the beam.
a) Compression Axis   b) Neutral Axis
c) Tensile Axis   d) Longitudinal Axis

Q.2 The minimum length of bar which must be embedded in concrete to develop its full strength is called_____
a) Bond Length
b) Flexural Length
c) Development Length
d) Anchorage Length

Q.3 Maximum stress at extreme fibre of reinforced beam above neutral axis is_____
a) 0.87fy   b) 0.67fy
c) 0.45fy   d) None of these

Q.4 In a slab floor system, the end beams are called
a) T-Beams   b) L-Beams
c) Flat-Beams   d) None of these

Q.5 Short column fail by
a) Buckling   b) Crushing
c) Twisting   d) Bending

Q.6 The minimum percentage of longitudinal steel in a column is
a) 0.6   b) 0.8
c) 1.0   d) 1.2

Q.7 When value of Xu <Xu (max) then the section is known as
a) Balanced section
b) Under-reinforced section
c) Over-reinforced section
d) None of these

Q.8 Shear reinforcement in beams may be provided as
a) Vertical Stirrups
b) Bent up bar
c) Combination of vertical stirrups and bent up bar
d) All of these

Q.9 Total tensile force (T) in a beam is equal to
a) $f_y A_{st}$ b) $0.50f_y A_{st}$
c) $0.45f_y A_{st}$ d) $0.87f_y A_{st}$

Q.10 The ratio of Ly/Lx ratio for a two way slab is
a) ≥ 2 b) <2
c) $=2$ d) $=1$

SECTION-B

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

Q.11 Strain at neutral axis is maximum (True/False)

Q.12 Unit weight of RCC is..................

Q.13 LSM & WSM Stands for...................

Q.14 If TV > TC, then shear reinforcement is................

Q.15 Diagonal cracks are also known as..................

Q.16 Define balanced section

Q.17 B.M. in case of cantilever beam is.......... at free end.

Q.18 Define inverted T-beams

Q.19 Which two stresses are taken by distribution steel?

Q.20 Name the types of steel reinforcement in columns.

SECTION-C

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

Q.21 Give comparison between W.S.M & L.S.M

Q.22 What are the assumption & made in the theory of simple bending for R.C.C beam?

Q.23 An R.C.C beam 350mm x 600mm effective has factored shear force of 350KN.

The beam is reinforced with 1.5% steel on tension side. Comment whether shear reinforcement is required if concrete used is of M20 grade.

Q.24 Explain the terms bond, development length & Name the factors affecting shear resistance for RCC Members.

Q.25 Why tensile steel is provided at bottom of simply supported beam & top in cantilever beams?

Q.26 Explain the different types of reinforcement provided in beams and give their specification.

Q.27 Under what conditions doubly reinforced beams are provided.

Q.28 Draw a labeled diagram to explain the various components of T-beam.

Q.29 Give comparison between two way & one way slab.

Q.30 Define
a) Restrained slabs   b) Main steel
c) Composite column

Q.31 A short column 400mm x 400mm is reinforced with 4 bars of 20 mm diameter, Find the ultimate load carrying capacity of column if the minimum eccentricity is less than 0.05 times the lateral dimension . Use M20 concrete and Fe-415 steel.

Q.32 Write a short note on a) footings b) columns

Q.33 What are the functions of longitudinal & transverse reinforcement?

Q.34 Differentiate between pre-tensioning & post - tensioning method.

Q.35 Write a short note on loss in pre-stress due to friction & Shrinkage of concrete

SECTION-D

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

Q.36 Determine the area of tensile reinforcement required for singly reinforced simply supported beam of size 300mm x 600mm (effective) to resist a factored bending moment of 220 KN M. Use M20 concrete & Fe-500 grade of steel.

Q.37 Draw the sketches of one way & two ways slabs showing their reinforcement details (plan & section) Also explain type of reinforcement in both and IS 456-200 specification for design of slabs

Q.38 An R.C.C beam 200mm x 500mm (effective) is subjected to a factored moment of 200 kN-m. Find the area of steel reinforcement required. If M20 grade of concrete and Fe 415 steel are used. Assume d'=50mm