4th Sem. / Civil Engg.

Subject : R.C.C. Design

Time : 3 Hrs.   M.M. : 100

(i) Use of IS-456:2000 is permitted.
(ii) Use of calculator is permitted.

SECTION-A

Note: Very Short Answer type questions. Attempt any 15 parts.   (15x2=30)

Q.1 a) Define reinforcing materials

b) Define nominal diameter of bars.

c) Define singly reinforced beams.

d) Define lever arm.

e) Define moment of resistance.

f) Define nominal shear stress.

g) Define bond.

h) Define development length

i) Define effective span of a beam.

j) Define characteristic strength.

k) Define T-beam.

l) Define one way slabs.

m) Define two way slabs.

n) Define a column.

o) Define effective length of a column.

p) Define prestressed concrete.

q) What do you mean by M-25.

r) Define R.C.C.

SECTION-B

Note: Short answer type questions. Attempt any ten parts   10x4=40

Q.2 i) Write the advantages of R.C.C.

ii) Write the characteristics of a reinforcing material.

iii) Why HYSD bars do not require hooks at the ends for anchorage?

iv) Write the assumptions in the theory of simple bending.

v) Explain the method of finding actual depth of neutral axis in R.C.C. beams.

vi) Write any four differences between under-reinforced and over-reinforced beams.

vii) On which factors shear strength of concrete depends.

viii) An R.C.C beam 300x600mm (effective) is reinforced with 6-25 mm tensile steel bars. It is subjected to a shear force of 150kN. Find the nominal shear stress.

ix) Write the code requirement regarding spacing of reinforcement.

x) Define doubly reinforced beams. Write the conditions under which doubly reinforced beams are used.

xi) What distribution reinforcement is provided in one way slabs?

xii) Write the code specifications regarding minimum reinforcement in slabs.

xiii) Differentiate between short column and long column.

xiv) Write the functions of longitudinal reinforcement in a column.

xv) List the advantages and disadvantages of prestressed concrete.

SECTION-C

Note: Long answer type questions. Attempt any three questions.   3x10=30

Q.3 Explain the method of finding the moment of resistance of a R.C.C. beam.

Q.4 An R.C.C. beam 300mmx600 (effective) is reinforced with 4 bars of 25mm diameter. The beam is subjected to a bending moment of 120 kNm. Find the stresses developed in steel and concrete. Take m = 13.33

Q.5 Determine the ultimate moment of resistance of a 160mm thick slab reinforced with 10mm bars @200mm c/c. The effective cover is 30mm. Use M20 grade concrete and Fe 415 steel.

Q.6 An R.C.C. column of dimensions 250mmx400mm is to be designed to support an ultimate axial load of 1250kN. Design suitable reinforcement for the column using M 20 grade concrete and Fe 415 steel. Assume this column as short column.

Q.7 Explain under reinforced and over-reinforced beams in detail.