



Roll No:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

BTECH
(SEM VI) THEORY EXAMINATION 2023-24
DESIGN OF CONCRETE STRUCTURES

TIME: 3 HRS**M.MARKS: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A**1. Attempt all questions in brief.**

Q no.	Question	Marks	CO
a.	Define working stress method.	2	1
b.	Differentiate between load factor method and ultimate load method.	2	1
c.	Write the limit state concept.	2	2
d.	Draw the crack pattern in simply supported beam.	2	2
e.	Write the functions of distribution steel.	2	3
f.	Give the name of slab which corners are not prevented from lifting.	2	3
g.	Define pedestal.	2	4
h.	What do you mean by eccentrically loaded columns.	2	4
i.	Where raft foundations are provided?	2	5
j.	Draw the neat sketch of L-shape cantilever retaining wall.	2	5

SECTION B**2. Attempt any three of the following:**

a.	A doubly reinforced beam of width 350 mm is subjected a uniformly distributed load of 15 kN/m over an effective span of 8 m. Determine the depth required for the beam and also calculate the area of tensile steel reinforcement required. Use M20 concrete and Fe415 steel by W.S.M.	10	1
b.	Write the procedure for design of shear reinforcement by given data (a) Loads (b) Span of beam (iii) Grades of concrete and steel (iv) Area of tensile steel,	10	2
c.	Design a cantilever slab for an overhang of 1.20 m. The imposed load on slab consists of 1 kN/m ² of live load and weight of finishing is 800 N/m ² . Use M20 and Fe415 steel. With all necessary check. Also draw the reinforcement detail.	10	3
d.	Design a circular column of diameter 400 mm subjected to a load of 1200 kN. The column is having spiral ties. The column is 3 m long and is effectively held in position at both ends but not restrained against rotation. Use M25 concrete and Fe415 steel.	10	4
e.	Define strip footing. Write the design steps for strip footing for brick masonry and concrete wall.	10	5

SECTION C**3. Attempt any one part of the following:**

a.	A rectangular beam is 20 cm wide and 400 mm deep up to the Centre of reinforcement. Find the area of reinforcement required if it has to resist a moment of 25 kN-m. Use M20 and Fe415 steel by L.S.M.	10	1
b.	Write the design procedure for Doubly reinforced beam with all necessary checks given in IS 456 2000 by Limit State method.	10	1



Roll No:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

BTECH
(SEM VI) THEORY EXAMINATION 2023-24
DESIGN OF CONCRETE STRUCTURES

TIME: 3 HRS

M.MARKS: 100

4. Attempt any one part of the following:

a.	A simply supported RCC beam 250 mm wide and 45 cm deep (effective) is reinforced with a 4-18 mm dia. Bars. Design the shear reinforcement if M20 and Fe415 steel is used and beam is subjected to a shear force of 150 kN at service state.	10	2
b.	An R.C.C. beam 250 mm x 500 mm has a clear span of 5.5 m. The beam has 2-20 mm dia bars going into the support. Factored shear force is 140 kN, check for development length if Fe415 steel and M20 grade of concrete is used.	10	2

5. Attempt any one part of the following:

a.	Write the proportioning of stair case for their thumb rule. And find the live loads and dead loads on the stair case.	10	3
b.	A simply supported slab of a corridor of a building has a clear span 2.5 m and is supported on beams 230 mm width, Design the slab, if the beam is carrying a live load of 5 kN/m ² . Use M20 concrete and Fe415 steel.	10	3

6. Attempt any one part of the following:

a.	Design a column of size 450mm x 600 mm and having 3 m unsupported length. The column is subjected to a load of 2000 kN and is effectively held in position but not restrained against rotation. Use M20 and Fe415 steel.	10	4
b.	Design a short RCC column to carry an axial load of 1600 kN, it is 4 m long, effectively held in position and restrained at both ends. Use M20 concrete and Fe415 steel.	10	4

7. Attempt any one part of the following:

a.	A combined footing for two columns 500 mm X 500 mm each, 5 m apart carrying a load of 1600 kN. Available width restriction is 2.4m. The safe bearing capacity is 200 kN/m ² . Use M25 concrete and Fe415 steel. Determine the depth check following conditions (i) B.M. considerations (ii) One way shear considerations (iii) Punching shear considerations	10	5
b.	Draw the deflected shape of various components of retaining wall under loading and explain (i) Stem (ii) Heel Slab (iii) Toe slab	10	5