PAPER ID-420860

Subject Code: KCE601

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VI) THEORY EXAMINATION 2021-22
DESIGN OF CONCRETE STRUCTURES

Time: 3 Hours ***Total Marks: 100***

Notes:

- *Attempt all Sections and Assume any missing data.*
- *Appropriate marks are allotted to each question, answer accordingly.* **IS 456:2000 ALLOWED**

SECTION-A	Attempt **All** of the following Questions in brief	Marks **(10X2=20)**	
Q1(a)	What are the disadvantages of R.C.C. structures?		1
Q1(b)	Write the data required for Design mix concrete.		1
Q1(c)	Draw crack pattern in simply supported beams.		2
Q1(d)	Where bond stress developed in a steel bar and concrete?		2
Q1(e)	Draw the neat sketch of reinforcement in one way slab.		3
Q1(f)	Define landing and riser.		3
Q1(g)	With neat sketch define axially loaded column.		4
Q1(h)	Why all columns shall be designed for minimum eccentricity?		4
Q1(i)	Write the purpose of foundation in a structure?		5
Q1(j)	Which cases retaining walls constructed?		5

SECTION-B	Attempt **ANY THREE** of the following Questions	Marks **(3X10=30)**	
Q2(a)	Find the moment of resistance of a R.C.C. beam 300 mm wide and 500 mmm effective depth is required is reinforced with 3 bars of 16 mm . Use M20 concrete and Fe415 steel. By Working stress method.		1
Q2(b)	An R.C.C .beam 200 mm x 400 mm effective carries a uniformly distribute load of 70 kN/m over a clear span of 6m. The beam is reinforced with 1% steel on tension side comment on the shear design of the beam. Using m20 concrete and load factor =1.5		2
Q2(c)	Write the design steps of one way slab.		3
Q2(d)	Classify the columns for material of construction. Why R.C.C. column are used instead of plain cement concert?		4
Q2(e)	A brick masonry wall 230 mm thick carries a load of 370 kN/m incusive of its own weight . Design the footing of the wall , take bearing capacity of soil as 150 kN/m^2 at 1 m depth. Use M20 concrete. For strip footing.		5

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X10=10)**	
Q3(a)	A simply supported R.C.C. beam 250 mm wide and 450 mm deep (effective) is reinforced with 4-18 mm diameter bars. Design shear reinforcement if M20 grade of concrete and Fe415 steel is used and beam is subjected to a shear force of 150 kN at service load.		1
Q3(b)	Write the design steps of simply supported beam . check all codal reqirements.		1

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X10=10)**	
Q4(a)	Write the design procedure of RCC beam subjected to equivalent shear force and equivalent bending moment.		2
Q4(b)	An RCC beam 250 mm x 500 mm has a clear span of 5.5 m . The beam has 2-20 mm dia bars going on supports , Factored shear force is 140 kN. Check for development length if Fe415 and M20 grade of concrete is used. Take effective cover 30 mm.		2

PAPER ID-420860

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VI) THEORY EXAMINATION 2021-22
DESIGN OF CONCRETE STRUCTURES

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X10=10)**	
Q5(a)	Design a simply supported roof slab for a room 7.5 m x 3.5 m clear in size . The slab is carrying an imposed load of 5 kN/m^2 . Use M20 Concrete and Fe415 steel. And also check for deflection..		3
Q5(b)	Calculate the long term deflection of a simply supported beam 300 mm x 600 mm spanning over 5 m . It is reinforced with 4 bars of 20 mm diameter on tensile side. It is subjected to an imposed service load of 20 kN/m including its self . The effective cover to tension steel is mm. Use M 20 and Fe415 . I_{eff} = 3.6187 X 10^9 mm^4 , Δe =2.011mm.		3

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X10=10)**	
Q6(a)	Design a short RCC column to carry an axial load of 160 kN. It is 4 m long , effectively held in position and restrained against rotation at both ends. Use M20 concrete and Fe415 steel. Show the reinforcement detail.		4
Q6(b)	Find the uniform depth of rectangular footing of uniform thickness for an axially loaded column of size 300 mm x 600 mm load on column is 1150 kN. Safe bearing capacity of the soil is 200 kiN/m^2 . Use M20 concrete and Fe415 steel. (i) By one way shear criteria (ii) By B.M. criteria.		5

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X10=10)**	
Q7(a)	With neat sketch explain the deflected shape of a cantilever retaining wall under loading for Stem, Heel slab, Toe slab.		5
Q7(b)	Check for stability condition of cantilever retaining wall to retain horizontal earthen embankment of height 4 m above the ground level . The earthen backfill is having a density of 18 Kn/m^3 and angle of repose is 30^0. The safe bearing capacity of soil is 180 kN/m^2. The coefficient of friction between soil and concrete is 0.45. Use M20 and Fe415.		5