Printed Pages: 4 **NCE-505**

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2012210 Roll No. | | | | | | | | | | |

B.TECH

Regular Theory Examination (Odd Sem - V), 2016 - 17

DESIGN OF CONCRETE STRUCTURE - 1

Time : 3 Hours *Max. Marks : 100*

SECTION - A

1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (10×2=20)

a) What is pedestal and where does it use?

b) Write the measures to control the deflection in slab.

c) Define admixture? List different types of admixtures.

d) Write situations in which one - way behavior can be assumed of a slab Supported on four sides.

e) State water-cement law and how does it influence the strength of concrete?

f) How is it determine whether a beam of a given dimensions is to be designed as doubly reinforced?

g) What is meant by shear lag in T-beams?

h) How does the shear span influence the mode of shear failure?

i) How are slabs classified? List the various classifications.

j) What is the role of minimum Eccentricity in the design of column?

SECTION - B

2. Attempt any FIVE questions from this section. (5×10=50)

a) A rectangular beam section is 20 cm wide and 35cm deep upto the centre of reinforcement. Determine the reinforcement required at the bottom if it has to resist a factored moment of

i) 5kNm

ii) 40 kNm.Use M25 mix concrete and TOR steel.

b) i) Discuss the salient features of working stress method and ultimate load method.

ii) Discuss the need and salient features of performance based design.

c) Design a doubly reinforced section for a rectangular beam at midspan having a simply supported effective span of 4m. The superimposed load is

40kN/m and section of beam is limited to 25 cm x 40cm overall. Assume suitable data.

d) Design a singly reinforced concrete beam of width 300mm, subjected to an ultimate moment of 250kNm. Assume f_{ck} =25MPa and f_y =415MPa.

e) Determine the ultimate moment of resistance of a doubly reinforced beam section with the following data : b=350mm, d=550mm, d' = 60mm, A_{st} = 5-32mm. ϕ bars, A_{sc} = 3-25 mm ϕ bars, f_y = 415MPa and f_{ck} = 25 MPa.

f) A rectangular beam of size 250mm width and 500mm effective depth is reinforced with four bars of 25 mm diameter. Determine the required vertical shear reinforcement to resist factored shear force of

i) 80kN

ii) 300kN and

iii) 600kN. consider concrete of grade M20 and steel of grade Fe415.

g) A hall in a building has a floor consisting of continuous slab cast monolithically with simply supported 230 mm wide beams spaced at 3.5m c/c. The clear span of the beam is 6m. Assuming the live load on slab as 3.0kN/m² and partition plus load due to finishes as 1.5kN/m², design the slab with M25 grade concrete and Fe415 steel.

h) A hall measures 10 m × 6 m inside and has walls 400 mm thick. Design a suitable reinforced concrete T beam roof to carry a superimposed load of 2 kN/m². Use M20 grade concrete and Fe415 grade steel.

SECTION - C

Note: Attempt any two questions from this section. **(2×15=30)**

3. A column height of 1.5m is pinned at the bottom effectively restrained against rotation but not held in position at the top. It is subjected to a factored axial load of 2500kN under the combination of dead load and live load. Design the column, using M30 concrete and Fe 415 steel.

4. a) A rectangular cantilever beam of span 3.5m is 30cm ×50cm. Bending moment at the fixed end due to uniformly distributed service loads is 100 kN/m out of which 40% moment is due to permanent loads. Check the beam for deflection. Assume M25 concrete.

   b) Describe P_u - M_u interaction diagram used in the analysis of eccentric column.

5. Design a continuous two - way slab system shown in fig. It is subjected to an imposed load of 3kN/m² and surface finish of 1kN/m². Consider M25 concrete, grade Fe415 steel, and moderate environment. Assume that the supporting beams are 230×500mm.