QP CODE: 25800414

25800414

Reg No : .....

Name : .....

B.ARCH DEGREE (REGULAR/SUPPLEMENTARY)EXAMINATIONS, JANUARY 2025

Third Semester

BACHELOR OF ARCHITECTURE

19AR03005 - THEORY OF STRUCTURES - III

2019 Admission Onwards

E694BBBB

Time: 3 Hours Max. Marks : 100

Part A

Answer any six questions out of Eight.

Each question carries 5 marks.

1. What are the two major conditions that is required to satisfy the Structural Design?
2. Write down the relationship between the elastic constants.
3. Explain the concept of temperature stresses.
4. Difference between uniformly distributed load and uniformly varying load.
5. Sketch the variation of shear stress across the depth of a beam of a 'L' section.
6. Difference between strut and columns.
7. Explain Double integration method with an example.
8. Are shear centres unique? Explain with figures. How is shear centre of a section is calculated?

(6×5=30)

Part B

Answer any four questions out of six.

Each question carries 10 marks.

9. List out different types of stress coming over a structural member. Explain any two stress with real life structure examples.
10. A beam of span 4 metres which is simply supported at, A and B. The point load 20 kN acts at beam at a point 1 m from point A and a udl 5 kN/m acts at beam from 2m to 4m from point A. Calculate the reactions R_A and R_B.

11. A clockwise moment of 'M' kNm is acting at the free end of a cantilever beam of span 'L' metre. Draw the shear force and bending moment diagram.

12. Give two examples each of statically indeterminate and kinematically indeterminate structures. Calculate the degree of indeterminancy in each cases.

13. An overhanging beam ABC 6 m long is supported at A and B such that AB = 4 m.It is loaded with a point load of 10 kN at the end C. If E= $200x10^6$ kN/m^2 and I= $12x10^{-6}$ m^4, determine:
    (i) Deflection at point C.
    (ii) Maximum deflection between A and B.

14. A soild shaft is to transmit a torque of 80 kNm. If the sheraing stress is not to exceed 45 MN/m^2, find the maximum diameter of the shaft.

(4×10=40)

Part C

Answer any two questions out of Four.

Each question carries 15 marks.

15. A reinforced concrete column of size 300 mm × 500 mm has 8 steel bars of 16 mm diameter. If the column is subjected to an axial compressive force of 800 kN, find the stresses developed in steel and concrete. Take Ea/Es = 18.

16. Design a timber beam to carry a uniformly distributed load of 5 kN/m over a simply supported span of 6 m. If the depth of the beam section is twice the width and the permissible stress in timber is not to exceed 10 N/mm^2 .

17. Determine the ratio of strength of a solid steel column to that of a hollow column of internal diameter equal to 3/4 of its external diameter. Both the columns have the same cross sectional areas, length and end conditions.

18. A girder of uniform section and constant depth is freely supported over a span of 3 metres. If the point load at the midspan is 30 kN and I_{XX} = 15.614 x 10^6 mm^4. Derive the general expression for slope and deflection and calculate the central deflection and the slopes at the ends of the beam.Take E = 200 x 10^3 N/mm^2.

(2×15=30)