Reg. No. ..... (2 pages) **K 6179**

Name .....

COMBINED FIRST AND SECOND SEMESTER B.Arch. DEGREE EXAMINATION, MAY / JUNE 2005

Paper—STRUCTURAL MECHANICS

(2003 Scheme)

Time : Three Hours Maximum : 100 Marks

Answer all questions in part A. Each question carry 2.5 marks.

Answer one question from each module in part B. Each question carry 15 marks.

Part A

1. Define force and distinguish clearly between resolution of forces and composition of forces.
2. State and explain polygon law of forces.
3. Define friction, coefficient of friction, angle of friction and limiting friction.
4. Define principal axis and principal moment of inertia.
5. Describe the method of finding out the moment of inertia of a composite section.
6. Define modulus of rigidity as elastic constant.
7. Discuss the concept of strain energy.
8. Define beam. Discuss different support conditions of beams.
9. Define and distinguish between bending moment and shear force in a beam.
10. Define factor of safety in structural design.

(10 × 2.5 = 25 marks)

Part B

MODULE 1

11. The following forces acts at a point 0. 20N inclined at 30° towards north of east, 25N towards north, 30N towards north-west and 35N inclined at 40° towards south of west. Find the magnitude and direction of the resultant force.
12. A body of weight 400N is lying on a rough plane inclined at an angle of 25° to the horizontal. It is supported by an effort 'P' parallel to the plane. Determine the minimum and maximum values of P for which the equilibrium can exist if the angle of friction is 20°.

(1 × 15 = 15 marks)

MODULE 2

13. A cantilever truss is loaded as shown in figure 1. Fine out the value of W which would produce the force fo magnitude 15KN in the member AB.

Turn over

14. Find the moment of inertia about the centroidal XX and YY axis of an inverted L section shown in figure 2.

(1 × 15 = 15 marks)

MODULE 3

15. A steel short column, hexagonal section of sides 200mm carries an axial load of 30KN. Calculate the compressive stress and strain on the column if the young's modulus of elasticity of the material is 21×10^5 N/mm^2.

16. For the cantilever beam loaded shown in Figure 4, calculate te shear stress and strain in the material at the support. Given that the cantilever section is 25mm × 18mm and the modulus of rigidity 0.8×10^5 N/mm^2.

(1 × 15 = 15 marks)

MODULE 4

17. For the simply supported beam loaded as shown in figure 3, draw the bending moment and shear force diagram and mark the salient points.

18. For the cantilever beam loaded shown in figure 4, draw the bending moment and shear force diagram and mark the salient points.

(1 × 15 = 15 marks)

MODULE 5

19. With the help of neat sketches, explain different parts of an overhead water tank and explain their functions.

20. Discuss various loads that can come on a retaining wall and name and explain the relevant I.S. codes.

(1 × 15 = 15 marks)