

CBCS SCHEME

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18ENG15

First Semester B.Arch. Degree Examination, Jan./Feb. 2021 Building Structures - I

Time: 3 hrs.

Max. Marks: 100

**Note: i) Answer any FIVE full questions, choosing ONE full question from each module.
ii) Follow written dimensions do not scale the drawings.**

Module-1

- 1 a. What is concrete? Explain the properties of concrete in plastic state and Hardened state. (10 Marks)
- b. List the differences between Static Load and Dynamic Load. (06 Marks)
- c. Calculate the self weight of Reinforced Concrete Beam of c/s dimension 200mm×400mm and length 4m. Take density of RCC as 25 KN/m³. (04 Marks)

OR

- 2 a. Write important properties and uses of the following building materials :
i) Steel ii) Wood iii) Glass (12 Marks)
- b. Explain the advantages of steel and concrete as building material. (08 Marks)

Module-2

- 3 a. Explain Force and characteristics of Force. (04 Marks)
- b. Differentiate between
i) Rigid body and Deformable body.
ii) Resolution of force and composition of forces. (06 Marks)
- c. Determine the magnitude and direction of the resultant force, for the force system shown below in Fig. Q3(c).

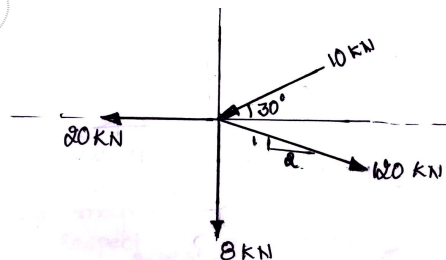


Fig. Q3(c)

(10 Marks)

OR

- 4 a. Explain parallelogram Law of forces. (05 Marks)
- b. 'P' and 'Q' are two forces acting @ a point as shown below in Fig.Q4(b), knowing that the magnitude of the resultant force is 80KN and acting horizontally along X-axis. The force 'Q' is of magnitude 20KN as shown below. Determine the magnitude and direction of the force 'P'.

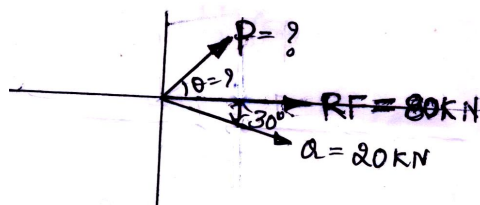


Fig.Q4(b)

(08 Marks)

- c. Draw the Free Body Diagram for the sphere of weight 100N placed inside a groove as shown below in Fig.Q4(c). Determine the reaction from wall 'A' and wall 'B'

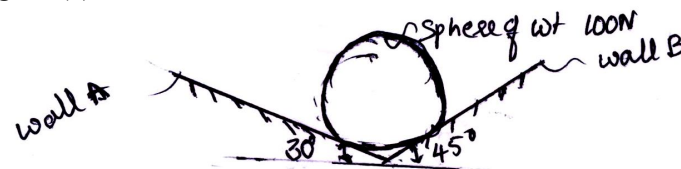


Fig.Q4(c)

(07 Marks)

Module-3

- 5 a. State Varignon's theorem. Explain its use. (04 Marks)
 b. Find the algebraic sum of moments of all the forces about point 'O' for the force system shown below in Fig. Q5(b).

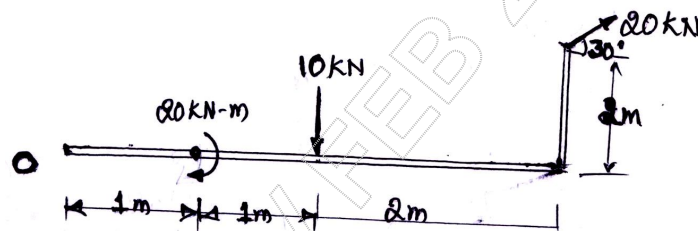


Fig. Q5(b)

(06 Marks)

- c. Find the magnitude, direction and position of the resultant force with respect to 'A', for the force system shown below in Fig. Q5(c).

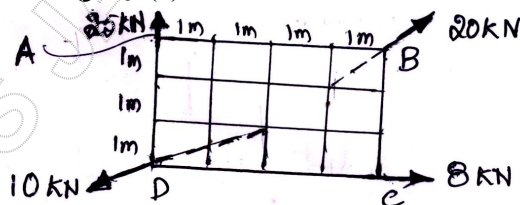


Fig. Q5(c)

(10 Marks)

OR

- 6 a. Explain different types of supports for beams with neat sketches. (05 Marks)
 b. For the cantilever Beam shown in below Fig. Q6(b), determine the support reactions @ A subjected to udl of 10 kN/m throughout and a point load of 15 kN as shown.

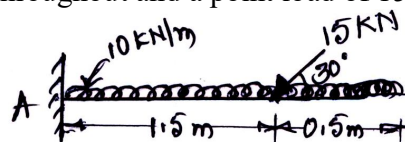


Fig. Q6(b)

(07 Marks)

- c. Determine the support reactions @ A and B for the beam shown below in Fig. Q6(c).

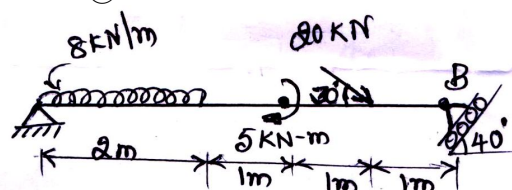


Fig. Q6(c)

(08 Marks)

Module-4

- 7 a. Locate the centroid for the composite section shown in below Fig. Q7(a).

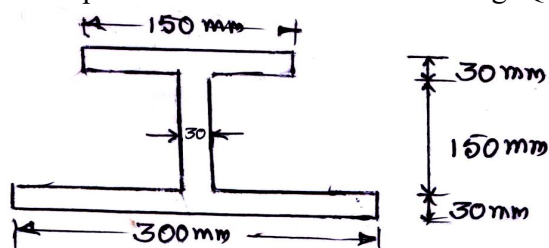


Fig. Q7(a)

(08 Marks)

- b. Locate the centroid for the shaded area shown in below Fig Q7(b).

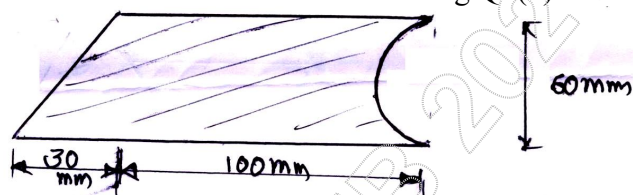


Fig Q7(b)

(12 Marks)

OR

- 8 a. State parallel axis theorem. (05 Marks)
b. Determine least Radius of gyration for the T-section shown below in Fig. Q8(b).

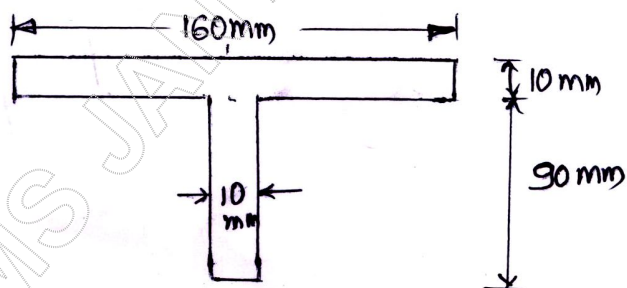


Fig. Q8(b)

(15 Marks)

Module-5

- 9 a. With neat sketch explain
i) Perfect frame ii) Deficient frame iii) Redundant frame. (09 Marks)
b. Determine the forces in the members for the truss shown in below Fig. Q9(b) by method of joint.

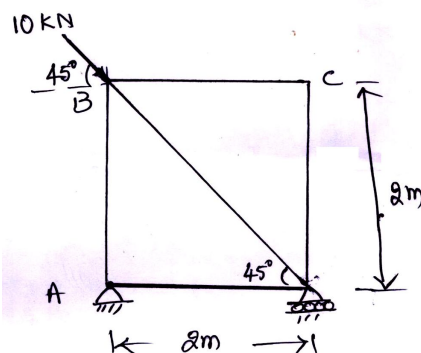


Fig. Q9(b)

(11 Marks)

OR

- 10 Determine the force in each member by method of joints, mention the nature of force in each for the truss shown below in Fig. Q10.

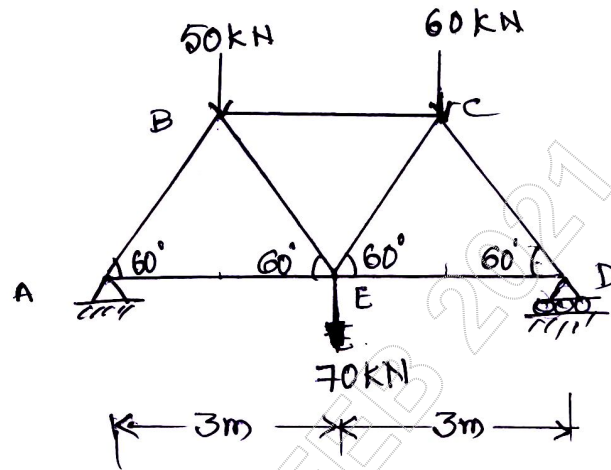


Fig. Q10.

(20 Marks)
