CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐   **18ENG15**

First Semester B.Arch. Degree Examination, July/August 2021
Building Structures – I

Time: 3 hrs.   Max. Marks: 100

Note: 1. Answer any FIVE full questions.
2. Follow written dimensions, do not scale the drawing.

1 a. Explain the following construction materials with emphasis on structural properties and uses:
(i) Steel   (ii) Wood   (iii) Aluminium.   **(12 Marks)**

b. Explain Dead Load and Live Load. Determine the total Dead Load of RCC Beam of cross sectional dimension 200mm × 400mm and length 4 mt. Take the density of RCC material as 25 kN/m³.   **(08 Marks)**

2 a. Explain briefly Ductility and Brittleness.   **(04 Marks)**

b. Explain with examples Static Load and Dynamic Load.   **(08 Marks)**

c. What is workability of concrete? What are the factors that affect the workability of concrete?   **(08 Marks)**

3 a. Explain (i) Force and classification of Force system
(ii) Parallelogram Law of forces.   **(08 Marks)**

b. Determine the magnitude and directions of the resultant force, for the coplanar concurrent force system shown in Fig.Q3(b).
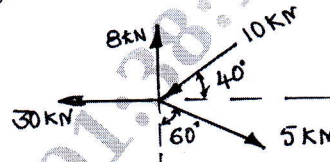

Fig.Q3(b)   **(09 Marks)**
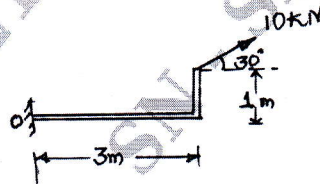
c. Determine the moment of the force shown in below Fig.Q3(c), about point 'O'.

Fig.Q3(c)   **(03 Marks)**

4 a. Differentiate between (i) Resolution of force and composition of force. (ii) Rigid body and Deformable body   (iii) Resultant and equilibrant.   **(09 Marks)**

b. For the coplanar concurrent force system shown in Fig.Q4(b). The magnitude and direction of the resultant force is 300 kN and 40° with respect to horizontal as shown in figure below. Determine the magnitude of the unknown force 'F'.
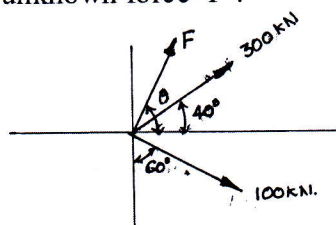

Fig.Q4(b)   **(11 Marks)**

5 a. For the coplanar non-concurrent force system shown in Fig.Q5(a) below. Determine the magnitude, direction and position of the resultant force with respect to point 'A'.
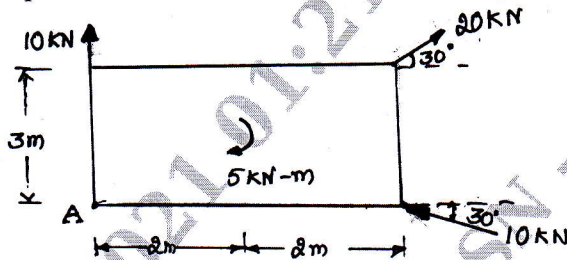

Fig.Q5(a) (10 Marks)

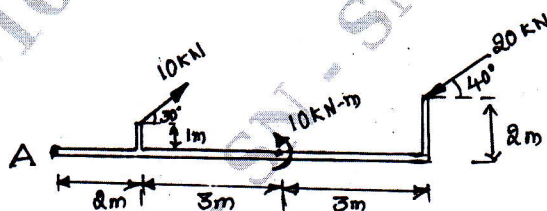b. For the force system shown in Fig.Q5(b) below, determine the resultant force with respect to point 'A'

Fig.Q5(b) (10 Marks)

6 a. With neat sketches explain statically determinate and statically indeterminate beams. (08 Marks)

b. Determine the support reactions for the beam shown in Fig.Q6(b) below.
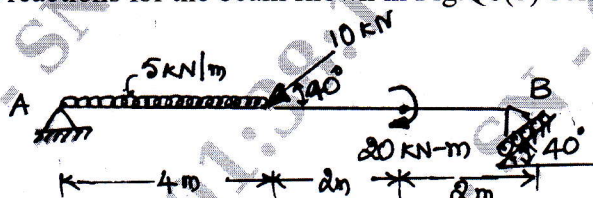
Fig.Q6(b) (12 Marks)

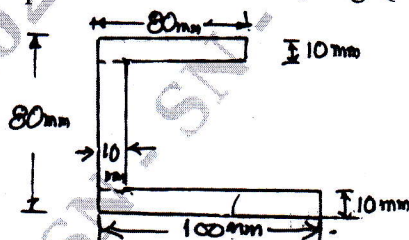7 a. Locate the centroid for the composite section shown in Fig.Q7(a) below.

Fig.Q7(a) (08 Marks)

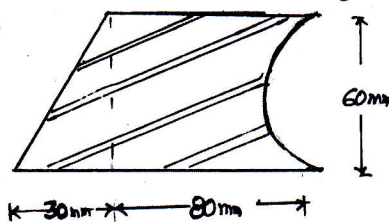b. Locate the centroid for the shaded area shown in below Fig.Q7(b).

Fig.Q7(b) (12 Marks)

8 a. State and prove parallel axis theorem. **(06 Marks)**

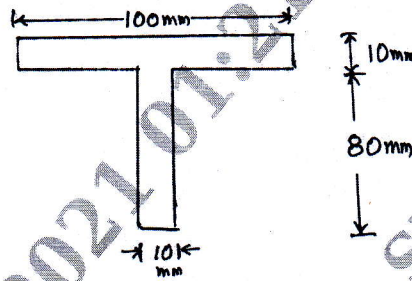b. Determine the polar moment of inertia for the T-section shown in below Fig.Q8(b).

Fig.Q8(b) **(14 Marks)**

9 a. With neat sketch, explain
   (i) Perfect frame (ii) Deficient frame (iii) Redundant frame. **(09 Marks)**
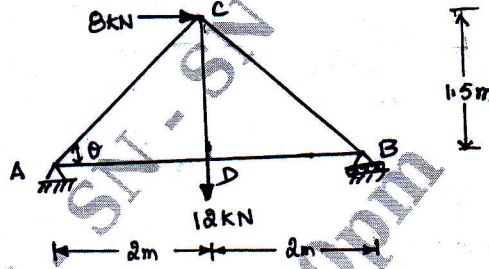
b. Determine the forces in the truss shown in Fig.Q9(b).

Fig.Q9(b) **(11 Marks)**

10 a. Mention the assumptions made in analysis of frames. **(05 Marks)**

b. For the frame shown in Fig.Q10(b) analyse the forces by the "Method of Joints" and indicate the name of the force.
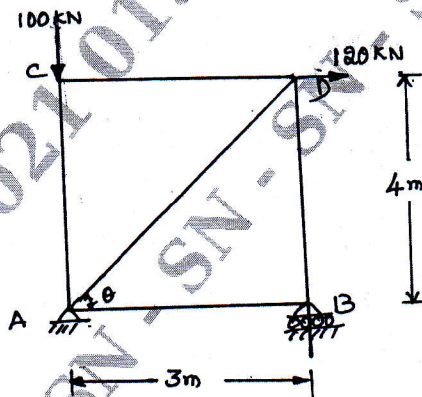

Fig.Q10(b) **(15 Marks)**

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