SEAT No. :

P3865

[5062] - 1002

F.Y. B.Arch. (Semester - I)
THEORY OF STRUCTURES - I
(2015 Pattern)

*Time : 3 Hours]*   *[Max. Marks : 70*
Instructions to the candidates :-

1)   *Q.no. 1 & 5 are compulsory.*
2)   *Solve any 2 questions out of the remaining 3 from each section. Total solve 3 questions from each section.*
3)   *Figures to the right indicate full marks.*
4)   *Assume suitable data wherever required. Mention the assumption.*
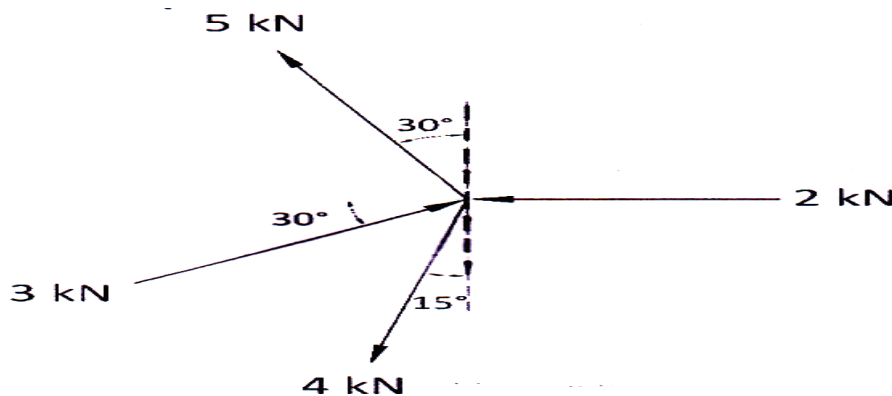5)   *Use of Non-programmable scientific calculator is allowed.*

SECTION - I

Q1) For the beam shown in figure below,

a)   Determine reactions at supports.   **[3]**

b)   Draw the Shear force diagram.   **[6]**

c)   Draw the Bending moment diagram.   **[6]**
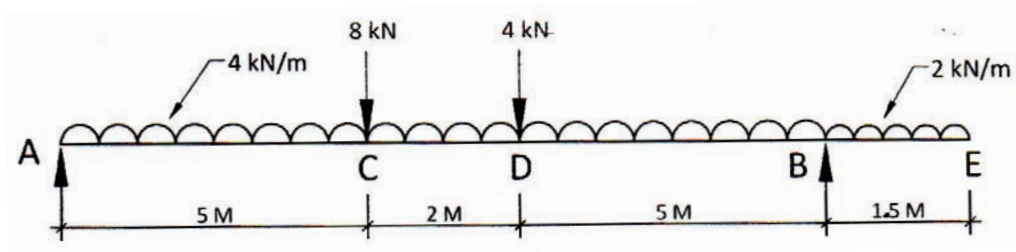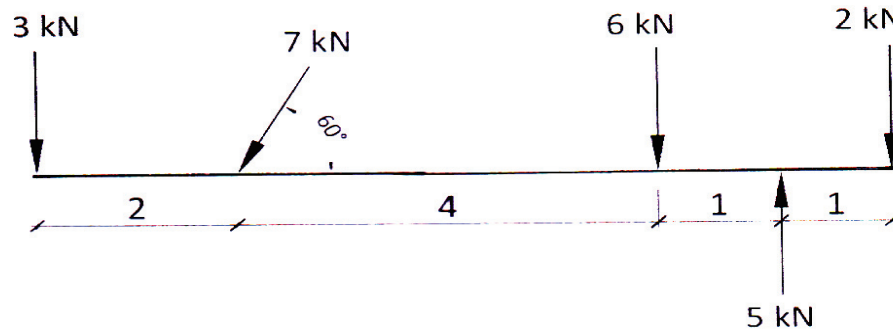

Q2) a)   For the concurrent forces shown in figure below, find out the resultant in magnitude & direction, analytically or graphically.   **[7]**

P.T.O.

b) State the conditions of equilibrium of a system of concurrent or non-concurrent forces. **[3]**

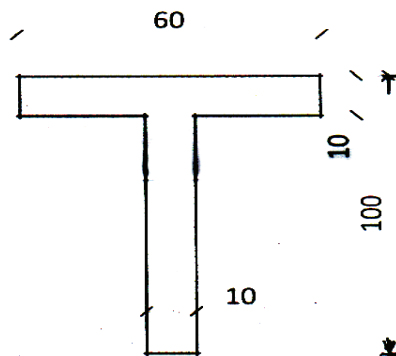**Q3)** **a)** For the non-concurrent forces shown in figure below, find out the resultant in magnitude, direction and position. **[7]**

Note: All dimensions in m,

b) Explain with sketches, Principle of transmissibility of forces. **[3]**

Q4) **a)** Explain with sketches, parallel and collinear forces. **[4]**

b) Explain with sketches, law of parallelogram of forces. **[4]**

c) Explain with sketches, moment of a force. **[2]**

SECTION - II

Q5) For the section as shown in figure below,

a) Determine the position of C.G. of the section. **[6]**

b) Determine the M.l. of the section along both axes passing through its C.G. **[9]**

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Q6) a) For the beam loaded as shown in figure below, determine the reactions at the columns Cl and C2. Take density of concrete = 25 kN/m³ and density of brickwork = 19 kN/m³. **[7]**

Bk. wall 230 thk., Height - 3.2 m.

3200

RCC beam (Simply supported)
Cross section - 230 x 750
Span - 7 m.

7000

b) Define support. Explain with sketches, the difference between hinged and roller support. **[3]**

Q7) a) If the forces as shown in figure below, are in equilibrium, determine the unknown force P₁, P₂. **[6]**

P1

70°

45°

30°

19 kN

P2

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b)	Define Resultant of a force and Equilibriant force.	**[2]**

c)	Define Couple. Give examples.	**[2]**

Q8) a)	What are statically determinate and indeterminate structures? Define degree of indeterminacy with an example of a fixed beam.	**[4]**

b)	Draw a typical simply supported beam with UDL over the entire span. Draw its SFD & BMD. Mention & show max. values in the diagrams.**[6]**

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