

**[4962] - 1002**  
**F.Y. B.Arch (Semester - I)**  
**THEORY OF STRUCTURES - I**  
**(2015 Pattern)**

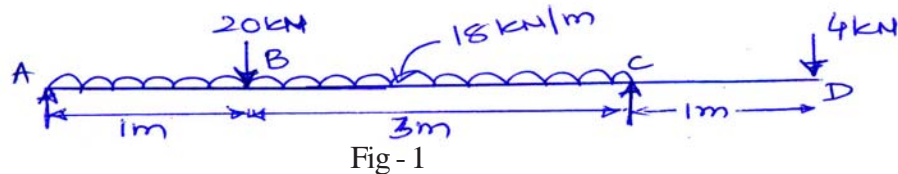
*Time : 3 Hours]*

*[Max. Marks : 70*

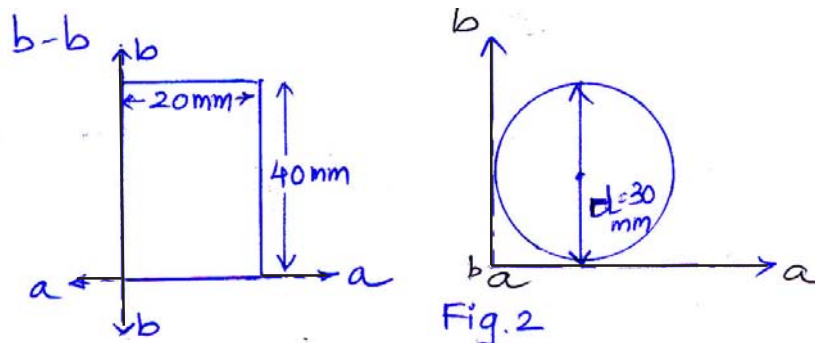
*Instructions to the candidates :-*

- 1) *Que. 1 is compulsory.*
- 2) *Attempt any four out of Q.2, 3, 4, 5, 6.*
- 3) *Use of scientific calculator is allowed.*
- 4) *Numbers to the right indicate full marks.*
- 5) *Draw neat sketches wherever required.*

- Q1) a)** A cantilever beam having length  $l$  is subjected to uniformly distributed load 'w' over the entire length. Show support reactions and draw shear force and bending moment diagram for the same. [5]
- b)** Draw shear force and bending moment diagram for the beam shown. Find maximum bending moment for the same. (Fig - 1) [17]



- Q2) a)** Find moment of Inertia for the given sections with respect to axis a - a and b - b (Fig - 2) [6]



*P.T.O.*

- b) Find resultant of the given force system analytically. Also find the equilibrant force for given force system. (Fig - 3) [6]

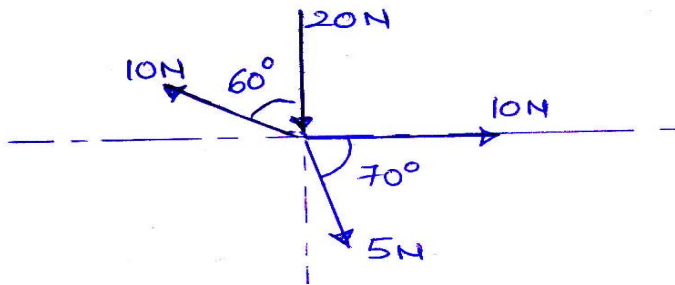


Fig - 3

- Q3) a) Find centre of gravity for the given lamina with respect to point 'o'. [6]

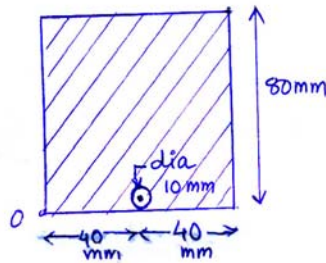


Fig - 4

- a) Explain with a diagram [6]
- i) Cantilever beam
  - ii) Overhang beam

- Q4) a) State and explain parallel axis theorem. [4]

- b) Find moment of inertia of the given section with respect to its centroidal X-X and Y-Y axis. (Fig 5). [8]

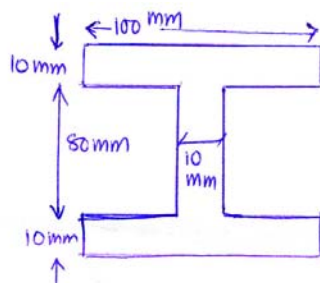


Fig - 5

- Q5) a)** Find the loads acting on given beam, where unit weight of brick (density) is  $18 \text{ KN/m}^3$ , and unit weight (density) of R.C.C. is  $25 \text{ KN/m}^3$ . Also find reactions for the same. (Fig 6) [6]

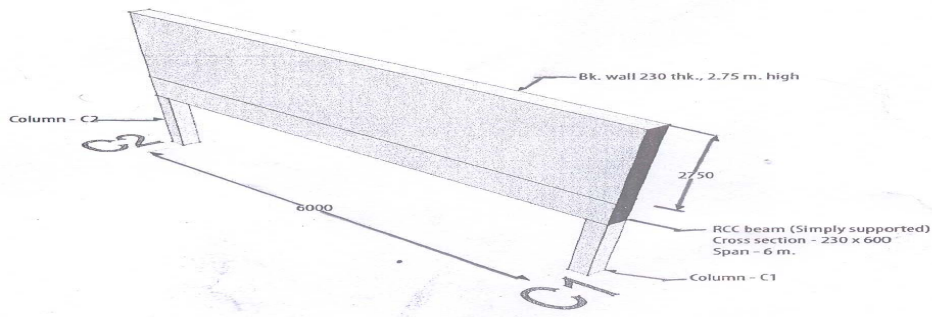


Fig - 6

- b) Explain the following :- [6]
- Conditions of equilibrium for coplanar nonconcurrent force system.
  - Lami's theorem.

- Q6) a)** What is shear force diagram? What is point of contra-shear? Explain the importance of point of contra-shear. [6]

- b) Find reactions at support 'A' and 'B' the given beam. (Fig - 7) [6]

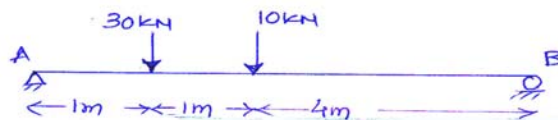


Fig - 7

