USN | | | | | | | | | | 18ENG15

## First Semester B. Arch. Degree Examination, June/July 2024
## Building Structures – I

Time: 3 hrs.                                                                 Max. Marks: 100

**Note:** *Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

1   a.  State the structural properties of i) Reinforcement steel   ii) Concrete.   (10 Marks)
    b.  State the scope of the following codes i) IS – 875 part 1  ii) IS – 875 part 2.   (10 Marks)

### OR

2   a.  State the structural properties of i) Wood   ii) Aluminium.   (10 Marks)
    b.  Explain the following terms :  i) Dead loads   ii) Imposed loads.   (10 Marks)

### Module-2

3   a.  Define "Force" and state its characteristics.   (05 Marks)
    b.  State and explain with a sketch "principle of transmissibility" of a force.   (05 Marks)
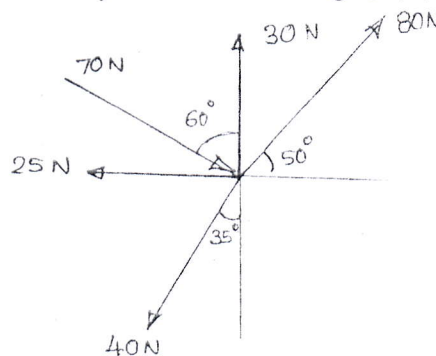    c.  Determine the resultant of the force system shown in Fig Q3(c).



Fig Q3(c)   (10 Marks)

### OR

4   a.  Explain the concept of "Moment of a Force" with an example.   (05 Marks)
    b.  State and explain with a sketch the term "Resultant Force"   (05 Marks)
    c.  The following forces act a point. Determine the resultant.
        i)   245N inclined at 30° to East of North
        ii)  196N towards North
        iii) 294N towards North-west
        iv)  392N inclined at 40° to west of south.   (10 Marks)

### Module-3

5   a.  State and explain "Statistically determinate beams" with an example.   (04 Marks)
    b.  With a neat sketch, explain coplanar non-concurrent force system.   (04 Marks)
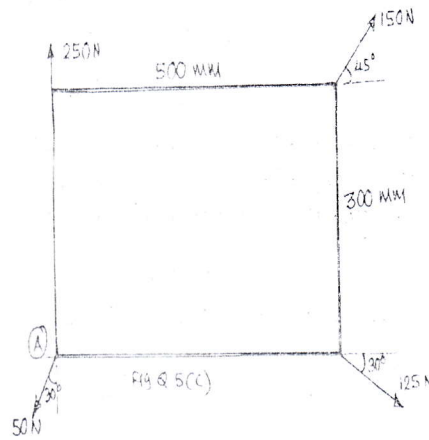    c.  Locate the resultant of the force system shown in Fig Q5(c) with respect to point Ⓐ

Fig Q5(c)

(12 Marks)

## OR

6  a.  "State and explain "Statically Indeterminate" beams with example.   (05 Marks)
   b.  Define the term "Couple" and state the characteristics of couple.   (05 Marks)
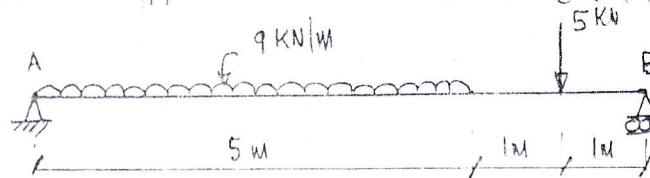   c.  Calculate the reactions at the supports for the beam shown in Fig Q6(c).



Fig Q6(c)   (10 Marks)

## Module-4

7  a.  Explain the terms "centroid" and 'centre of gravity' with examples.   (06 Marks)
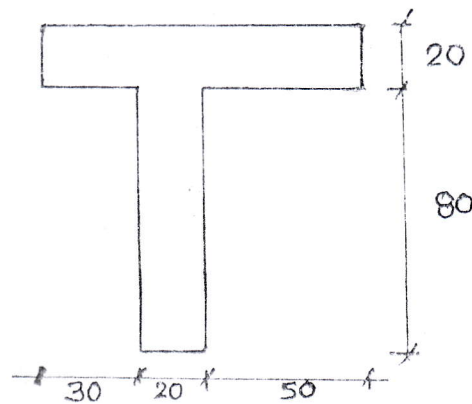   b.  Locate the centroid of the area shown in Fig Q7(b) all dimensions are in 'mm'.



Fig Q7(b)   (07 Marks)

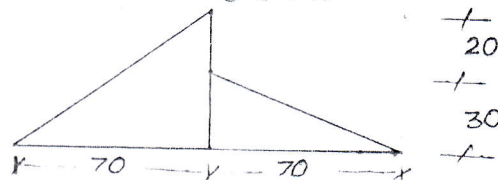   c.  Locate the centroid of the area shown in Fig Q7(c), all demensions are in mm.



Fig Q7(c)   (07 Marks)

OR

**8**  a. State and explain "parallel axis theorem". (05 Marks)

b. State and explain "radius of gyration" (05 Marks)

c. Calculate the moment of inertia of the area shown about vertical centroidal axis all dimensional are in "mm". (Refer Q8(c))
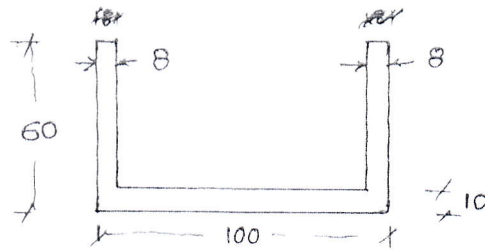


Fig Q8(c) (10 Marks)

## Module-5

**9**  a. State the assumption made in the analysis of trusses. (06 Marks)

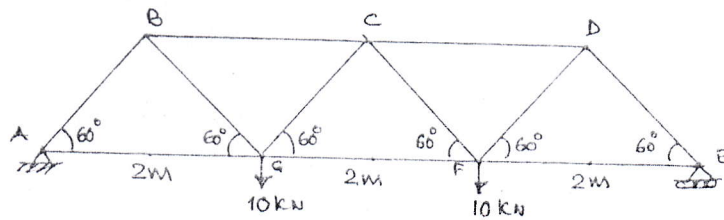b. Calculate the forces in the members of the truss shown in Fig Q9(b)



Fig Q9(b) (14 Marks)

OR

**10**  a. State and explain with a diagram 'Statically determinate truss". (06 Marks)

b. State and explain with a diagram "Redundant truss". (06 Marks)

c. State the relationship between number of members(m), number of joint (j) in a truss. Discuss possible cases. (08 Marks)

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