BMS College of Engineering, Bangalore-560019

(Autonomous Institute, Affiliated to VTU, Belgaum)

January 2017 Semester End Make Up Examinations

Course: Structures - I   **Duration: 3 hrs**
Course Code: 09AT1DCSTR   **Max Marks: 100**
                                                                        Date: 13.01.2017

Instructions: **Answer five full questions choosing one question from each module**

MODULE - 1

1 a) Explain with examples scalar and vector quantities   **06**
   b) Define force and list the characteristics   **04**
   c) Determine the resultant for the system of force given in fig. Q.1c   **10**

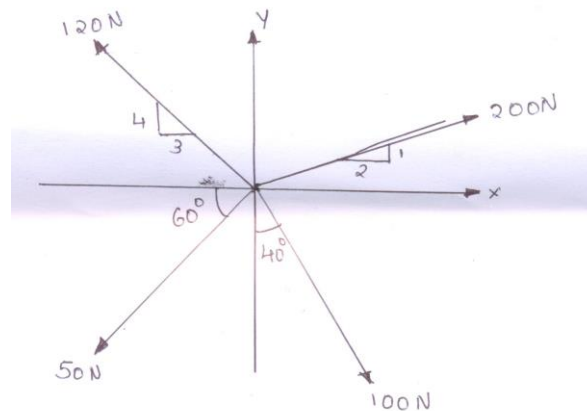Fig Q1c

MODULE - 2

2 a) Explain the different types of loadings and supports with neat sketches   **08**
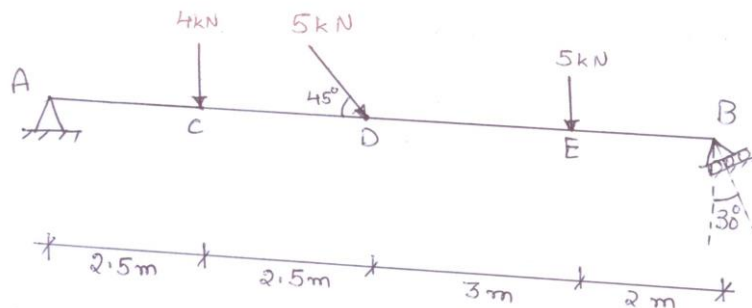   b) Determine the support reactions for the beam shown in fig. Q.2b   **12**

Fig Q2b-

OR

3   a)   Explain different types of beams with neat sketches showing support conditions   **08**

      b)   Determine the reactions at supports 'A' & 'B' for the beam shown in fig Q.3b   **12**
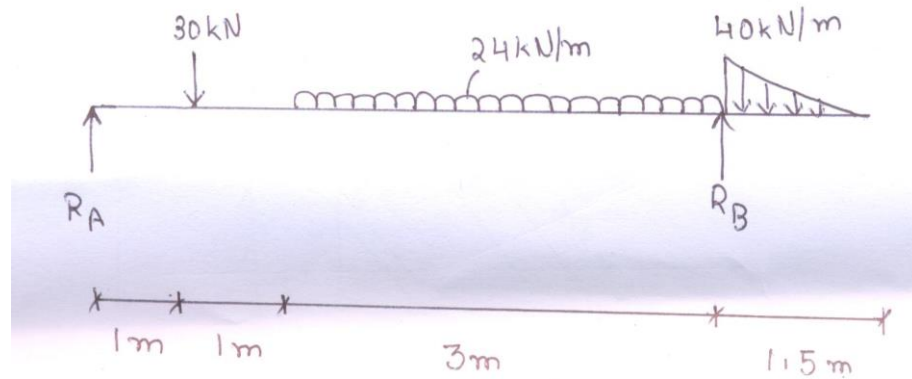

Fig Q 3b.

MODULE - 3

4   a)   List the laws of friction   **06**

      b)   Explain the mechanism of friction   **06**

      c)   A body of weight 70N is placed on a rough horizontal plane. To just move the body   **08** on the horizontal plane, a push of 20N inclined at 20° to the horizontal plane is required. Find the co-efficient of friction for the fig Q.4b

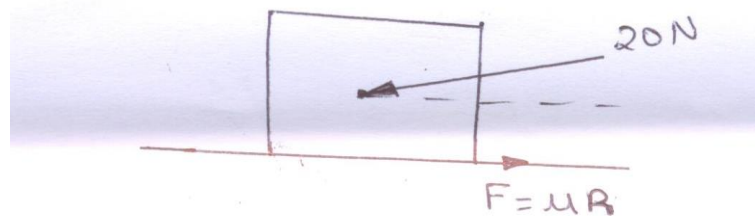Fig Q 4b.

OR

5 a) Explain – angle of friction, angle of repose   **06**

   b) A uniform ladder of weight 200N of length 4.5m rests on a horizontal ground and   **14**
   leans against a rough vertical wall. The co-efficient of friction between the ladder
   and floor is 0.4 and between ladder and vertical wall is 0.2. When a weight of 900N
   is placed on the ladder at a distance of 1.2m from the top of the ladder, the ladder is
   at the point of sliding. Determine
        i.   the angle made by the ladder with the horizontal
        ii. reactions at the foot of the ladder
        iii. reactions at the top of the ladder
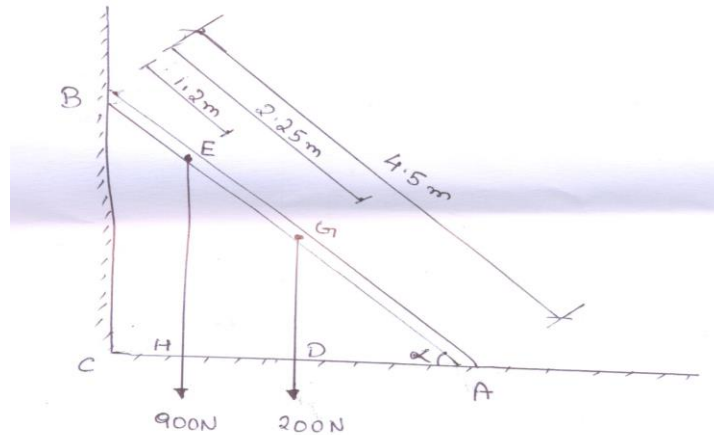   Refer fig Q.5

Fig Q5

MODULE - 4

6 a) Derive the centroid of the sector of a circle   **06**

   b) Determine the co-ordinates of the centroid of the plane area shown shown in fig Q.6   **14**
   with reference to 'O' Take x = 40 mm
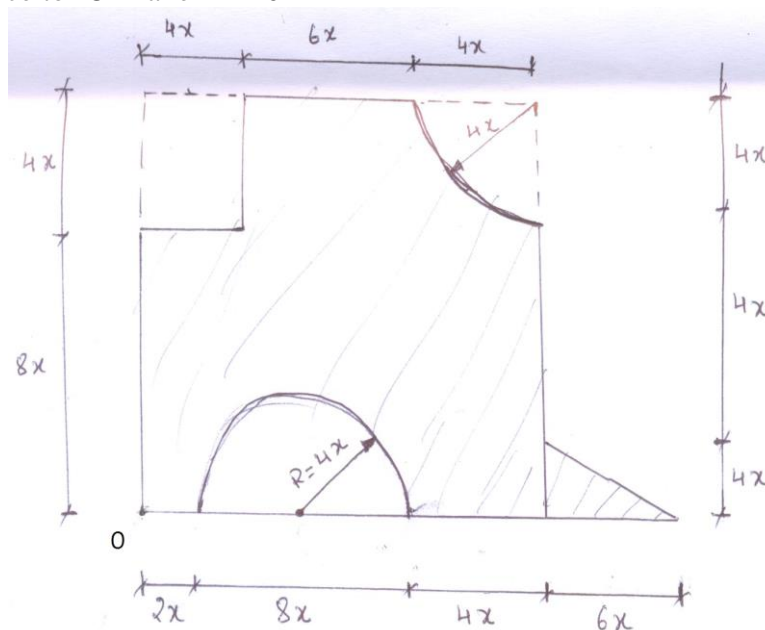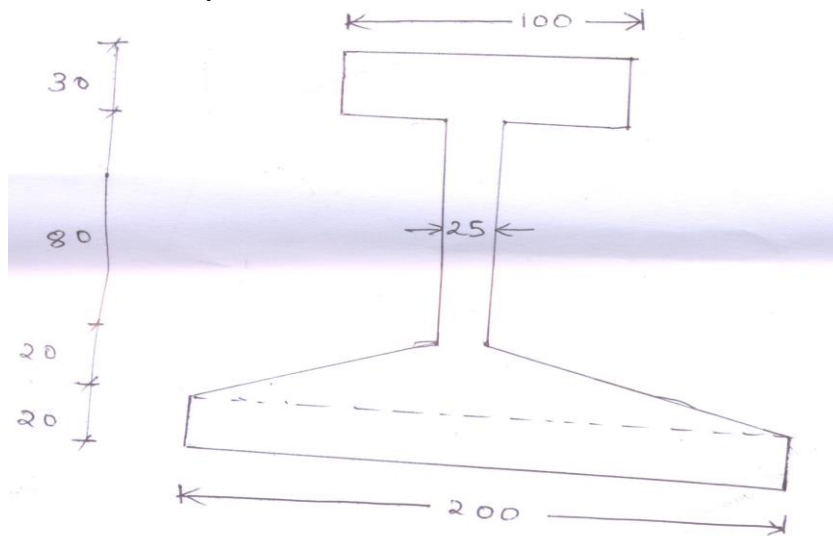

Fig Q6

MODULE - 5

7   a)   State and prove perpendicular axis theorem   **06**

     b)   Determine the moment of inertia of the built up section shown in fig Q.7 about its   **14**
          centroid axes and x-x only

Fig Q7.

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