AA-154

April-2019

B.Sc. (Fire & Safety), Sem.-II

CC-203 : Mechanics of Solid and Town Planning

Time : 2:30 Hours]   **[Max. Marks : 70**

Instruction : Scientific calculator is allowed.

1. (A) Write the following :   **14**

    (i) Explain the branch diagram of Mechanics of structure with neat sketch.   **7**

    (ii) What are the methods to find out the resultant of number of forces ? Explain any one of them.   **7**

    OR

    (i) Explain types of beam with neat sketch.

    (ii) Explain different types of force.

    (B) Short questions (Any **four** out of **six**)   **4**

    (i) Define Force.

    (ii) Write down the mathematical representation of Lami's theorem.

    (iii) The Reaction force of roller support is

         (1) Vertical

         (2) Horizontal

         (3) Vertical & Horizontal

         (4) None

    (iv) What is deformable body ?

    (v) Give example of compressible fluid and in-compressible fluid.

    (vi) Write down the statement of Parallelogram Law.

2. (A) Write the following : **14**

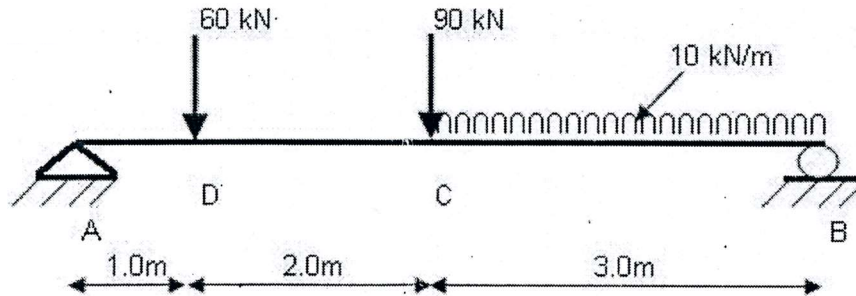   (i) Explain Moment of force with their types. **7**

    (ii) Fig. shows a bar consisting of three lengths. Find the stresses in the three parts and the total extension of the bar for an axial pull of 40 kN. Take $E = 2 \times 10^5$ N/mm². **7**

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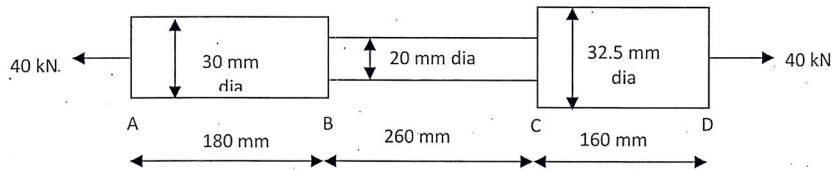
OR

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    (i) Explain Stress with their types.

    (ii) Draw S.F. and B.M diagram for the given beam.

(B) Short questions (Any **four** out of **six**) **4**

    (i) Define Centre of gravity.

    (ii) Unit of moment of force is

        (1) KN

        (2) N-m

    (iii) Define Strain.

    (iv) List out different types of friction.

    (v) What is Bending moment ?

    (vi) Write down the equation of Young's modulus.

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3. (A) Write the following : **14**

   (i) Give the classification of building categories according to NBC. List out the parts of building and explain sub-structure, also write down the names of building components. **7**

   (ii) Describe primary function of wall and what should be the good quality of wall. Draw the figure of a Panel wall. **7**

   OR

   (i) What do you understand by foundation of building and types of foundation ? Draw a figure of Single footing and combined footing.

   (ii) Explain roofs and types of roofs and also explain the requirement of roof. Draw sketch of curved roof.

   (B) Short questions (Any **three** out of **five**) : **3**

   (i) Mercantile building falls in which category ?

   (1) F   (2) B

   (3) H   (4) D

   (ii) It is a door which consists of centrally placed pivot in a circular opening

   (1) rolling door   (2) louvered door

   (3) revolving door   (4) flush door

   (iii) This equipment to climb up occupies least floor area

   (1) stairs   (2) ladders

   (3) ramp   (4) none

   (iv) Pile foundation is not made up of this material

   (1) Timber   (2) Steel

   (3) RCC   (4) Plastic

   (v) This type of foundation is hollow from inside

   (1) mat   (2) pile

   (3) well   (4) pier

4. (A) Write the following : .   **14**

    (i) What are the important features for selection of site for a new town and explain multi-storeyed building.   **7**

    (ii) What is the additional information required in building plan of special risks e.g. hospitals ?   **7**

<div align="center">OR</div>

    (i) Explain in details the various sources of water supply, and distribution system of water.

    (ii) Describe fire hydrant, requirement of hydrant and draw sketch of post fire hydrant.

  (B) Short questions (any **three** out of **five**) :   **3**

    (i) The diameter of outlet of a fire hydrant is

      (1) 60 mm   (2) 61 mm

      (3) 62 mm   (4) 63 mm

    (ii) In low density residential area the road width should not be less than

      (1) 25 feet   (2) 28 feet

      (3) 30 feet   (4) 35 feet

    (iii) Maximum daily consumption is how many times average daily consumption ?

      (1) 1.2 times   (2) 1.3 times

      (3) 1.5 times   (4) 2.0 times

    (iv) If the height of a building is between 13 mtrs. to 15 mtrs. U/G water tank capacity should be

      (1) 75000 ltrs.   (2) 78000 ltrs.

      (3) 79000 ltrs.   (4) 80000 ltrs.

    (v) Maximum daily consumption of water is calculated considering how many years ?

      (1) 2 years   (2) 3 years

      (3) 4 years   (4) 5 years

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