BACHELOR OF ARCHITECTURE (B.Arch.)
Term-End Examination
00651   **June, 2019**

BAR-004 : THEORY OF STRUCTURES – I

Time : 3 hours   *Maximum Marks : 70*

*Note : Question no. 1 is **compulsory**. Answer any **four** questions from the remaining questions.*

1. Choose the most appropriate answer from the options given in questions (a) to (g) below :   *7×2=14*

    (a) A fixed support transfers

        (i)   shear force

        (ii) bending moment

        (iii) axial force

        (iv) All of the above

    (b) Choose a brittle material out of the following :

        (i). Rubber

        (ii) Steel

        (iii) Glass

        (iv) Bitumen

(c) A material of construction should be

    (i) strong

    (ii) ductile

    (iii) cheap

    (iv) All of the above

(d) Resistance against impact forces is shown by

    (i) Hardness

    (ii) Strength

    (iii) Toughness

    (iv) Brittleness

(e) How many reaction components are there in a simply supported beam in a plane ?

    (i) 2

    (ii) 3

    (iii) 4

    (iv) 5

(f) In a determinate structure

    (i) Only two reactions can be calculated.

    (ii) Only some reactions at the location of fixed supports can be calculated.

    (iii) All external reactions can be calculated.

    (iv) No reaction can be calculated as it is unstable.

(g) A UDL of intensity w per unit length and a concentrated load P act on a cantilever of span L. Moment on the fixed support is $\frac{wL^2}{2}$ + PL. Which of the following gives correct application of loads ?

(i)

(ii)

(iii)

(iv)
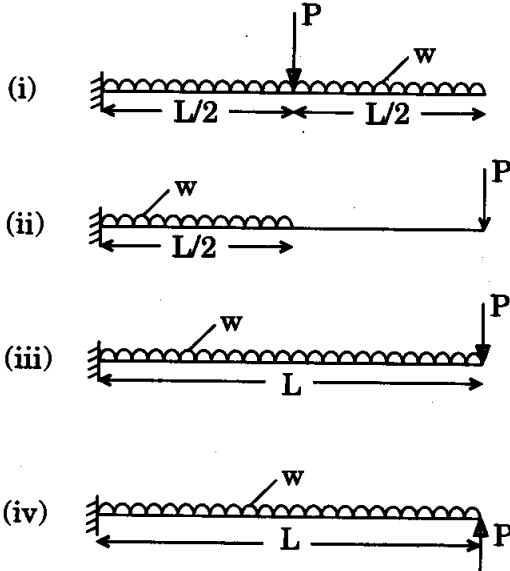
2. (a) Define an elastic material and give some examples. 7

   (b) What do you understand by yield stress for mild steel ? Explain with a sketch of stress-strain curve of mild steel. 7

3. (a) Briefly discuss the characteristics of a pin support. 7

   (b) What do you understand by a stable structure ? Explain with one example. 7

4. (a) Discuss how dead loads are different from live loads. **7**

   (b) Discuss how stresses may be introduced due to thermal variations in a structure. **7**

5. (a) Briefly discuss how factor of safety of a structure can be improved by using better materials. **7**

   (b) Explain the term 'Stiffness'. How is it different from 'strength' ? Discuss briefly. **7**

6. (a) What are equations of static equilibrium ? Explain briefly. **7**

   (b) Differentiate between the terms 'Analysis' and 'Design'. **7**

7. Write short notes on any *two* of the following topics : *2×7=14*

   (a) Primary Elements of Structure

   (b) Classification of Structures

   (c) Natural Forms