BACHELOR OF ARCHITECTURE (BARCH)

Term-End Examination

December, 2012 00131

BAR-024 : THEORY OF STRUCTURES - III

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any five** questions in total with question No. **1** which is **compulsory**. Use of scientific calculator is **permitted**.*

1. Choose the most appropriate answer in questions (a) to (g), given below, out of options given in each case. **2x7=14**

(a) Two equal and opposite parallel coplanar forces are equivalent to :

(i) a resultant force

(ii) a couple

(iii) shear force

(iv) none of the above

(b) For a cantilever beam, loaded with a UDL all over its length, the shape of SFD for it would be :

(i) a rectangle (ii) a triangle

(iii) a trapezoid (iv) a parabola

(c) Centre of gravity of a solid hemisphere is located at a distance of (where 'r' is the radius of the sphere) _____ from its centre.

(i) $\frac{3}{8}$ r (ii) $\frac{5}{8}$ r

(iii) $\frac{2}{7}$ r (iv) $\frac{4}{16}$ r

(d) Centre of gravity of a semi circular plane area is located at a distance of (where 'r' is the radius of the circle) _____ from its centre.

(i) $\frac{2}{5}$ r (ii) $\frac{3}{8}$ r

(iii) $\frac{4\,r}{3\,\pi}$ (iv) $\frac{3}{10}$r

(e) In the analysis of plane pin-jointed trusses by the method of joints, forces at a joint may be considered if total number of unknown forces is not more than :

(i) 1 (ii) 2 (iii) 3 (iv) 4

(f) In case of pure bending in a beam, the shear force is :

(i) the maximum

(ii) the minimum

(iii) zero

(iv) having a constant value

(g) Buckling is generally expected in :

(i) short columns

(ii) long columns

(iii) very long columns only

(iv) both short and long columns

2. (a) Determine forces in each member of the truss, shown in Fig. 1, by method of joints. 7

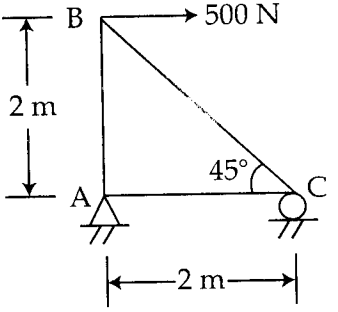

Fig. 1

The truss is pin-jointed.

(b) Explain method of sections used to analyse a truss, briefly. 7

3. (a) Determine support reactions for the beam shown in Fig. 2, which is subjected to a triangular load. 7

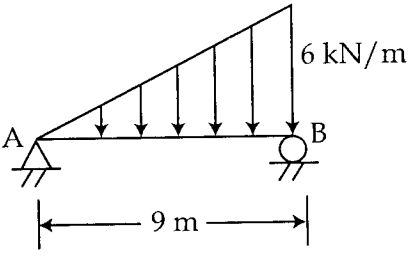

Fig. 2

(b) Write equation of pure bending of beams. Explain various terms in it briefly. 7

4. (a) Derive the equation for determining Euler's buckling load for a long column for the standard case of the column. 7

(b) Discuss some ways of increasing load carrying capacity of a long column. 7

5. (a) What is the purpose of assessment of possible deflection in a beam ? Give a brief example to explain. 7

(b) What do you understand by composite materials ? Do they offer any advantage ? If yes, explain briefly. 7

6. (a) Locate the centroid of the plate area shown in Fig. 3. 7

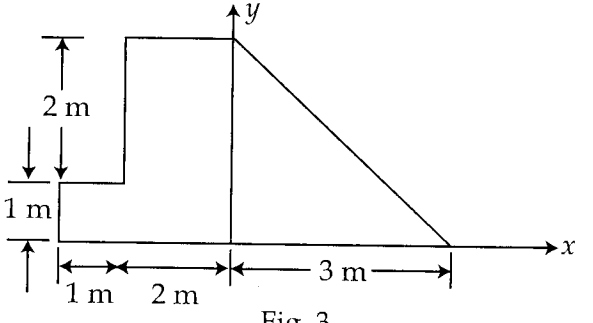

Fig. 3

(b) Write some uses of trusses briefly. 7

7. Write short notes on **any two** of the following : **2x7=14**

(a) Funicular polygon

(b) Hooke's law

(c) Stability of a column