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BAR-004

BACHELOR OF ARCHITECTURE (B.Arch.)

Term-End Examination

June, 2018

00453

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.*

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

   (a) A structure should be

   (i) stable

   (ii) strong

   (iii) safe

   (iv) All the above

   (b) Moment of inertia of a square shape of side 'a' about an axis passing through its CG of area and parallel to one of its sides is

   (i) $\frac{a^4}{36}$

   (ii) $\frac{a^4}{12}$

   (iii) a^4

   (iv) a^2

(c) Total number of reactions at a fixed support for a plane structure should be

(i) 3

(ii) 2

(iii) 1

(iv) 6

(d) In earlier times, an arch was used for a

(i) beam

(ii) column

(iii) slab

(iv) foundation

(e) Vertical reaction at a support for a simply supported beam, of span L which is subjected to a UDL of intensity 'w' over its full length, would be

(i) wL

(ii) $\frac{wL^2}{12}$

(iii) $\frac{wL}{2}$

(iv) $\frac{5\,wL^4}{384}$

(f) For a roller support, the reaction is

(i) parallel to the plane on which the roller is supported

(ii) perpendicular to the plane, as defined above

(iii) always zero as it can move

(iv) a moment

(g) CG of a UDL may be taken at

(i) one of its ends

(ii) the centre of its length

(iii) anywhere in its length

(iv) a distance of $\frac{L}{3}$ from the left end of the load, if L is the length of UDL

2. (a) Write a classification of civil engineering structures. 7

(b) Draw a neat sketch of a cantilever and its deflected shape when it is subjected to a point load 'P' at its free end. 7

3. (a) Briefly discuss how the strength of materials used in construction affect the strength of the structure built with them. 7

(b) What do you understand by equations of static equilibrium ? Discuss briefly. 7

4. (a) Discuss under which condition(s) may a simply supported beam, provided with roller supports at both ends, be statically stable. 7

(b) Explain various factors which may make a building durable. 7

5. (a) Explain the difference between a 'Dead Load' and a 'Live Load' with examples of both the loads. 7

(b) Draw a line sketch of a stable arch showing appropriate supports. 7

6. (a) Discuss why walls in a building should be straight and vertical. 7

(b) Write names of any seven materials which are used in construction of buildings. 7

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

(a) Importance of Good Roads

(b) Demerits of Vibrations in Buildings

(c) Importance of Regular Maintenance of Buildings