

BACHELOR OF ARCHITECTURE (B.Arch.)

Term-End Examination

December, 2017

00042

BAR-034 : THEORY OF STRUCTURES – IV

Time : 3 hours

Maximum Marks : 70

Note : Question no. 1 is compulsory. Attempt any four questions from the remaining. Use of scientific calculators, IS 800 code and steel tables is permitted.

1. Choose the most appropriate answer from the given options in questions (a) to (g) given below :

$7 \times 2 = 14$

- (a) A two-hinged arch is a/an
- (i) determinate structure
 - (ii) indeterminate structure
 - (iii) unstable structure
- (b) A fixed arch is
- (i) stable and indeterminate
 - (ii) determinate
 - (iii) unstable

- (c) N-Girder is
- (i) a plane frame
 - (ii) a space frame
 - (iii) unstable
- (d) In a simple truss these days
- (i) welded connections are preferred
 - (ii) bolted connections are preferred
 - (iii) riveted connections are preferred
- (e) What are the units of strain ?
- (i) kg/m^2
 - (ii) N/mm^2
 - (iii) No units
 - (iv) kNm
- (f) Materials which follow Hooke's law are
- (i) Elastic
 - (ii) Inelastic
 - (iii) Plastic
- (g) A portal with horizontal or vertical load
- (i) is a plane frame
 - (ii) is a space frame
 - (iii) behaves like an arch

2. Figure 1 below shows a continuous beam ABC in which $AB = 6\text{ m}$, $BC = 4\text{ m}$, $I_{AB} = 2 I$, $I_{BC} = 3 I$.

Find distribution factors for AB and BC.

14

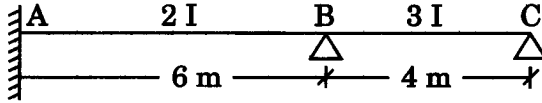


Figure 1

3. (a) Draw a sketch of a 3-hinged arch and state whether it is determinate or not.

7

- (b) How is an arch more efficient than a straight beam? Discuss.

7

4. (a) To make a roof of a factory shed which material would you prefer, RC or steel? Explain.

7

- (b) Compare riveted joints with welded joints.

7

5. In Figure 2 of a portal, how would you analyse it for the given loads?

14

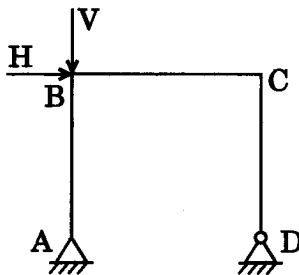


Figure 2

6. Explain in short any *two* of the following : $2 \times 7 = 14$

- (a) Efficiency of an arch
- (b) Use of arch for long span bridge
- (c) Compare 2-hinged arch with 3-hinged arch in steel

7. (a) Explain, what is Stiffness. Explain its role in the design of a beam. 7

- (b) Show with sketches, a statically indeterminate portal frame. 7
