

00741

B. ARCH.

Term-End Examination

June, 2010

BAR-034 : THEORY OF STRUCTURES - IV

Time : 3 hours

Maximum Marks : 70

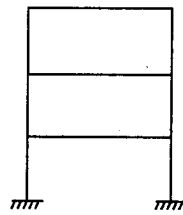
Note : Question No.1 is compulsory. Attempt any four questions from the remaining. Use of steel tables and calculator is permitted.

1. Choose the most appropriate answer from the 14 options given for the questions (a) to (g).
- (a) A propped cantilever with an internal hinge is :
- (i) a determinate structure
 - (ii) an indeterminate structure
 - (iii) an unstable structure
 - (iv) nothing can be said
- (b) Equations of static equilibrium are less than the total number of unknown reactions in the case of :
- (i) determinate structures
 - (ii) indeterminate structures
 - (iii) both the above
 - (iv) none of the above

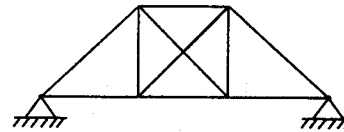
- (c) A parabolic arch with a udl over its entire span shall be under :
- (i) tension throughout its length
 - (ii) tension only near to supports
 - (iii) compression throughout its length
 - (iv) compression only near to supports
- (d) In comparison to mild steel, ductility of medium tensile steel is :
- (i) less
 - (ii) more
 - (iii) equal
 - (iv) negligible
- (e) Speed of construction in steel is faster in the case of :
- (i) bolted joints
 - (ii) rivetted joints
 - (iii) welded joints
 - (iv) speed in same in all cases

- (f) The heaviest I - section for same depth is :
- (i) ISMB
 - (ii) ISLB
 - (iii) ISHB
 - (iv) ISWB
- (g) In the cross - section of a weld, throat is the :
- (i) minimum dimension
 - (ii) maximum dimension
 - (iii) average dimension
 - (iv) none of the above

2. (a) Discuss the advantages and disadvantages of indeterminate structures. 7
- (b) Find the indeterminacy of the rigid frame and the truss shown in Figure 1 (a) and (b) respectively. 7



(a)



(b)

Figure - 1

3. A continuous beam ABC is supported on an elastic column BD, and loaded as shown in figure 2. Treating joint B as rigid, analyse the frame and plot the BMD. 14

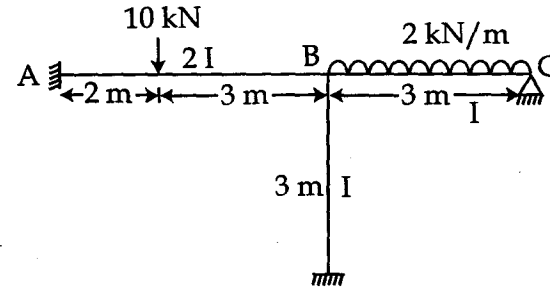


Figure - 2

4. A symmetrical parabolic arch with a central hinge, of rise 'r' and span 'L', is supported at its ends on pins at the same level. What is the value of the horizontal thrust when a load 'W' which is uniformly distributed horizontally covers the whole span? Also show that with this loading there is no bending moment at any point in the arch rib. 14
5. A built column consists of ISMB 300 @ 44.2 kg/m, having two plates, each of 10 mm thickness attached to each flange so as to have equal resistance about either axis. Determine the load the column can safely carry over an effective length of 4.5 m. Take $f_y = 250 \text{ N/mm}^2$. 14

6. (a) Describe the advantages of welded joints. 7
(b) Find the safe load that can be transmitted 7
by the fillet welded joint shown in figure 3.
The size of weld in 8 mm. Take the safe
stress in the weld equal to 110 N/mm^2 .

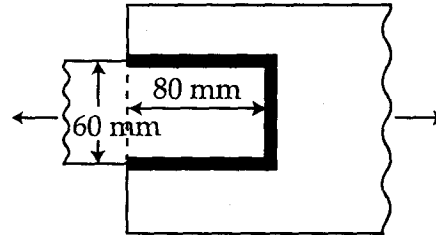


Figure - 3

7. Write short notes on *any two* of the following : $2 \times 7 = 14$
- (a) Types of welded joint
 - (b) Moment distribution method
 - (c) Steel as a structural material