

BACHELOR OF ARCHITECTURE (B.Arch.)

Term-End Examination

June, 2017

00004

BAR-024 : THEORY OF STRUCTURES – III

Time : 3 hours

Maximum Marks : 70

Note : *Question no. 1 is compulsory. Attempt any four questions from the remaining questions. Use of scientific calculator is permitted.*

1. Choose the most appropriate answer from the options given in questions (a) to (g) below : $2 \times 7 = 14$
- (a) In which of the following structures are members subjected to axial forces only ?
- (i) Rigid frames
 - (ii) Cantilever beam
 - (iii) Pin-jointed trusses
 - (iv) Continuous beam
- (b) Deformations in structures produce
- (i) Strains
 - (ii) Poisson's ratio
 - (iii) Stresses which produce strains
 - (iv) Young's modulus of elasticity

- (c) The shape of shear force diagram for a cantilever beam which is subjected to a UDL over its full span is
- (i) rectangular
 - (ii) square
 - (iii) triangular
 - (iv) parabolic
- (d) Which of the following supports can develop a moment reaction ?
- (i) Fixed
 - (ii) Hinge
 - (iii) Roller
 - (iv) Pin
- (e) In a beam subjected to pure bending, shear force
- (i) is absent
 - (ii) is uniformly distributed
 - (iii) is added to bending moment
 - (iv) is responsible for failure
- (f) Columns are members primarily subjected to
- (i) axial forces
 - (ii) shear forces
 - (iii) bending moments
 - (iv) torsion
- (g) While analysing a plane truss by the method of joints, the unknown forces at a joint should **not** exceed
- (i) 2
 - (ii) 3
 - (iii) 4
 - (iv) 6

2. (a) Determine the forces in members DE and CE of the pin-jointed truss shown in Figure 1. 7

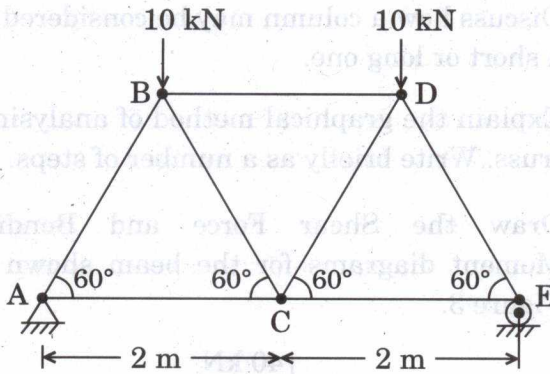


Figure 1

- (b) Compare a fixed support and a roller support. 7
3. (a) Determine the moment of inertia of the rectangle with base b and altitude h about the centroidal axis XX as shown in Figure 2. 7

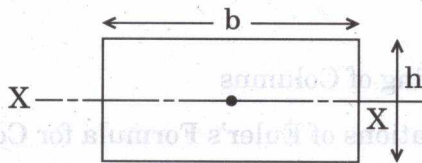


Figure 2

- (b) Describe how would you find the resultant of a group of coplanar concurrent forces. 7

4. (a) Write Hooke's law and explain its utility. 7
 (b) What do you understand by 'Pure bending of beams'? Describe briefly. 7
5. (a) Discuss how a column may be considered as a short or long one. 7
 (b) Explain the graphical method of analysing a truss. Write briefly as a number of steps. 7
6. (a) Draw the Shear Force and Bending Moment diagrams for the beam shown in Figure 3. 7

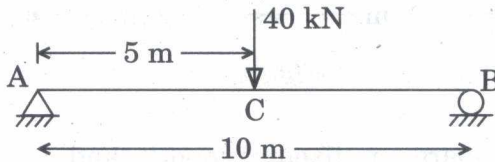


Figure 3

- (b) Draw neat line sketches of any two types of trusses. 7
7. Write short notes on any **two** of the following topics : $2 \times 7 = 14$
- (a) Buckling of Columns
 (b) Limitations of Euler's Formula for Columns
 (c) Centre of Gravity