B.E.Second Semester All Branches (C.B.S.) / B.E. Second Semester (Fire Engineering)

Engineering Mechanics

P. Pages : 3 **NKT/KS/17/7205**

Time : Two Hours Max. Marks : 40

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Due credit will be given to neatness and adequate dimensions.
7. Assume suitable data whenever necessary.
8. Use of non programmable calculator is permitted.

1. a) What is Axioms of mechanics ? Enumerate. **3**

b) Reduce the force system in single force and determine its position w.r.t. point B as shown in fig. 1(b). **7**

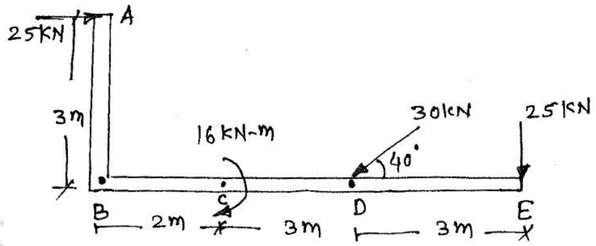


Fig 1(b)

OR

2. a) What are the characteristics of couple ? **3**

b) ABCD are the points in space having the co-ordinates A(12, 0, 0), B(0, 4, -6), C(0, 0.7), D(0, -12, 0). The force F = 5.6 kN acts from A to B Determine : Moment of a force F about the point C and moment about line CD. **7**

OR

3. a) Define free body diagram ? Explain with example. **3**

b) Find the support reactions at A and B for the beam shown in fig. 3(b). **7**

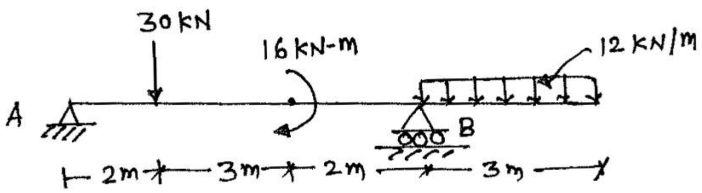


Fig.3(b)

OR

4. Determine the forces in all the members of the truss as shown in fig. 4 b. **10**

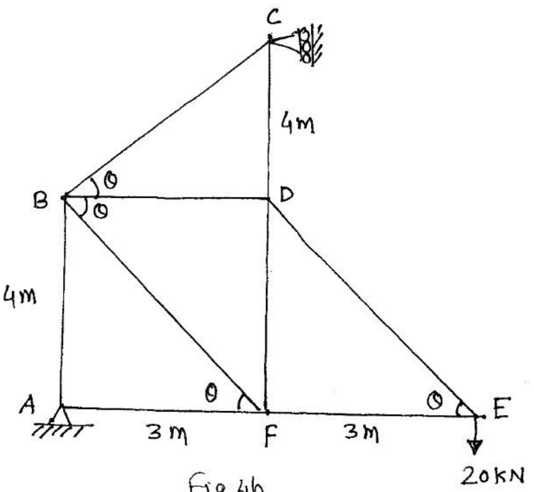


Fig 4b

5. a) Static and explain parallel axis theorem of moment of inertia. **3**

b) Determine the moment of inertia about its centroidal orves of given fig. 5b. **7**

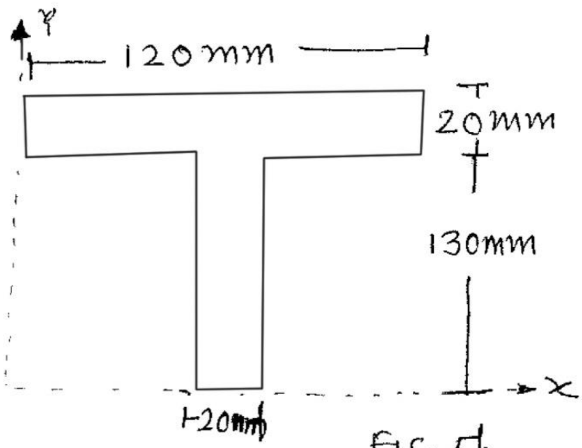


Fig. 5b

OR

6. a) State and explain principle of virtual work. **3**

b) Determine the reaction at supports for the beam shown in fig. 6b by virtual work method. **7**

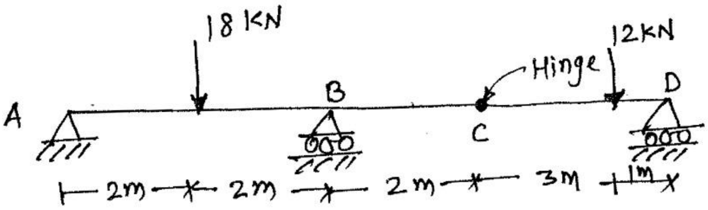
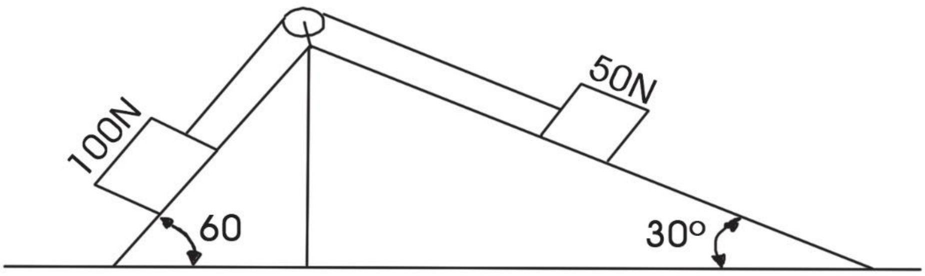


Fig 6b.

7. a) Explain D'Alembert's principle. **3**

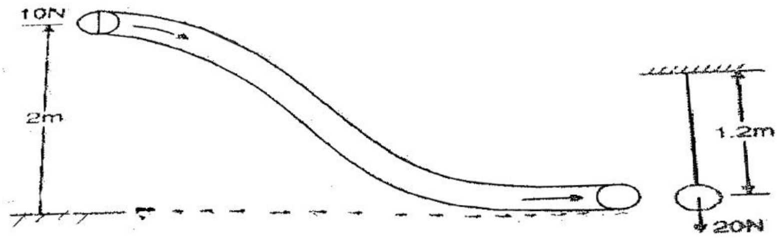
b) Two rough planes inclined 30° and 60° to horizontal are placed back to back as shown in figure. The blocks of weight 50 N and 100 N are placed on the faces and are connected by a string running parallel to planes and passing over a frictionless pulley, if the coefficient of friction between planes and blocks is 1/3, Find the resulting acceleration and tension in the string. **7**



OR

8. a) Explain the term Elastic Impact. **3**

b) A 10N ball traverses a frictionless tube as shown in figure falling through a height of 2m. It then strikes a 20N ball hung from a rope 1.2 m long. Determine the height to which the hanging ball will rise if the collision is perfectly elastic. **7**



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