B.E./ B.Tech. (Chemical Engineering) / B.Text. First Semester (Old Course)

Engineering Mechanics - I: 1 S 5

P. Pages : 2

Time : Two Hours

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Max. Marks : 40

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Notes :   1.   Due credit will be given to neatness and adequate dimensions.
2.   Assume suitable data wherever necessary.
3.   Diagrams and chemical equations should be given wherever necessary.
4.   Illustrate your answer necessary with the help of neat sketches.
5.   Use of pen Blue/Black ink/refill only for writing the answer book.

1.   a)   State & derive the parallelogram law of forces.   4

b)   A wire rope is fixed at two points A and D as shown in Fig. No. 1. Find the tension in segments AB, BC & CD of the wire, also find the angle of segment CD to vertical.   9
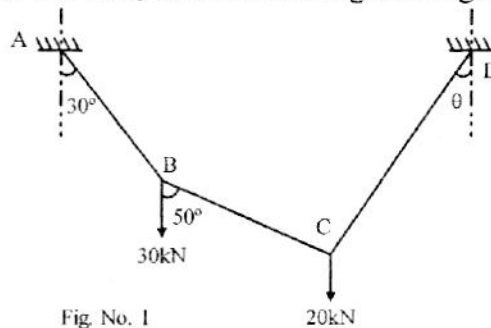

Fig. No. 1

OR

2.   a)   State & explain analytical & graphical conditions of equilibrium.   4
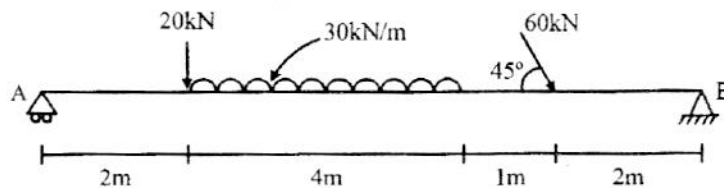
b)

Fig. no. 2

Find the support reaction for the loaded beam as shown in Fig. No. 2.   9

3.   a)   Define the following terms.   4
i)   Truss   ii)   Space truss
iii)   Deficient truss   iv)   Redundant truss

b)   Find the force in all the members of the truss as shown in Fig. No. 3.   10
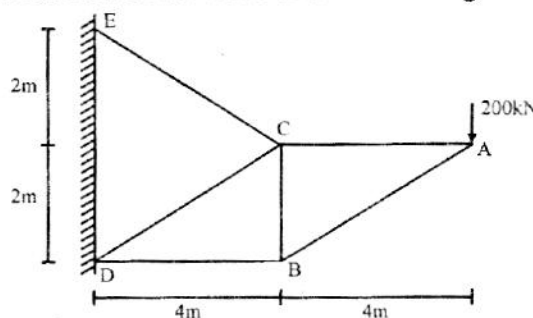

Fig. No. 3

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OR

4. a) State the solid laws of friction.   4

    b) What should be the value of θ in fig. no. 4 that will make the motion of 900N block down   10
        the plane to impend? The coefficient of friction for all contact surfaces is 1/3.
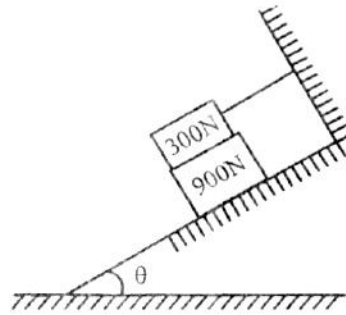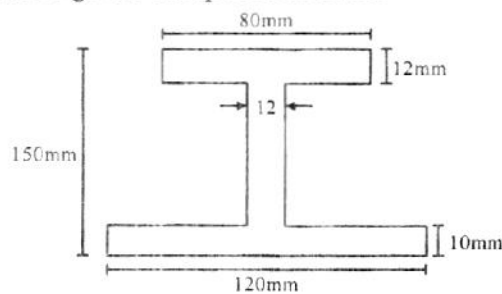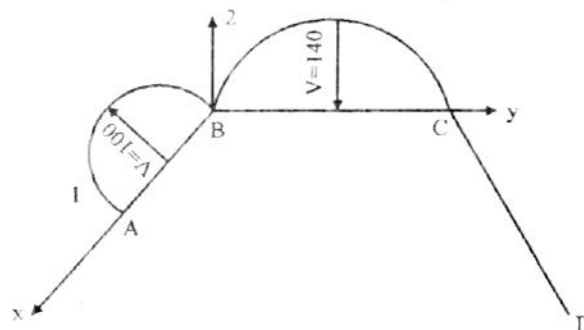

Fig. No. 4

5. a) State & derive the perpendicular axis theorem.   3

    b) Find the radius of gyration for given composite section.   10

OR

6. a) Determine the centre of gravity of solid hemisphere of radius r from its diametral axis.   4

    b) Locate the centroid of the wire shown in Fig. 5. Portion AB is in x-z plane, BC in y-z plane   9
        and CD in x-y plane. AB and BC are semicircular in shape.

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