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ANJUMAN-I-ISLAM'S

KALSEKAR TECHNICAL CAMPUS, NEW PANVEL

School of Engineering & Technology

2011-12

Sem. I

UT-II

Subject: Computer Programming-1 **Marks:50**

Date: 1st Nov2011 **Duration: 2 Hr**

Se **Class: FE-All**

Please Note: Q1 is compulsory.

1. Find the output of the following: (10)

a)
```
main()
{       for(int i=0;i<8;i++)
{       if(i%2==0)
                cout<<i+1<<endl;
        else if(i%3==0)
                continue;
        elseif(i%5==0)
                break;
        cout<<"\nEnd of program";       }
cout<<"\nEnd of program"; }
```

b)
```
void main()
{       int a=1,b=2,c=3,d=4.75,x;
        x=++a+b++*++c%d++;
cout<<a<<b<<c<<d<<x; }
```

2. Write a program to print the following pattern: (10)

```
    1
   21A
  321AB
 4321ABC
54321ABCD
```

3.a) Write a program to check whether the entered number is prime . (5)

b) What is recursion? Write a program to find Fibonacci series up to n terms using recursive functions. (5)

4.Write a program to sort 10 floats in descending order. (10)

5.Write a program in C++ to transpose a matrix. (10)

6. Define a structure within a structure of Employee consisting of following elements: i)Code ii)Name iii)Salary and iv)Date of Joining
Accept and display data for 10 employees. (10)

7.a) Explain logical operators. Write a C++ program to demonstrate the same. (5)

b) What is object oriented programming? How it is different from procedure oriented programming? (5)

2011-12

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School of Engineering & Technology

ject: Applied Chemistry I
e: 2/11/11

Marks:50
Duration: 2 Hr
Class: FE-All

Please Note: Q1 is compulsory. Attempt any 4 out of remaining 6 questions.
At wts- C=12, O=16,N=14,S=32,Ca=40,Mg=24,Si=28,Na=23,H=1,K=39,Fe=56

1) a) Explain the terms a) Degree of freedom b) Components (3M)
b) Write a short note on a) Ultra filtration **OR** b)Solid lubricants (3M)
c) Explain Cloud point and Pour point.? (2M)
d) State Gibbs phase rule with equation ? **OR**
Distinguish between Hard water and Soft water ? (2M)

2) a) What is Phase rule.Explain the application of phase rule to one component system? (7M)
b) Find acid value of given sample of oil whose 20ml required 2.8ml of N/10 KOH during titration.State whether the oil is suitable for lubrication or not. (3M)
(Density of oil = 0.86gm/ml)

3)a) Explain the mechanism of lubrication of delicate instruments? (4M)
b) A water sample contains following impurities : $CaSO_4$ =136 ppm, $MgSO_4$ =120ppm, $MgCl_2$ = 95ppm,H_2SO_4=49ppm,$NaHCO_3$ =165.2mg/l, SiO_2=10ppm.Calculate amount of lime and soda required for treating 1 million litres of water ,if the cost of lime and soda are Rs 60 and Rs 350 resp per 100 kg.Calculate the total cost of treatment? (6M)

4) (a)Write a short note on Activated Sludge process ? (5M)
(b)A zeolite softner was completely exhausted by passing 100 litres of NaCl. How many litres of hard water having hardness of 50ppm can be softened by this softner.The concentration of NaCl is 200mg/l of soln. (5M)

5) (a)) Explain the application of Condensed phase rule to two component Lead –Silver system? (5M)
(b) An oil sample of saponification value 168 mgs KOH was saponified using 0.5 N HCl.Find the quantity of alcoholic 0.5N KOH consumed by oil per gram.Weight of oil used in the experiment is 5 gm? (5M)

6) (a) Explain the demineralization process with neat labelled diagram and reactions. Give advantages and disadvantages? (6M)
b) Calculate the temporary,permanent hardness of water containing, $Mg(HCO_3)_2$ = 7.3mg/l, $Ca(HCO_3)_2$ =16.2mg/l,$MgCl_2$ = 9.5mg/l,$CaSO_4$ =13.6 mg/l, NaCl=2.3mg/l. (4M)

7) (a) 20ml of SHW (containing 3g of CaCO3 per 200ml) required 25ml of EDTA soln for end point. 100ml of water sample required 18ml of EDTA soln.While same water after boiling required 12ml of EDTA soln. Calculate carbonate and non carbonate hardness of water. (5M)
b) What is Saponification number?How is it experimentally determined? State its significance? (5M)

2011-12

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KALSEKAR TECHNICAL CAMPUS, NEW PANVEL
School of Engineering & Technology

Subject: **Applied physics** Marks:50

Date:1/11/11 Class: FE-CE,EE Duration: 2 Hr

Please Note: Q1 is compulsory ,attempt any three questions from question nos,2 to 6.

1.(a)State applications of Hall effect. (2)

b)Explain the term 'DIAMAGNETISM IS THE TEST FOR SUPERCONDUCTIVITY' (3)

(c)In the orthorhombic crystal a lattice plane cuts intercepts of lengths 3a, -2b and 3c/2 along three axes Find Miller indices of the plane. Where a, b, c are primitive vectors of the unit cell. (3)

2.(a)What is Hall effect? Derive the expression for Hall coefficient R_H and Hall voltage V_H with proper diagram. (7)

b)Describe Type I and Type II superconductors? (7)

3.(a)Derive Bragg's law. (7)

b)Show that for an intrinsic semiconductor, the Fermi level lies halfway between conduction and valence band. (7)

4.(a)An X-ray beam of wavelength 0.71 A^0 is diffracted by a FCC crystal of density $1.99*10^3$ kg/m^3. Calculate the interplanar spacing for (2 0 0) planes and the glancing angle for the second order reflection from these planes. Given mol.wt of the crystal is 74.6 and Avogadro's no. is $6.023*10^{26}$/kg mole. (7)

b)What is Meissner effect? Explain the concept of MAGLEV train. (7)

5.a)Derive Packing factor for FCC.Cu has FCC structure and atomic radius 1.28A^0. Calculate its density if its atomic weight is 63.5 (Given Avogadro's no. is $6.023*10^{23}$ in CGS). (7)

b)Explain the formation of energy band in solids and classify the solids on the basis of energy band diagram. (7)

6.(a)Explain atomic arrangement in diamond structure and calculate (10)

Total number of atoms per unit cell(n)
) Co-ordination number (CN)
) Atomic packing factor (APF)
) Packing efficiency (PE)
Void space and density
) Also write the materials exhibiting diamond structure.

b)The interplanar spacing of (1 1 0) plane is 2 A^0 for a FCC crystal.Find the atomic radius. (4)

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ANJUMAN-I-ISLAM'S

KALSEKAR TECHNICAL CAMPUS, NEW PANVEL

School of Engineering & Technology

Subject: Applied Physics I **Marks:** 50 **Date:** 01/11/2011

Duration: 2 Hr **Class:** F.E (ME/EXTC/CO)

Note: 1) Q1 is compulsory.
2) Attempt any four out of six questions.
3) All Questions carry equal marks.
4) Figures to the right indicate full marks.

Q1) a) Write a short note on point defects in solids. 3

b) Derive the relation between lattice constant and density of diatomic solid. What changes you will make in it for mono atomic solids. 7

Q2) a) Draw the following in a unit cell for 3

$(00\bar{1})$, (101), [111]

b) Derive Bragg's law and explain its significance. 7

Q3) a) Define the following terms, 3

i) Electric Current Density

ii) Drift Velocity

iii) Mobility

b) Discuss the origin of X rays with the help of diagrams. 7

Q4) a) Explain Cubic Crystal system and find Packing Efficiency of FCC unit cell. 7

b) Calculate the glancing angle on the cube (100) of a rock salt if its lattice constant is 2.81 A°. The second order diffraction maxima occur for X rays of wavelength 0.714 A°. 3

Q5) a) derive the relation for mobility of electrons in a conductor. State its unit in SI system. 5

b) If the P. d applied across an X ray tube is 25 KV and current through is 10 mA. Calculate number of electrons striking the target per second and minimum wavelength of X rays. 5

Q6) a) Differentiate the solids on the basis of their energy band structure. 5

b) Cu has FCC structure and atomic radius 1.28 A°. Calculate its density if its atomic weight is 63.5. 5

Q7) a) Discuss the Fermi level in conductor at 0° K. 3

b) Show that Packing Factor for HCP is 0.74. 7

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Sem-I/2011

2011-12

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KALSEKAR TECHNICAL CAMPUS, NEW PANVEL
School of Engineering & Technology

Subject: Engineering Mechanics
Date: 02/11/2011

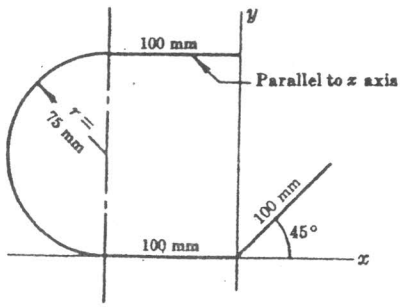
Marks:50
Duration: 2 Hr
Class: FE-EE

Please Note:

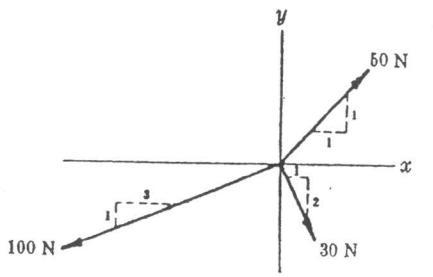
1. Q1 is compulsory.
2. Solve any four out of the remaining six questions.

1. All questions are compulsory.
   a. State Varignon's theorem and illustrate with an example how to apply it.
   b. What are the assumptions made in the analysis of a truss?
   c. What is Lami's theorem? When can you apply it?
   d. State De'Alembert's Principle.
   e. What is meant by radius of gyration?

2. Solve both the questions. Both questions carry equal marks.
   a. Find the centroid of the figure built up of the lines as shown in the figure.

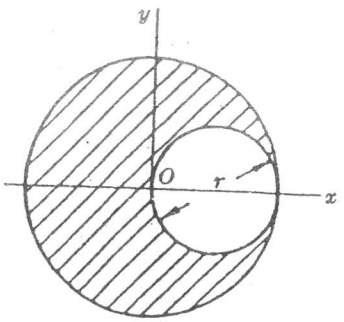


   b. Determine algebraically the resultant of the force system shown in the figure. Note that the slope of the action line of each force is indicated in the figure.



3. Solve both the questions. Both questions carry equal marks.

a. Determine the centroid of the area remaining after a circle of diameter r is removed from a circle of radius r, as shown in the figure.



b. Two cables support a mass of 225 kg as shown in the figure. Determine the tension in each cable.

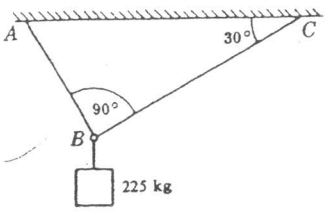
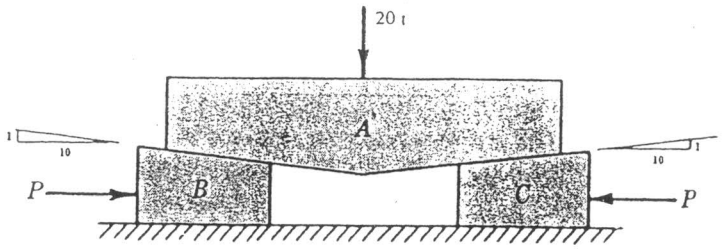


Fig. 1-21

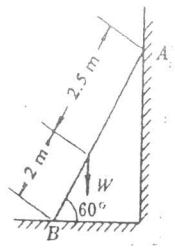
4. Solve both the questions. Both questions carry equal marks.

a. What horizontal force P on the wedges B and C is necessary to raise the 20 tonnes resting on A? Assume μ between the wedge and the ground to be 0.25 and between the wedges and A is 0.2. Also assume symmetry of loading.



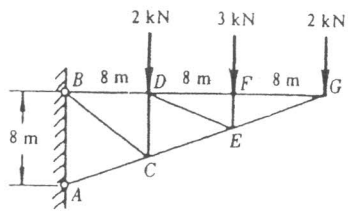
b. A local train starts from a station and reaches the next station 3.2 km away after 6 minutes. It accelerates during start and retards during stop at the uniform rate, and attains a uniform speed of 48 kmph in between.
Determine:
   i. The time interval and distance for each motion.
   ii. The acceleration of the train.

5. Solve both the questions. Both questions carry equal marks.
   a. A ladder shown in the figure is non-homogeneous. Its mass of 40kg may be considered concentrated 2m from the bottom. It rests against a smooth wall at A and on a rough floor at B. The coefficient of static friction between the ladder and the floor is 1/3. Will the ladder stand in the 60 degree position shown?



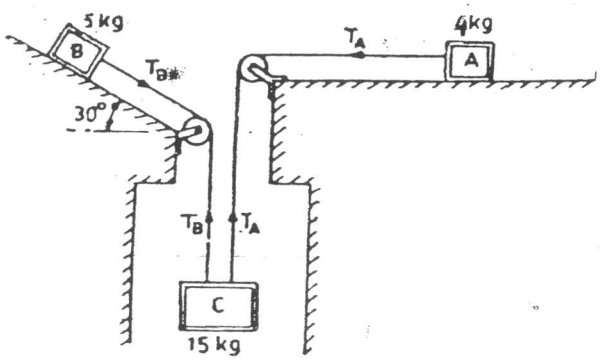
   b. At what angle a shot has to be fired with a velocity of 30 m/s to clear the top of a wall 15 m in front and 6 m high? What time will it take to hit the target?

6. Solve both the questions. Both questions carry equal marks.
   a. Determine the forces in all members of the cantilever truss shown diagrammatically in the figure.



   b. A system of weights shown in the figure is released from rest. find:
      i. The acceleration of the masses.
      ii. Tensions in the two strings.

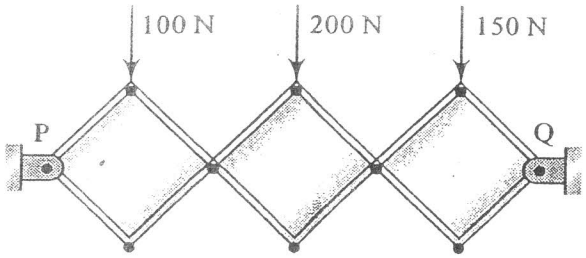
      Take coefficient of friction for the contact surfaces of bodies A and B as 0.4.



Solve both the questions. Both questions carry equal marks.

a. Two equal billiard balls meet centrally with speeds of 2 m/s and 2.5 m/s. What will be their final speeds after impact, if the coefficient of restitution is assumed to be 0.8. What is the loss of K.E. during impact?

b. Determine using the method of virtual work, the horizontal and vertical components of reactions at P and Q of the plane frame, as shown and loaded in the figure. The bars form three equal squares.



2011 12

Anjuman-I-Islam's Kalsekar Technical Campus EXAMINATION CELL New Panvel

Symbol of Secularism & National Integration

ANJUMAN-I-ISLAM'S
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL
School of Engineering & Technology

Subject: Engineering Mechanics
Date: 02 Nov. 2011

Marks: 50
Duration: 2Hr
Class: FE-[redacted] CO

Note: 1. Q1 is compulsory.
2. Attempt ant four out of remaining six questions.
3. All Questions carry equal marks.
4. Make assumptions, where necessary

Q 1.0 Attempt any FOUR.

(a) State the law of parallelogram of forces and prove it mathematically.
(b) State and prove Varignon's theorem.
(c) State the conditions of equilibrium for non-concurrent force system.
(d) Explain the parallel axis theorem for Moment of Inertia, with reference to rectangular area.
(e) A small steel ball is dropped from a very tall tower, calculate the distance travelled by the ball in its 10^{th} second fall.

Q2.0 (a)A force of 400N is acting at A. i) Find moment of force about 'O' by resolving it into components along OA and perpendicular to OA. ii) Determine the magnitude and direction of smallest force Q, applied at B which has the same moment as 'P' about 'O'. Refer Fig. 2(a).

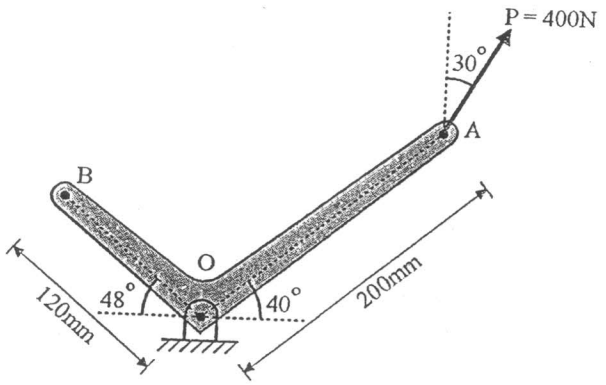
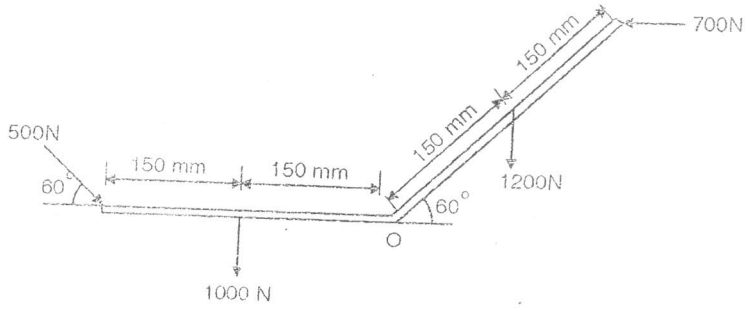


Fig. 2 (a)

2.0(b) A system of forces acting on a bell crank is as shown in Fig. 2(b) Determine the magnitude, direction and point of application of the resultant w.r.t 'O'.



Q3.0(a) Five concurrent coplanar forces act on a body as shown in Fig.3(a). Find the forces P and Q such that the resultant of the five forces is zero.

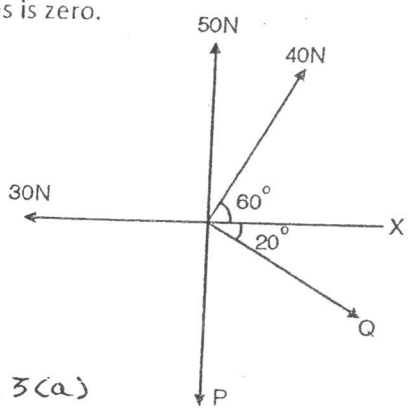


Fig. 3(a)

Q3.0(b) Two smooth cylinders are placed in a channel as shown in Fig. 3(b). Their respective diameters are indicated in figure. The weight of smaller cylinder is W and that of larger cylinder is 3W. Determine contact forces at points A, B, C and D. Draw neat FBDs. Take w=10kN.

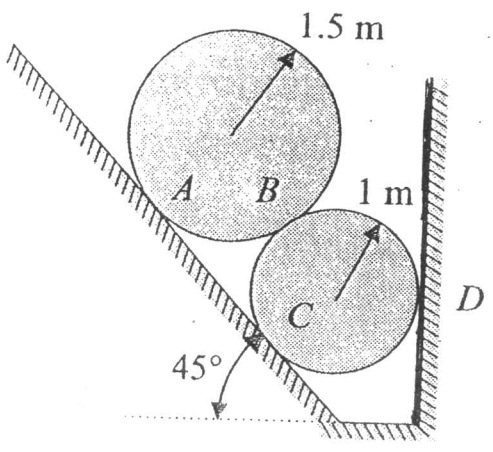


Fig. 3(b)

Q5.0(b) A block A shown in Fig. 5(b) weigh 2000N. The cord attached to the block passes over a smooth pulley and supports a weight of 800N. The value of coefficient of friction between block and horizontal plane is 0.25. Determine the value of force P, if the motion is impending towards left

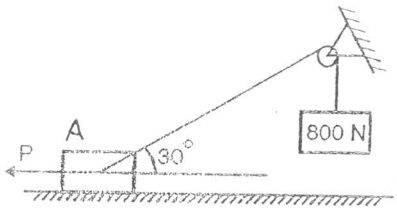


Fig. 5 (b)

Q6.0(a) A sprinter in a 100m race accelerates uniformly for the first 35m and then runs with constant velocity. If the sprinters time for first 35m is 5.4 seconds, determine his time for race.

Q6.0(b) A stone is dropped from the top of the tower. When it has fallen a distance of 10 m, another stone is dropped from a point 38 m below the top of the tower. If both the stones reach the ground at the same time, Calculate: i) the height of the tower ii) the velocities of the stones, when they reach the ground.

Q7.0(a) Determine the force 'P' to cause the motion to impend (start). Take masses of blocks A and B as 8 kg and 4 kg respectively and the coefficient of sliding friction as 0.3. The force 'P' and the rope are parallel to the inclined plane. Assume frictionless pulley.

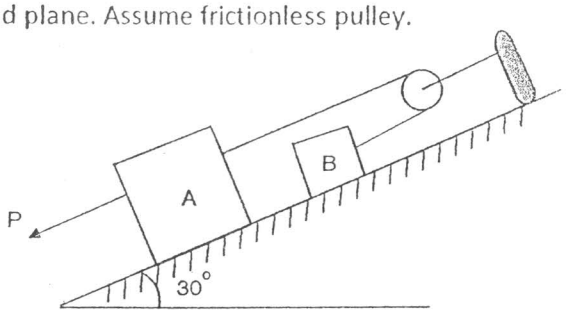


Fig. 7 (a)

Q7.0(b) An aeroplane is flying in a horizontal direction with a velocity of 540 km/hr and at a height of 2200m. When it is vertically above the point A on the ground, a body is dropped from it. The body strikes the ground at B. Calculate the distance AB (ignore the air resistance). Also find the velocity at B and the time taken to reach B.

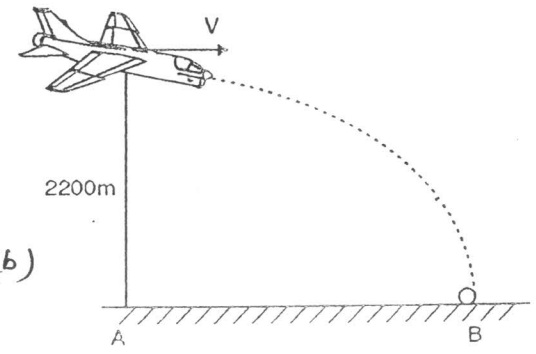


Fig 7 (b)

Q4.0(a) Find the reactions at the supports of the beam loaded as shown in Fig. 4(a)

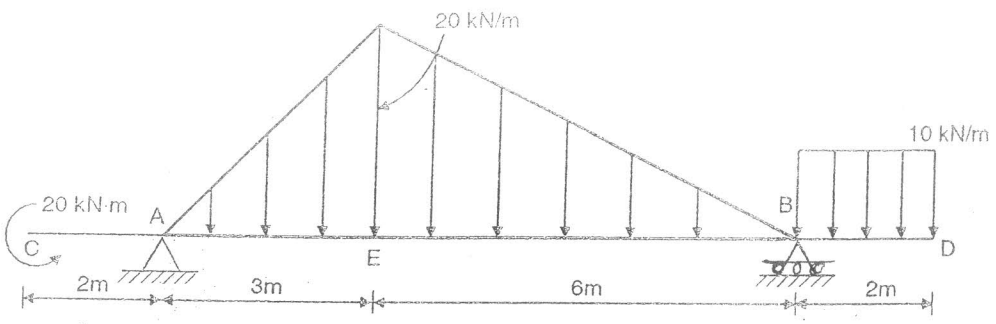


Fig.4(a)

Q4.0(b) A uniform ladder weighting 1000N and 10 m long is resting on rough horizontal floor and inclined at an angle of 30 deg with the vertical wall. The ladder would just slip if a man of 800N weight reaches a point that is 8 m from the lower end of ladder. If the coefficient of friction between wall and ladder is 0.3, determine the coefficient of friction between floor and ladder.

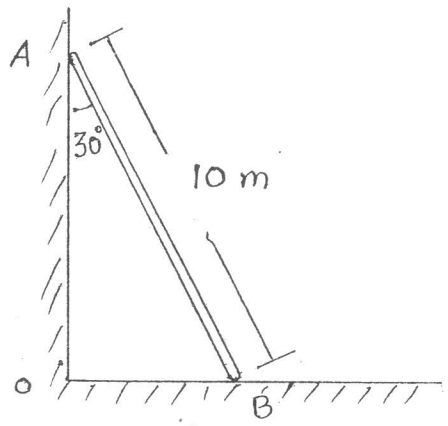


Fig. 4(b)

Q5(a) Find the forces in truss members AB, AF and BF.

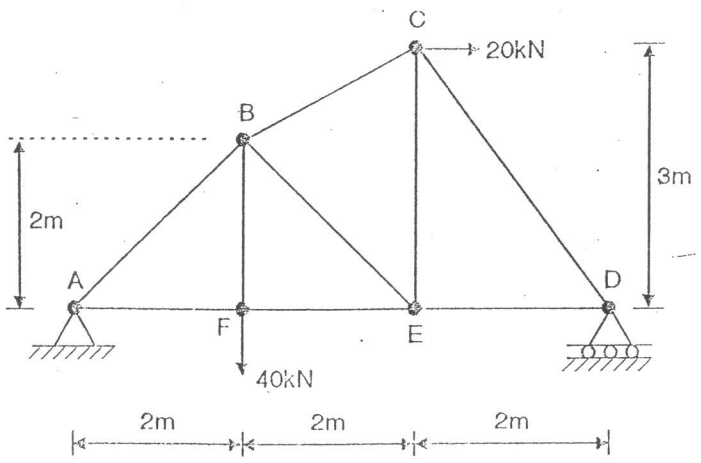


Fig. 5(a)

Sem IV 2011

2011-12

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ANJUMAN-I-ISLAM'S
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL
School of Engineering & Technology

Subject :ENGINEERING MECHANICS
Date: 2.11.11

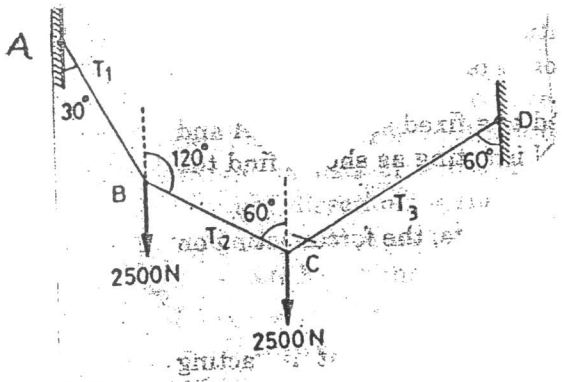
Marks:50
Duration: 2 Hr
Class: FE - CE/ME

Please Note: Q1 is compulsory. Attempt any four out of remaining 6.

Q 1 Attempt any two

1 State Varignon's Theorem.
2 State Lami's Theorem.
3 State Assumptions made in analysis of truss.
4 State Laws of friction.

2 (a) Two equal loads of 2500 N are supported by a flexible string *ABCD* at points *B* and *C*. Find the tensions in the portions *AB*, *BC* and *CD* of the string.



(b) Two men support a weightless wooden beam *AB* with a weight of 1000 N hanging from the beam as shown in Fig. 3. Find the load shared by the each man.

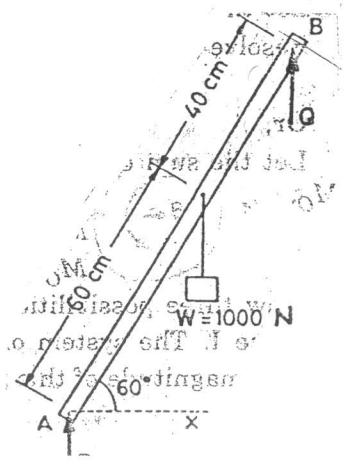
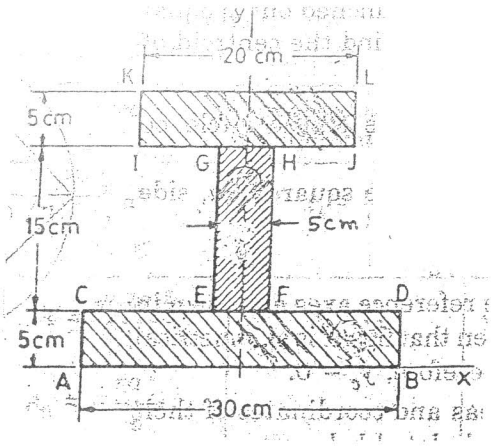


FIG 3

Q3 (a) Determine the centroid of the cross-sectional area of an unequal I-section.



(b) Referring to Fig. 1 determine the location of centroid of the shaded area.

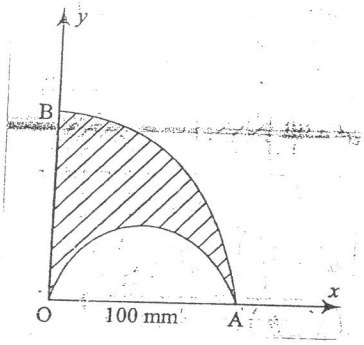


FIG 1

Q4 (a)

Determine the moments of inertia of the shaded area about the x-axis and y-axis. Refer Fig. 2

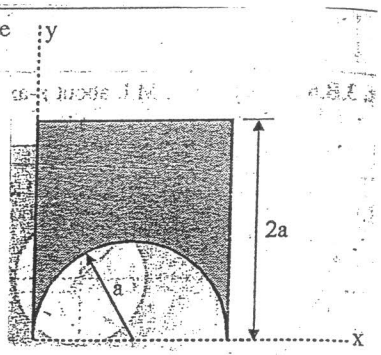
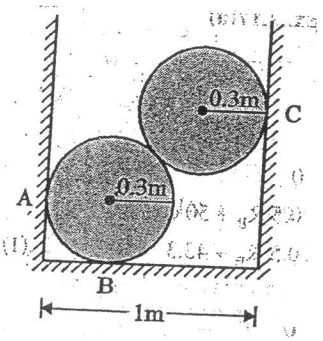


FIG 2

(b)

The cylindrical rollers of weight 50 N each are placed inside a cup. Find reactions at points of contact



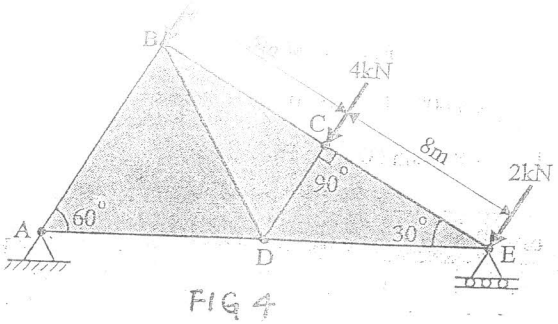


FIG 4

A force of 100 N is acting on a bracket as shown in Fig. 5. Determine

1) An equivalent force-couple system at 'A'.
2) An equivalent system consisting of a 300 N force at 'B' and another force at 'A'.

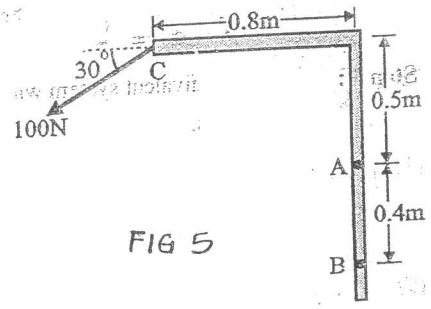
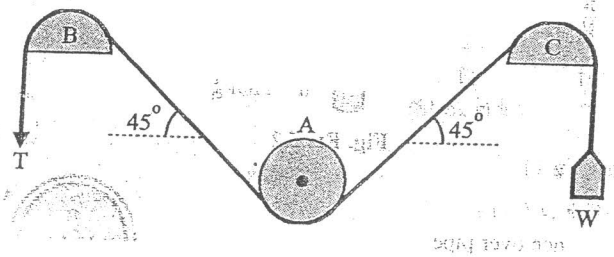


FIG 5

The maximum tension that can be developed in belt is 600 N. If the pulley A is free to rotate and coefficient of static friction at fixed drums B and C is 0.25. Determine the largest mass of block that can be lifted.



The maximum allowable force

Tension or compression) in AB, AF and GF is 2.5 kN. Determine the maximum permissible load P on the s shown in Fig. 6

SE METHOD OF SECTIONS

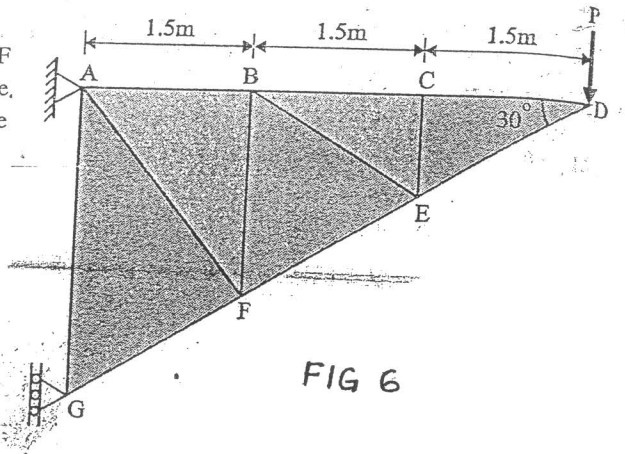


FIG 6

ladder of length 7 m leans against a wall as shown in

Assuming that the co-efficient of static ction μ_s is zero at B. Determine the smallest value μ_s at A for which equilibrium is maintained.

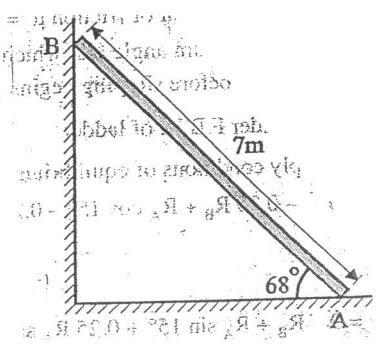


FIG 7

flat belt the initial tension is 175kg.The lap angle on smallest pulley is 170°. If $\mu = 0.25$, mine the power transmitted at a speed of 520 r.p.m. If diameter of pulley is 85cm. Neglect C.F.