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

(2013 - 14)

Subject: Engineering Mechanics   Marks: 20
Unit Test: 2   Duration: 1 Hr
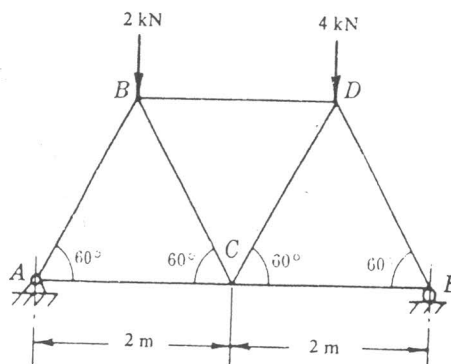Oct-13
Semeste: I   Test - II   Branch: A,D.

Q. 1. Attempt any six of the following questions (2marks x 6 = 12 marks).

a. State the assumptions in the analysis of a truss.

b. Find the support reactions of the truss shown in the figure.

c. The motion of the particle is given by the equation $x = t^3 - 3t^2 - 9t + 81$. Determine the location, time and acceleration of the particle when the velocity becomes zero.

d. A car is driven at 70 km/hr on a road of radius 200 m. find the normal and tangential components of the acceleration.

e. A varying force $\vec{F} = (t^2 \vec{i} + 2t \vec{j})$ Newtons is applied on a particle from time t = 0 sec to t = 3 sec. Determine the impulse of the force in 3 sec.

f. A stone is dropped from the top of a tower. During the last second of its fall it is observed to fall to one-third its height. Estimate the height of the tower.

g. For the a-t plot shown in the figure what is the distance covered by the particle in 50 s?

20 – test
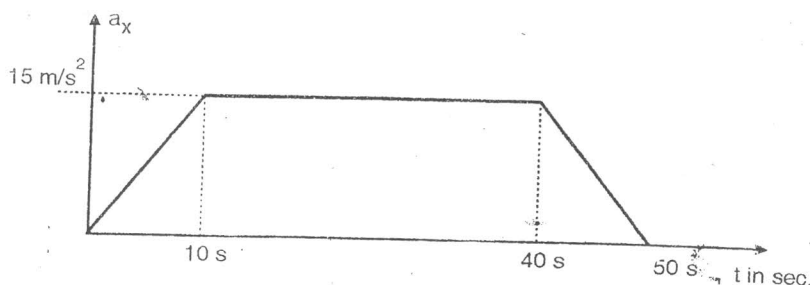
Q. 2. Attempt any two of the following questions (4 marks x 2 = 8 marks).

a. Find   the   forces   in   the   members   of   the   truss   shown   in   the

2 kN

4 kN

B

D

60°

60°   C   60°

60°

A

E

2 m

2 m
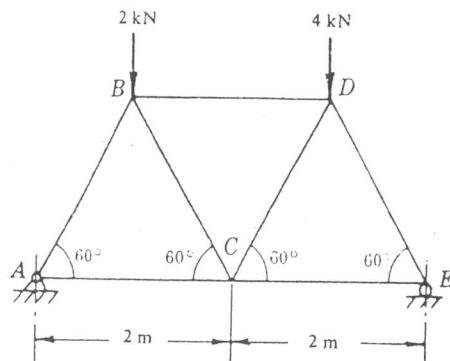
b. A ball is thrown with a velocity of 30 m/s at an angle of 30° from the top of a building 20 m high. W
where will it strike the ground?

c. A ball of mass 1 kg moving with a velocity of 2 m/s impinges directly on a ball of mass 2 kg at rest.
ball after impinging comes to rest. Find the velocity of the second ball after the impact and the co
of restitution.

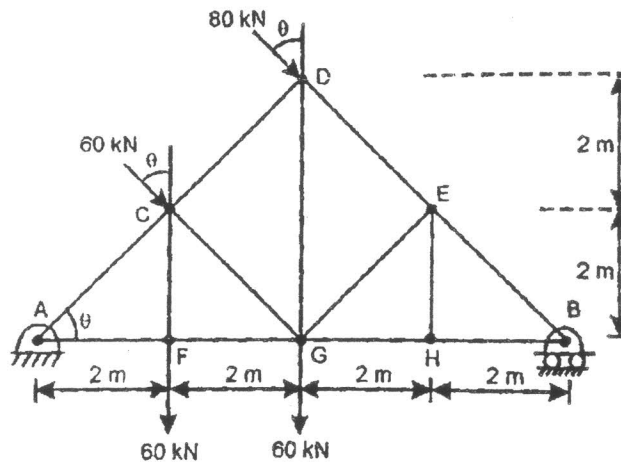|	
Subject: Engineering Mechanics	Date: ___02.13___
Marks: 20	Duration: 1 Hr
Class: FE - B Div (I) Test II	Branch: EXTC (2013-14)

Q-1 Solve the Following (Any one) (08 Marks)

1) For the roof truss shown
   a) Find Support Reactions
   b) Find force in CD, CG and GF by Method of sections
   c) Find forces in members at joint A,

2. The acceleration of particle is defined by $a = - k.v^2$. When time t=0, displacement is zero and velocity is 16 m/s. When x=6 m, v = 4m/s. Determine the time when v= 6m/s.

## Q2. Solve the following (Any Three) (4*3 = 12)

1. To raise a heavy stone block weighing 2000 N, the arrangement shown is used. What horizontal force P is required to be applied to the wedge in order to raise the block. Coefficient of friction between all surfaces is 0.25. Neglect the weight of the wedges.


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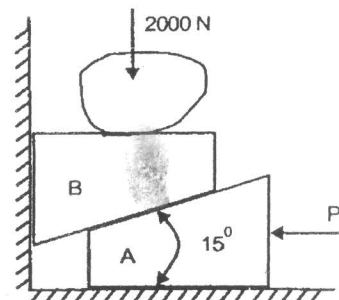
2. Two Smooth Spheres of Weight 100N and of radius 250mm each are in equilibrium in a Horizontal Channel of width 900mm as shown in fig (b). Find the Reaction at the surface of contact A, B, C, and D. Assuming all the surfaces to be smooth.
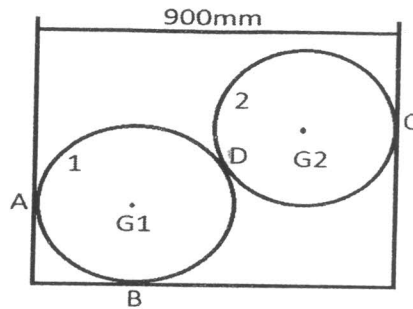
3. For the v-t graph shown, Draw x-t curve and a-t curve, Determine distance travelled by car in 50 secs.
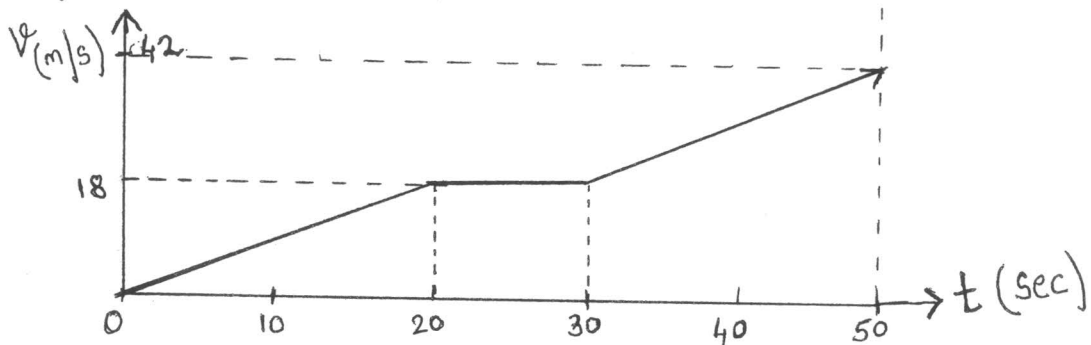
4. Force F1 = 500 N, F2 = 800 N and F3 = 600 N act on a vertical mast AB as shown. Find the Resultant moment of the forces about origin. A (0,0,0), B(0,0,5) C(0,-4,0) D (-3.2,0), E (-3,-5-0) F (0,0,5).
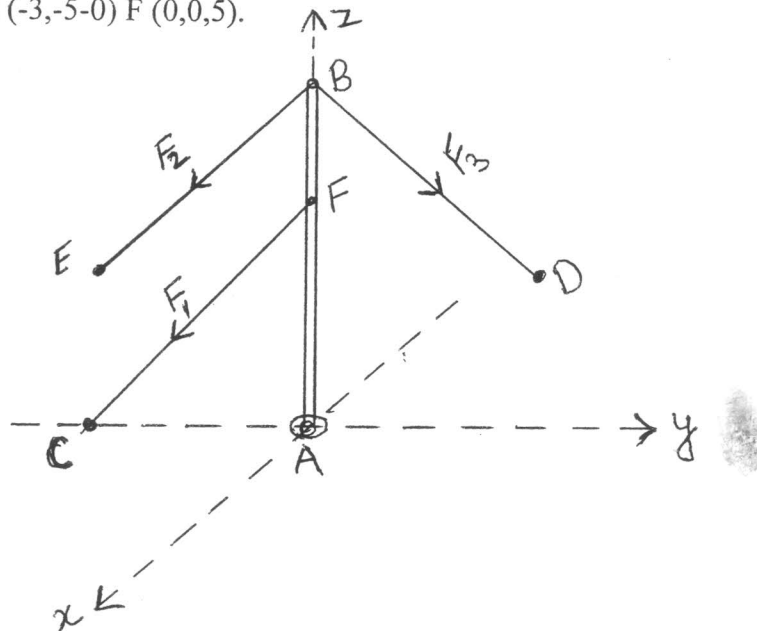
--------------Best of Luck-----------------

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Subject: Engineering Mechanics	**Date: 23.10.2013**
Marks: 20	**Duration: 01Hr**
Class: FE – Division C (I)	**Branch: Mechanical Engg.**

Instructions: 1. All questions are compulsory.
  2. Figures to the right indicate maximum Marks.
  3. Use of non-programmable calculator is permitted.

Test -II

1. Attempt Any Four. (12)
   a. What are the laws of friction?
   b. What is rectilinear motion, write equations of motion of a particle with uniform acceleration
   c. Define: Projectile, Angle of projection, Time of flight, Range.
   d. Locate centroid of T- section with flange of 100 mm x 20 mm and web of 20 mm x 100 mm.
   e. A vertical lift of weight 10 KN moving from rest with constant acceleration acquires an upward velocity 4 m/sec over a distance of 5 m. Determine the tension in the cables supporting the lift.
   f. An automobile is decelerating from a speed of 60 kmph at the rate of 1.5 m/sec^2.
      How long will it take to come to rest & how far will it have gone.

2. Attempt Any One. (04)
   a. A stone is dropped down the well and 5 sec later the sound of splash is heard. If the velocity of sound is 330 m/sec, what is the depth of the well?
   b. Locate centroid of shaded area shown in fig.1.

3. Attempt Any One. (04)
   a. A body is projected upward with a velocity of 30 m/sec at an angle of 300 with the horizontal. Find- Time of flight, Maximum height attained by the body & Range.
   b. Determine force P cause motion to impend. Take masses of block A & B as 9 Kg & 4 Kg respectively & the coefficient of sliding friction as 0.25. The force P & rope are parallel to the inclined plane as shown in fig.2.
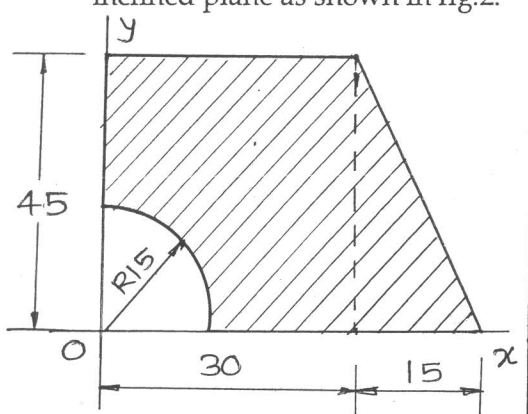
(FIG.NO.1)
(Q.2.a)
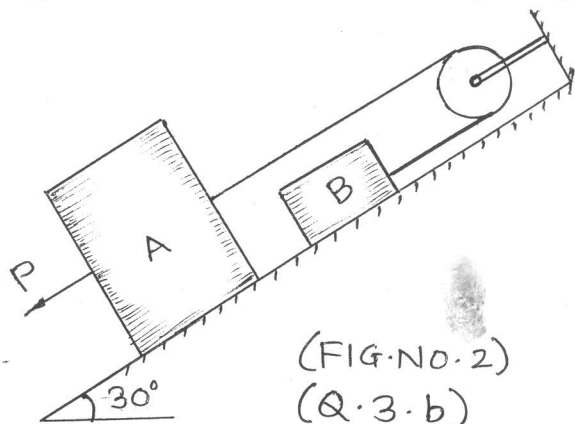
(FIG.NO.2)
(Q.3.b)

ANJUMAN-I-ISLAM'S
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL

School of Engineering & Technology   (2013-14)

Subject: ENGINEERING MECHANICS.	Max. Marks: 20
Date: 23.10.2013 UNIT TEST - II	Duration: 1 hr.
Class: F.E. (Sem I)	DIV.: E

INSTRUCTIONS:

All questions are compulsory.
Use suitable data if necessary
Numbers in the parenthesis are right to indicate full marks.

Q.NO.1) Attempt any **THREE**

    i) Find the support reactions for the beam loaded and supported
       as shown in figure (1) .   [4]

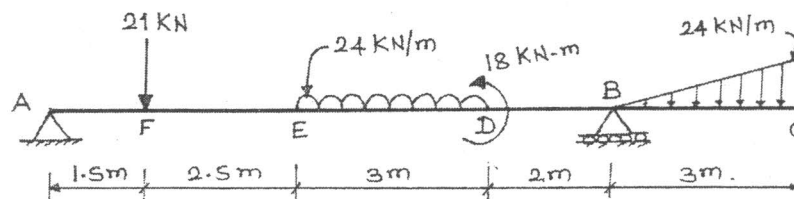

Fig.(1)

    ii) Determine the force 'P' to cause motion to impend, if the
        co-efficient of friction for the blocks and the plane is 0.25 and
        the pulley is frictionless. The force 'P' and the strings are
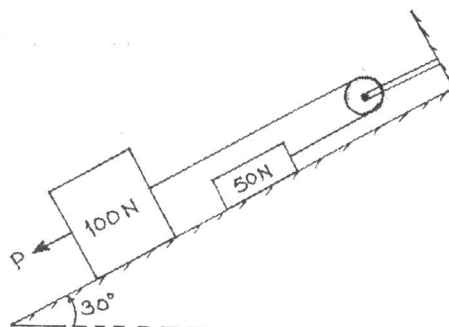   parallel to the inclined plane as shown in figure (2).   [4]

Fig.(2)

    iii) Ship A is moving north-west at a speed of 18km/hr. and the
        ship B is moving east at a speed 9km/hr. Find the magnitude
        and direction of the relative velocity of the ship B with respect
        to the ship A.   [4]

iv) A particle moves along a straight line so that its displacement in
meter from a fixed point is given by, $s = t^3 + 3 t^2 + 4t + 5$.
Find i) Velocity at start and after 4 seconds,
ii) Acceleration at start and after 4 seconds. [4

Q.NO.2) Attempt any **ONE**

a) The acceleration-time diagram for the linear motion is shown
in figure (3). Construct v-t and s-t diagrams for the motion
assuming that the motion starts with an initial velocity of 5m/s
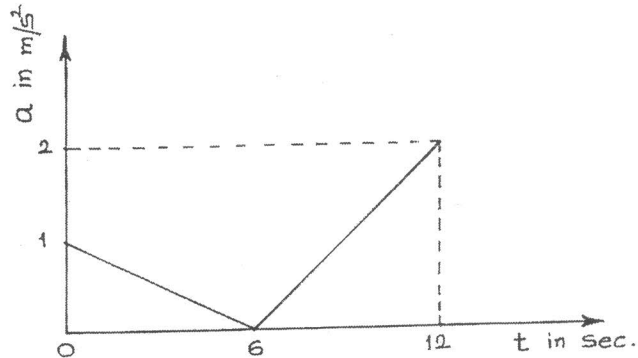from the starting point. [8

Fig.(3) a-t diagram.

b) Two cylinders, 'A' of weight 4000N and 'B' of weight 2000N
rest on smooth inclines as shown in figure (4). They are connected
by a bar of negligible weight hinged to each cylinder at its geometric
centre by smooth pins. Find the force 'P' to be applied such that
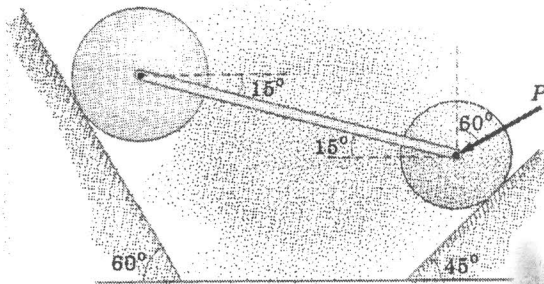it will hold the system in given position. [8

Fig.(4)

2/2

Subject: Engineering Mechanics	Date: Oct-13
Marks: 20	Duration: 1 Hr
Class: FE- F Div (I) Test-II	Branch: Computer

Q-1 Solve the Following (Any Two)   (4*2 = 08 Marks)

1) The position of a particle which moves along a straight line is defined by the relation….
$X = t^3 - 6t^2 - 15t + 40$, where "X" is in meters and "t" is in second.
Determine:-
a) The Time at which velocity will be Zero
b) The Position and Distance travelled by particle at that time.
c) The Acceleration at that time.
d) The distance travelled by particle from t=4 sec to t=6 sec.

2) The Beam AB Supports Two Concentrated Load and rests on the Soil which exerts a linearly distributed reaction as shown in fig (a). If $W_A = 118$ KN/m.   AB= 1m
Determine (i) Distance "a" and (ii) The corresponding value of W_B in KN/m.
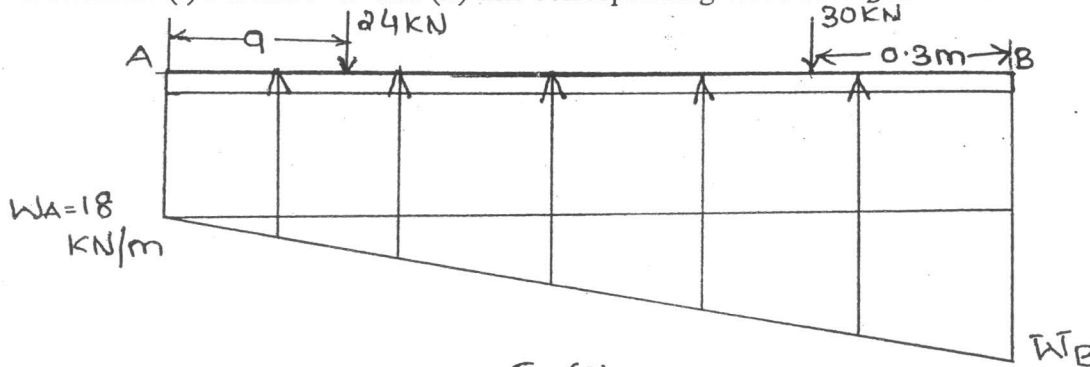
Fig (a).

3) Find the Forces in all the members of the truss as shown in fig (b). By Method of Joints at (B and C). Point "A" having a Hinge Support and Point "D" having a Roller Support.
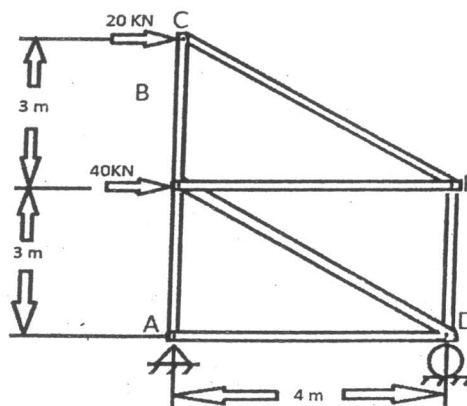
Fig (b)

4) A car cover a distance of 100m in 6sec & it takes 5sec to cover next 120m. Find the Initial velocity of the car and uniform Acceleration of the car.

Subject: Engineering Mechanics	Date: _____
Marks: 20	Duration: 1 Hr
Class: FE- G Div (I)	Branch: Civil (Second Shift) Test -II

Note: 1) Q.1 is compulsory

Q-1 Attempt any **ONE (08 Marks)**
1) For the roof truss shown
   a) Find Support Reactions
   b) Find force in CD, CG and GF by Method of sections
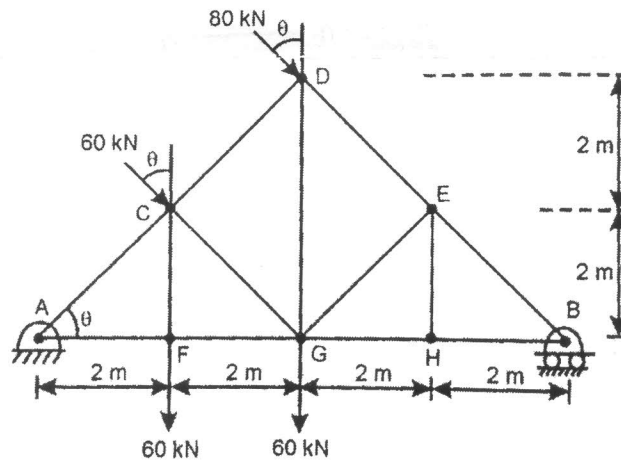
2) To raise a heavy stone block weighing 2000 N, the arrangement shown is used. What horizontal force P is required to be applied to the wedge in order to raise the block. Coefficient of friction between all surfaces is 0.25. Neglect the weight of the wedges.
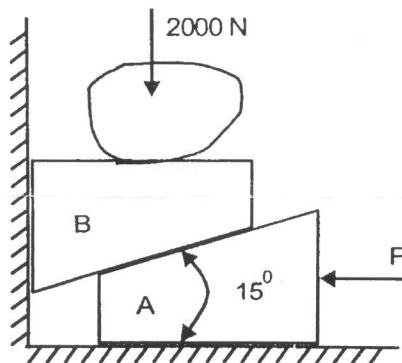
Q.2 Attempt any **TWO** (6+6= 12)

1) Locate centroid of shaded plane lamina shown in fig.
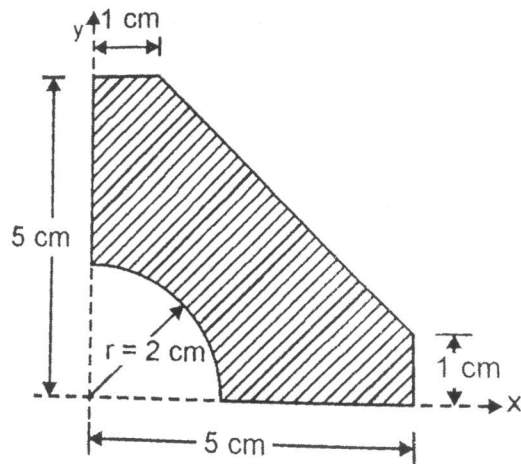
3) A stone is released from the top of the tower. During the last second of its motion, it covers $1/4^{th}$ of the height of the tower. Find the hight of the tower.

4) Cars P and Q are traveling in parallel lanes on a straight highway with a uniform velocity of 72 kmph. Car P is ahead of car Q by 200m. At a certain instant, car P decelerates uniformly at 2.5 m/s^2, whereas car Q accelerates uniformly at 2 m/s^2. When and where will the car Q overtake car P.

---------------Best of Luck----------------

Subject : Applied Chemistry I	Marks: 15
Test : II	Duration: 1hr
Class : FE Sem I	Branch : All
DT : 22/10/13	

Test II

Instructions:

At Wts: H=1,C=12,O=16,S=32,Cl=35.5,Na=23,Mg=24,Ca=40,N=14,Si=28,K=39

Note : 1. Question **No 1** is compulsory.

2. Attempt **any one** from the remaining two questions

Q1 Attempt **any three** of the following: 6M
   a. Distinguish between thermosoftening and thermosetting plastics?
   b. Define COD and BOD?
   c. Write preparation and uses of Kevlar?
   d. Define vulcanization of rubber and give its reaction?
   e. Draw neat labelled diagram of Osmosis and Reverse osmosis?

Q2   Attempt the Following:
   a. Write a short note on Activated sludge process to control water pollution?   5M

   b.   A sample of polluted water on analysis gave the following results :   4M
       Supended matter = 200 mg/l ,$CaSO_4$ =250 mg/l, $MgCl_2$ = 190mg/l,$MgSO_4$ = 240
       mg/l,H_2SO_4=98 mg/l,organic matter = 750mg/l.Calculate the amounts of lime and
       soda needed per litre for its treatment if the purity of lime is 90% and that of soda
       is 98%?

Q3 Attempt the Following:
   A. Explain Injection moulding with the help of neat labelled diagram?   5M

   B. Hardness of 77,500 litres of water was completely removed by zeolite method.   4M
      The exhausted zeolite softener then required 15 litres of 2% NaCl solution for
      regeneration. Calculate hardness of water sample?

Q 1 Solve any <u>two</u> problems.   (08)

1) If z = tan (y + ax) + (y − ax)$^{3/2}$ prove that $\dfrac{\partial^2 z}{\partial x^2} = a^2 \ \dfrac{\partial^2 z}{\partial y^2}$

2) If x = u v   and   y = u/v Prove that   J J' = 1

3) Fit a straight line to the data and estimate the production in the year 1995 .

Year	1951	1961	1971	1981	1991
Production in thousand tons	10	12	08	10	13

Q 2 Solve any <u>two</u> problems.   (12)

1) Solve the system of Equations using Gauss Seidel Iteration Method.

   3 x - 0.1 y − 0.2 z = 7.85 , o.1 x + 7 y -0.3 z = -19.3, 0.3 x-0.2 y +10 z =71.4

2)Find the Extreme values of the function.

   U = x^3 + 3 x y^2 -3 x^2 − 3 y^2 + 7

3) State and prove Euler's Theorem for homogeneous function of <u>three</u> variables

   and verify the same for u = $\sqrt{x}$ +$\sqrt{y}$ +$\sqrt{z}$.

Symbol of Secularism & National Integration

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Subject: ELECTRICAL AND ELECTRONICS MEASUREMENT	Date:21/10/13
Marks: 20 BEE	Duration: 1 Hr/s
Class: FE ELECTRICAL (I) Test -II	Branch:ALL FE

Q1)Attempt any 5 out of 7 (10 Marks)

1) For instantaneous current i=10sin(100t + Π/3). Find (i) RMS value, (ii) Average value.
2) For instantaneous voltage v=150sin(3000t + Π/4). Find i) Peak factor ii) Form Factor
3) For instantaneous current i=30sin(4000t + Π/6). Find i) Frequency ii) Time period
4) Voltage drop across four series connected impedance is

$$V_{1=}60\sin\left(\omega t + \frac{\pi}{6}\right) \; ; \; V_{2=}75\sin\left(\omega t - 5\pi/6\right)$$

$$V_{3=}100\cos\left(\omega t + \frac{\pi}{4}\right) \; ; \; V_{4=}V_m\sin(\omega t + \emptyset) \;.\; \text{Calculate } V_4 \text{ if voltage}$$

applied across the circuit is V=140 sin $(\omega t + 3\pi/5)$

5) Find Zeq and Yeq for the circuit
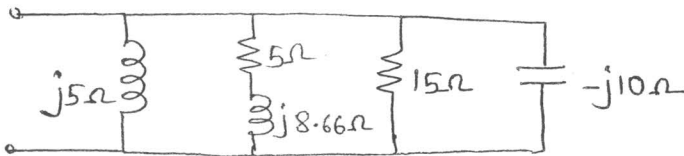
6) An RMS voltage of $100 \angle 0°$ is applied to a series combination of Z_1 and Z_2 when $Z_1 = 20 \angle 30° \, \Omega$. The effective voltage drop across Z_1 is $40 \angle -30° \, V$. Find reactive component of Z_2

7) A series circuit consumes 2000W at 0.5 leading power factor when connected to 230V 50Hz AC supply. Calculate (i) KVA , (ii) KVAR , (iii) Current.

Q2) attempt any 1 out of 2   (5 Marks)

1) An iron cored coil takes 4A at a power factor of 0.5 when connected to a 200V, 50Hz. When the iron core is removed. The voltage is reduced to 40V, the current rises to 5A at a power factor of 0.8. find the iron loss in core and inductance in each case.
2) Resistor R in series with a capacitance C is connected to a 240V, 50Hz AC supply. Find the value of C so that R absorbs 300W at 100V. find also the maximum energy stored in a capacitor C.

Q3) Attempt any 1 out of 2   (5 Marks)

1) A coil having power factor of 0.5 in series with a 79.57 μF capacitor and connected across a 50 Hz supply. The potential difference across the coil is equal to the potential difference across the capacitor. Find the resistance and inductance of the coil.
2) Choke coil is connected in series with a fixed resistor. A 240V 50 Hz supply is applied and current of 2.5A. how if the voltage drop across the coil anf fixed resistor are 140V and 160V calculate i) Resistance ii) Inductance iii) value of fixed resistors iv) power drawn by coil.

Subject: Environmental science	**Date:** /10/13
Marks: 15	**Duration:** 1 Hr.
Class: FE (I)	**Branch:** All Test - II

Instructions: 1. Question No. 1 is **compulsory**
2. Attempt any 3 questions out of remaining 4 questions.
3. Figures to the **right** indicate marks

1. Attempt any 3 of the following-   (3x2=6)
   (a) What is the structure of an ecosystem?
   (b) What are renewable energy sources and their advantages?
   (c) What is sustainable development?
   (d) Draw a neat labelled schematic diagram of Hydropower plant used to generate electricity.

2. Explain the working principle of Bag House filter.   (3)

3. What do you understand by photochemical smog?   (3)

4. Explain the concept of 3R.   (3)

5. What are the main functions and powers of Central Pollution Control Board?   (3)