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Roll No.

SECOND SEMESTER

B.E. (CE)

MID SEMESTER EXAMINATION **MARCH**

2005

CE-111 ENGINEERING ECONOMICS & ACCOUNTANCY

Time: 1 Hour 30 Minutes

Max. Marks : 20

Note : Attempt **ALL** questions.
Assume suitable missing data, if any.

- 1 Fill up the blanks: 3
 - [a] Income tax is _____ tax.
 - [b] In case of giffen goods, increase in income leads to _____ in demand.
 - [c] In practice, Technical efficiency can never be _____ than 100%.
 - [d] For survival and growth of any business, Economic efficiency should be _____ than 100%.
 - [e] Under Adverse balance of payment situation, value of export is _____ than value of import.
 - [f] Cost on machine will be included under _____ cost.
- 2 Differentiate between following: 9
 - [a] Micro economics and Macro economics
 - [b] Direct tax and Indirect tax
 - [c] Opportunity cost and Actual cost
- 3 What is inflation? 2
- 4 What do you mean by Money? 2
- 5 Why Sunk cost is not relevant for engineers? 2
- 6 What is Accounting? 2

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SECOND SEMESTER

B.E. (CE)

MID SEMESTER EXAMINATION **MARCH 2005**

CE-112 MATHEMATICS - II

Time: 1 Hour 30 Minutes

Max. Marks : 20

Note : Answer **ALL** questions.
Assume suitable missing data, if any.

1[a] If $u = \log \left(\frac{x^4 + y^4}{x + y} \right)$, by Euler's theorem show that

$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 3$$

[b] If $u = f(r)$ and $x = r \cos \theta$, $y = r \sin \theta$, prove that

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = f''(r) + \frac{1}{r} f'(r)$$

[c] Find the points on the surface $z^2 = xy + 1$ nearest to the origin.

(7)

2[a] Find the rank of the matrix

$$\begin{bmatrix} 5 & 3 & 14 \\ 0 & 1 & 2 \\ 1 & -1 & 2 \\ 2 & 1 & 6 \end{bmatrix}$$

[b] For what values of λ and μ , the system of equations :

$$x + y + z = 6$$

$$x + 2y + 3z = 10$$

$$x + 2y + \lambda z = \mu$$

has (i) no solution (ii) a unique solution
(iii) an infinite number of solutions.

[c] Verify Cayley Hamilton theorem for the matrix

$$A = \begin{bmatrix} 2 & -3 \\ 4 & 1 \end{bmatrix} \text{ and hence find } A^{-1}.$$

(6)

3[a] Evaluate the double integral

$$\int_0^{1/2} \int_0^1 f(x, y) dy dx$$

$$\text{where } f(x, y) = \frac{x}{\sqrt{1-x^2-y^2}}$$

[b] Evaluate $\iiint \frac{dx dy dz}{\sqrt{1-x^2-y^2-z^2}}$, the integral being extended to the positive octant of the sphere $x^2+y^2+z^2=1$.

[c] Change the order of integration in

$$\int_0^\infty \int_x^\infty \frac{e^{-y}}{y} dy dx \text{ and hence find its value.}$$

(7)

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SECOND SEMESTER

B.E. (CE)

MID SEMESTER EXAMINATION **MARCH 2005**

CE-113 PHYSICS-II

Time: 1 Hour 30 Minutes

Max. Marks : 20

Note : Answer **ALL** questions.
Assume suitable missing data, if any.

- 1[a] What are the conditions under which Maxwell Boltzman distribution law is applied? (1½)
- [b] Write the physical significance of Clayperan-Clausius equation. (1½)
- [c] Calculate the change in temperature of boiling water when the pressure is increased by 27.12 mm of Hg. (Given : Normal B.P of water is 100 C, $L = 537 \text{ cal/g}$, specific volume of water is 1674 cm^3) (2)
- 2[a] Define temperature of inversion. (1)
- [b] Absolute zero is not attainable. Explain. (1)
- [c] What is the point of inflexion? Calculate the Van der Waal's constants for dry air. ($T_c = 132 \text{ K}$, $P_c = 37.2 \text{ atm}$, $R/\text{mol} = 82.07 \text{ cm}^3 \text{ atm/K}$) (2)
- [d] How entropy is related to the Third law of Thermodynamics. (1)
- 3[a] Explain the need of radial magnetic field in a D'Arsonval moving coil galvanometer. How it is obtained? (1)
- [b] What is a ballistic galvanometer? State the conditions necessary for a moving coil galvanometer to be ballistic. How are they obtained? (2)
- [c] A resistor with resistance $10 \text{ M}\Omega$ is connected in series with a capacitor of capacitance $1 \mu\text{F}$ and a battery of emf 12 V. Before the switch is closed at time $t = 0$, the capacitor is

uncharged (i) What is the time constant? (ii) What fraction of the final charge is on the plates at time $t = 46 \text{ sec}$? (iii) What fraction of the initial current remains at $t = 46 \text{ sec}$? (2)

4[a] State Ampere's circuital Theorem and obtain its differential form. (1)

[b] A wooden ring whose mean diameter is 14.0 cm is wound with a closely spaced toroidal winding of 600 turns. Compute the magnitude of the magnetic field at the centre of the cross-section of the windings when the current in the winding is 0.650 A . (2)

[c] Define 'polarization'. Name and briefly explain various types of polarization. (2)

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SECOND SEMESTER

B.E. (CE)

MID SEMESTER EXAMINATION **MARCH**

2005

CE-114 ENGINEERING STATICS

Time: 1 Hour 30 Minutes

Max. Marks : 20

Note : Answer any **FOUR** questions.
All questions carry **EQUAL** marks.
Assume suitable missing data, if any.

1. A barge is pulled by two tugboats. If the resultant of the forces exerted by the tugboats is a 5000 N force directed along the axis of the barge, determine the tension in each of the ropes knowing that $\alpha = 45^\circ$

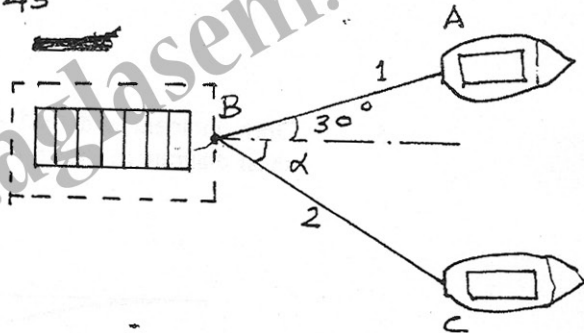
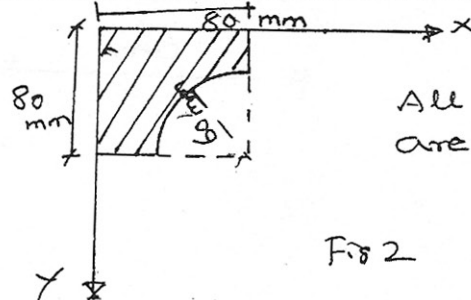


Fig.1

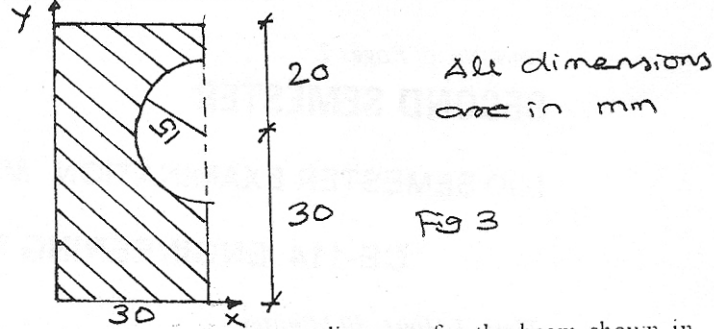
2. Calculate the moment of Inertia of the shaded area about the x-axis.



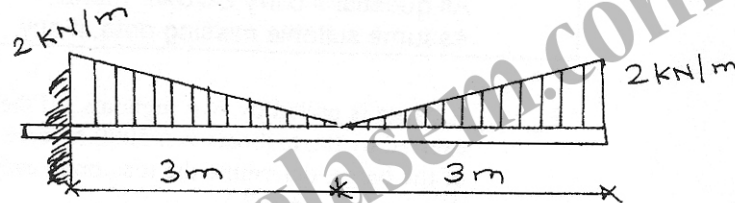
All dimensions
are in mm

Fig 2

3. Locate the centroid of the plane area shown in Fig. 3.



4. Draw the shear and moment diagrams for the beam shown in Fig. 4.



5. Draw moment and load diagrams corresponding to the given shear diagram as shown Fig. 5.

