12/10/15 ATKT old

VCD F.Y.B.Sc.(SEM I)2015-16 PHYSICS-I MARKS-75 TIME : 2:30hrs

NOTE: Numbers in the right indicate marks.
All questions are compulsory.
Use of calculators is allowed.

Q.1) Answer the following: **(20 marks)**

A) Derive Bernoulli's equation. What principle is it based? Is the equation applicable for a real liquid flow? (8M)

OR

A) For homogenous isotropic medium material show that $Y=3K(1-2\sigma)$. (8M)

B) State and explain Newton's Ist, IInd and IIIrd laws of motion with example. (7M)

OR

B) Derive Poisseulle's law for a liquid flowing in a narrow tube state the assumption made. (7M)

C) Define Poisson's ratio. Show that the theoretical limiting value of Poisson's ratio is 1 and 0.5. (5M)

OR

C) Define: Angle of friction, Coefficient of friction and Law of friction. (5M)

Q.2) Answer the following: **(20 marks)**

A) Derive the expression by a perfect gas in an isothermal expression and in the adiabatic change (8M)

OR

A) Explain the application for the first law of thermodynamic in real gas. Thus derive the expression by using $\beta=\frac{1}{V}\left(\frac{\partial V}{\partial T}\right)_p$ (8M)

B) What is phase transition? Explain free expansion of Gas-Joule's law. (7M)

OR

B) What is meant by phase transition? Show that the change in internal energy of a substance when it undergoes a phase change is given by $\Delta U = mL - p(V_2-V_1)$ (7M)

C) A perfect gas having volume of $2m^3$ and initial pressure of 1 atm undergoes isothermal expression to volume of $4m^3$. Calculate the work done by the gas (5M)

OR

C) One mole of perfect gas at 127^oC undergoes isothermal expansion till its volume is doubled. Calculate the work done by the gas and the heat absorbed by it. (5M)

Q.3) Answer the following: **(20 marks)**

A) What is magnetostriction effect? Explain magnetostriction oscillator with neat and labelled diagram. (8M)

OR

A) Explain the factors affecting the acoustic quality of building. (8M)

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B) Describe briefly the application of ultrasonic. (7M)

OR

B) What is meant by reverberation and reverberation time? Explain the causes to form reverberation in hall. How it can be minimized. (7M)

C) State the properties of ultrasonic waves. (5M)

OR

C) An auditorium of volume $3500m^3$ is found to have a reverberation time of 1.3s. The sound absorbing surface of the hall has an area of $600m^2$. Calculate the average absorption coefficient. (5M)

Q.4) Answer the following (Any 3): (15 marks)

A) State the feature that the acoustically good auditorium should have.

B) Explain principle and working of piezoelectric oscillator circuit.

C) State and explain hooks law.

D) A metal wire of length l and radius r is stretched. Assuming that the volume of wire is interchanged. Show that poisson's ratio of the material is ½.

E) The equation of state of gas is $PV=RT[1+\frac{B(T)}{V}]$; B is function of T alone. Show that $\beta=\frac{1}{T}[\frac{V+B+TdB/dT}{V+2B}]$..

F) State the term work done in thermodynamic one mole of perfect gas occupying 6 litres at 1 atm pressure is adiabatically compressed to 2 liter $C_V=\frac{3}{2}R$ Calculate the work done on the gas 1 atm=10^5 N/m^2.