8. (a) The magnetic susceptibility X_m a platinum is 30×10^{-5} Calculate its absolute permeability and relative permeability. $1\frac{1}{2}$

(b) Explain how an atom behaves as a magnetic dipole. 2

(c) What is hysteresis and hysteresis loss ? Show that energy loss per unit volume per cycle of magnetization is equal to the area of B-H curve. How this energy is dissipated ? 3

Roll No. .....

91040

B. Sc. (Hons.) Chemistry Ist Sem. Examination – December, 2015

PHYSICS – I OPTIONAL

Time : Three Hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note: Attempt *five* questions in all, selecting at least *one* from each Unit. Q. No. 1 is *compulsory*.

1. (a) What does the Lagrangian (L) of a system represent ? 2×7

(b) What all cyclic co-ordinates ?

(c) Why do we prefer steel to copper in manufacturing spring ?

(d) Hollow cylinders are preferred over solid cylinder for transmitting torques. Explain why ?

(e) Why is compensating glass plate used in Michelson-Morley experiment ?

(f) What is the importance of constancy of the speed of light ?

(g) What oscillates in an electromagnetic wave ?

UNIT – I

2. (a) Derive Lagrange's equations of motion for conservative system. 3

(b) Prove that sum of K.E. and interval P.E of a system is constant in the case where internal and external forces are conservative. $3\frac{1}{2}$

3. (a) Locate the centre of mass of a system of particles of masses 0.5kg, 1kg and 2kg placed at the corners of an equilateral triangles of 1 metre side. 3

(b) Write a note on Atwood's machine. $3\frac{1}{2}$

UNIT – II

4. (a) Derive an expression for the twisting couple required to twist a wire through a unit angle at one end, the other end being clamped. Also define torsional rigidity. 3,1

(b) Define Hooke's law. Discuss the variation of strain with stress and hence define the elastic limit. $2\frac{1}{2}$

5. (a) Discuss relativity a space and relativity of time on the basis of Lorentz transformation. 2, 2

(b) Derive the formula for the valuation of mass of particle with velocity. $2\frac{1}{2}$

UNIT – III

6. (a) Deduce the field intensity around a long line charge. 3

(b) Deduce an expression for electric pressure acting normally outward on the surface of a charged conductor. $3\frac{1}{2}$

7. (a) A uniform magnetic field points horizontally from south to north. The magnitude of the field is 1.5 wb m^{-2}. If a 10 Mev proton moves vertically downward through the field, what force act on it ? 3

(b) What is the difference in the nature of electric field vector $\vec{E}$ and magnetic field vector $\vec{B}$? $3\frac{1}{2}$