

Roll No. :

Total No. of Questions : 9] [Total No. of Pages : 4

91040

B.Sc. (Chemistry Hons.) 1st Semester
(Full & Reappear)
Examination, March-2021
(w.e.f. 2012-13)

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 question from each Unit. Question No. 1 is compulsory.

1. (i) What are holonomic constraints ? Explain with one example.
- (ii) Define Generalised Co-ordinates.
- (iii) Explain why the electric field is always perpendicular to the equipotential surface.

(iv) Define Magnetic flux. Give its S.I. unit.

(v) Define Torque.

(vi) Define Poisson Ratio.

(vii) Give the relation between relative permeability (μ_r) and susceptibility (χ).

(viii) What is the value of net magnetic moment of a diamagnetic atom ? 1×8=8

Unit-I

2. Obtain expression for generalised acceleration and generalised momentum. Also give advantages of generalised co-ordinates. 8
3. What is Hamilton's principle ? Using this principle derive Lagrange's equation of motion. 8

Unit-II

4. (a) What do you understand by 'Bending Moment' ? Derive an expression for the couple required to bend a uniform straight metallic strip into an arc of a circle of small curvature.

- (b) Calculate the work done in twisting a steel wire of diameter 2 mm and length 0.6 m through 60° .

Modulus of rigidity $\eta = 2 \times 10^{11} \text{ Nm}^{-2}$. 6,2

5. State the basic postulates of special theory of relativity and hence obtain the Lorentz transformation. 8

Unit-III

6. (a) Deduce the relation $\vec{E} = -\text{grad } V$.

- (b) Calculate the electric field intensity at the centre of square of side 'a' with four charges q , $2q$, $-4q$ and $2q$ kept at its four corners in order. 4,4

7. State Gauss's Law. Apply it to find the electric field intensity at a point inside and outside a uniformly charged spherical shell. 8

Unit-IV

8. Explain the magnetic behaviour of dia, para and ferro magnetic materials on the basis of electron theory of magnetism. 8

9. Explain the term hysteresis, residual magnetism and coercive force. What is a hysteresis loop? Show that the energy loss per unit volume per cycle of magnetization is represented by area of B-H curve.