2086

Unique paper code :

Name of the Paper : Physics I (Paper-V)

Name of the Course : B.Sc. (Hons) Chemistry

Semester/Annual : ANNUAL

Duration : 3 Hour

Maximum Marks *38*

E

Q.7 is compulsory

(Answer any five questions in Total~~All questions carry equal Marks~~)

Q1. (a) Determine a unit vector perpendicular to plane containing vectors $A = i-j-3k$ and

$B = 4i+j-k$.

(b) Prove that $(A \times B).(C \times D) = (A.C)(B.C) - (B.C)(A.D)$.

(c) Show that the gradient of a scalar function is irrotational.

$\left(2\frac{1}{2}, 3, 2 \right)$

(3,4,3)

Q2. (a) Show that for a particle moving under a central force, ~~the~~ its angular momentum ~~of the particle~~ is always conserved.

(b) Obtain an expression for acceleration when a solid cylinder rolls down an inclined plane without slipping.

$\left(3\frac{1}{2}, 4 \right)$

(5,5)

Q3. (a) What is a damped harmonic oscillator? Solve its differential equation for the 'under damped oscillations.

(b) ~~What is~~ Draw the shape of Lissajous figures formed by superposition of two perpendicular Simple Harmonic Oscillations, when frequency of one is ~~twice of other~~.

(i) equal to other

(ii) twice the other

~~(7,3)~~ $\left(5, 2\frac{1}{2} \right)$

Q4. What are elastic collisions? Two bodies of masses 'm' and 'M' are initially moving on straight line with velocities u_1 and u_2 in same direction ($u_1 > u_2$). After head on elastic collision in one dimension they acquire velocities v_1 and v_2. Obtain expressions for final velocities v_1 and v_2.

(3,7) $\left(7 \frac{1}{2}\right)$

one

Q5. (a) What is "Zone Plates" and how they are formed?

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(b) Explain how a zone plate acts like a convergent lens having multiple foci. Derive an expression for its focal length.

(4,4) $\left(3 \frac{1}{2}, 4\right)$

Q6. A) What is Diffraction? How is it different from Interference.

b) Discuss analytically the intensity pattern for principal maxima of diffraction pattern due to a plane transmission grating.

$\left(4, 3\frac{1}{2}\right)$ (4,6)

Q7. Write short note on any two of the following

1. Zone plate
2. Fresnel's Bi-prism
3. Circularly polarized light
4. Resolving power of a microscope and a telescope
5. Interference due to wedge shaped films.

(8)

$\left(4,4\right)$

(5,5)

5   7

35