## APPENDIX – V
SAMPLE QUESTIONS

PHYSICS

1. A pendulum bob of mass m carrying q is at rest with its string making an angle θ with the vertical in a uniform horizontal electric field E. The tension in the string is

   A) $mg/\sin\theta$ B) mg   C) $qE/\sin\theta$ D) $qE/\cos\theta$

2. The masses of three wires of copper are in the ratio 1:3:5 and their lengths are in the ratio 5:3:1. The ratio of their electrical resistance is

   A) 1:3:5   B) 5:3:1   C) 1:15:125   D) 125:15:1

3. A wire carrying current I is placed in a uniform magnetic field B in the form of a curve $y = a \sin(\pi x/L), 0 \le x \le 2L$ (a is a positive constant with the dimensions of length) as shown. Magnitude of force upon the wire is
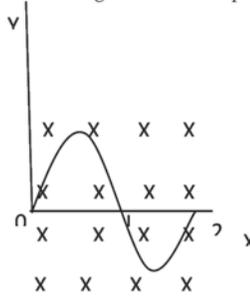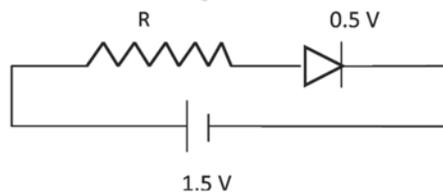

   X - denotes **B** – into

   A) $2\pi ILB$ B) $\pi L2BI/4$ C) $2IBL$ D) Zero

4. The current in a circular coil of single turn produces a magnetic induction B_0 at the centre. The coil is unwound and then rewound into a circular coil of two turns. Now the magnetic induction at the centre for the same current will be

   A) B_0 B) $4B_0$ C) $2B_0$ D) $B_0/2$

5. In a young's double slit experiment, the fringes are displaced by a distance 'y' when a glass plate of refractive index 1.5 is introduced in the path of one of the beams. When this plate is replaced by another plate of same thickness, the shift of fringes $\frac{3}{2}y$. The refractive index of the second plate is

   A) 1.75   B) 1.5   C) 1.25   D) 1.00

6. The ratio of the ionization energy of Bohr's hydrogen atom and hydrogen like Lithium atom is

   A) 1:1   B) 1:3   C) 1:9   D) 9:1

7. A ray if wavelength 663 nm is incident on a totally reflecting surface. The momentum delivered by the ray is

   A) 6.63×10^{-27} kgm/s   B) 2×10^{-27} kgm/s   C) 10^{-27} kgm/s   D) 13.26×10^{-27} kgm/s

8. The half life of radium is 1600 years. The fraction of a sample of radium that would decay in 6400 years is

   A) 1/16   B) 1/4   C) 7/8   D) 15/16

9. The following truth table belongs to which one of the following four gate

A	B	Y
1	1	0
1	0	0
0	1	0
0	0	1

   A) OR   B) NAND   C) XOR   D) NOR

10. The diode used in the circuit shown in the figure has a constant voltage drop of 0.5 V at all currents and a maximum power rating of 100 mW. What should be the value of the resistor R connected in series with the diode for obtaining maximum current

   A) $1.5\ \Omega$ B) $5\ \Omega$ C) $6.67\ \Omega$ D) $200\ \Omega$