Date

Question 1(a) :-

Answer :-

When a force causes a body to move, work is being done on the object by the force.

If the force has a component in the same direction as the displacement of the object the force is doing positive work. If the force has a component in the direction opposite to the displacement, the force does negative work.

$1\,J = 1\,Nm$

Question 1(b) :-

Sol :- Given data : $w = 32\,N$

$F = 45\,N$

$\theta = 45^\circ$

$W = ?$

$W = Fd \cos\theta$

$W = 45 \times 10 \times \cos 45^\circ$

$W = 4 \times 10 \times 0.707$.

$$\boxed{W = 318\,J}$$

Date

Question no2. (a) :-

Coulomb's law States that:

The magnitude of the electrostatic force of repulsion between two point charges is directly proportional to the product of the magnitudes of charges and inversely proportional to the square of the distance between them.

Coulomb's law can also be stated as a simple mathematical expression.

$$|F| = k_e \frac{|q_1 q_2|}{r^2}$$

Question 2 (b) :-

Electric flux is the rate of flow of the electric field through a given area. Electric flux is proportional to the number of

electric field lines going through a virtual surface.

- If the electric field is uniform, the eletric flux passing through a surface of vector area S is $\Phi_E = E.S = ES\cos\theta$.
- Electrical flux has SI units of Volt metres (Vm).

Question 3 (a):-

The magnetic field exerts a force on a current carrying wire in a direction given by the right hand rule 1 the same direction as that on the individual moving charges.

The force on an individual charge moving at the drift velocity V_d is given by

$F = qV_dB \sin\theta$.

Date

Question 3 (b) :-

Given Data

$I = 1.2A$

$B = 0.75T$

$L = 1m$

Lets $\theta = 90$ -> for maximum force

$F = ILB \sin\theta$

$F = 1.2 \times 1 \times 0.75 \times \sin 90$

$F = 0.9N$

Question 4 (a) :-

Conductors:

Conductors are solids that have good electrical Conductivity. They allow heat energy and electric Currents to transmit through them with Case and Speed. Conductions allow this transfer of energy to happen via free flow of electrons from atom to atom.

Insulators :-

An insulator is material that does not Conduct electrical current. Insulating materials include Paper, rubber, glass and air. Vacum is also an insulator, but is not actually a material.

Semiconductors :-

Semiconductors are the go-between Conductors and insulators. These are Solids that have the ability to Conduct electricity through them but only under Certain Conditions.

Question 4 (b):-

Intrinsic Semiconductor:-

An intrinsic Semiconductor is the purest form of a Semiconductor, elemental, without any impurities. Naturally available elements like Silicon and germanium are best examples of an intrinsic Semiconductor.

Extrinsic Semiconductors:-

Semiconductors can be broadly classified into intrinsic and Extrinsic Semiconductors. Intrinsic Semiconductors start conducting at temperatures above the room temperature, developing important electronic devices

Using these can pose a problem. this led to a need for improving the Conductivity of intrinsic Semiconductors.

Question 5 :-

Photoelectric effect, Phenomenon in which electrically charged Particles are released from or within a material when it absorbs electromagnetic radiations. The effect is often defined as the ejection of electrons from a metal plate when light falls on it.

1- The Photoelectric effect is an instantaneous Phenomenon. there is no time delay between the incidence of light and emission of Photoelectrons.

2- The number of Photoelectrons emitted is proportional to the intensity of incident light. Also, the energy of

emitted Photoelectrons is independent of the intensity of incident light.

3. The energy of emitted Photoelectrons is directly Proportional to the frequency of incident light.