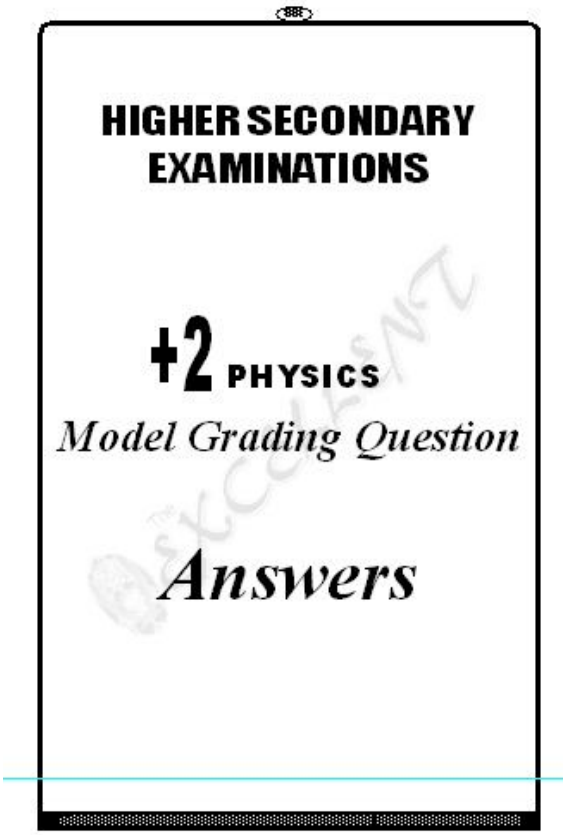

Unit - 1

Physics

Electrostatics

1. a) Normally outward b) Zero c) Direction become opposite d) Zero e) No

2. a) Closed Loop b) Along normal (to surface) c) Yes d) No

3. a) Zero b) Torque, = PE sin , where P is Dipole moment,and E is Electric field

c) $\theta = 90^0$

4. a) Quantisation of charge. b) To conduct the charges developed in the tyres to earth by friction. c) n = $\frac{Q}{e}$ = $\frac{1\times10^{-6}}{1.6\times10^{-19}} = 6.25\times10^{12}$

5. a) Coulomb b) 1 Coulomb c) $F=\frac{1}{4\pi\varepsilon_0}\frac{q_1 q_2}{r^2}$

6. a) parallel b) At the point of intersection, field has 2 directions, which is impossible

c) (i) + and - (ii) + and +

7. a) Vector b) Refer text for $E=\frac{1}{4\pi\varepsilon_0}\frac{q}{r^2}$ c) on axial line d) Refer text

8. a) gauss's therom b) Refer text

c) Due to electrostatic sheilding. The outer surface of car acts as sheild.

9. a) Van de Graff generator

b) 1) Action of points 2) Charge can reside only on the surface of a conductor.

c) No, only suitable for positive charge

10. a) False. In series connection capacitance will reduce by the equation

b) Increasing the area between the plates, using material of high dielectric constant, decreasing the distance between the plates. c) parallel d) Refer text

11. a) C_2& C_3 in series; $\therefore C_{23} = C_2C_3/C_2 + C_3$

$$C_{11} = \frac{200 \times 200}{200 + 200} = \frac{40000}{400} = 100pF$$

$C_{23} \| C_1, C_{123} = C_{23} + C_1 = 100 + 100 = 200$ pF C_{123} in series with C_4

$$\therefore C_{1234} = \frac{200 \times 100}{200 + 100} = \frac{20000 \times 10^{-24}}{300 \times 10^{-12}} = \frac{200}{3} \times 10^{-12}$$

b) $Q = CV = \frac{200}{3} \times 10^{-12} \times 300 = 2 \times 10^{-8} C$

Voltage across $C_4 = Q/C_4 = \frac{2 \times 10^{-8}}{100 \times 10^{-12}} =$ 200 V

Voltage across $C_1, V_1 = 100$ V

charge in $C_2 = C_2V = 200 \times 10^{-12} \times 50 = 10^{-8} C$

,, in $C_3 = C_3V = 200 \times 10^{-12} \times 50 = 10^{-8} C$

c) Refer text

12. a) electron will have greater acceleration.

Electric force F = qE ie , ma = qE a =

As acceleration $\alpha\ 1/m$; electron will have greater acceleration

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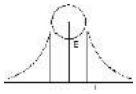
b) zero (equipotential surface) c) Refer text

13. a) on axial points

b) No. For a dipole $E \alpha 1/r^3$ c) Refer text

14. a) (i) Zero. (ii) Non Zero F = Eq b) (i) $\theta = 0^0$ (ii) $\theta = 90^0$
Refer Pep talks.

15. a) 

b) Refer text for $C = 4\pi\varepsilon_0 R$

16. a) Increases the Potential.

b) The surface charge density is maximum at sharp edges. Van de Graff generator is works on action of points.

17. a) (i) Same (ii) Different (Q ▫ C) b) (i) Different (ii) Same

c) (i) Parallel (ii) Series. d) Refer text for $\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2}$

Current Electricity

1. a) Yes. b) resistance increases with increase in temperature.

c) At 0 k ; resistance of all metals become zero.

2. a) Out of 3 resistors, 2 in series and 1 in parallel

ie 2R || R = $\frac{2R}{3}$

b) (i) R. (ii) 4R . (The resistance of diametrically opposite rings are 2R each).

3. a) To get same potential difference (Voltage).

b) $3 \times 10^{-6}\ \Omega m$. Since conductivity is the reciprocal of resistivity.

4. a) Resistivity $\rho = \frac{m}{ne^2\tau}$ b) Nature of material and temperature.

c) Refer text d) Resistivity ; since

As the temp. increases, thermal energy of e^- increases and they will suffer speedy collisions, then $\tau \downarrow$ thus $\rho \uparrow$

5. Refer text

6. a) Yes b) (i) No. (ii) Yes. c) Generator

7. a) Resistance. ohm (Ω)

b) Length, Area of Cross - section, temp. and Nature of material

c) mass of the wire = density × volume = density × Area × Length

Since resitance of Cu & Al are the same

$R_{Al} = RCu \quad \frac{\rho_{Al}\ell_{Al}}{A_{Al}} = \frac{\rho_{Cu}\ell_{Cu}}{A_{Cu}} \quad (\ell_{Al} = \ell_{Cu})$

$\therefore \frac{A_{Al}}{A_{Cu}} = \frac{\ell_{Al}}{\ell_{Cu}}$ then $\frac{m_{Al}}{m_{Cu}} = \frac{d_{Al} \cdot A_{Al} \cdot \ell_{Al}}{d_{Cu} \cdot A_{Cu} \cdot \ell_{Cu}} = \frac{d_{Al}}{d_{Cu}} \frac{\rho_{Al}}{\rho_{Cu}}$

As $m_{Al} < m_{Cu}$; Al wire are suitable for overhead cables.

8. a) Yes. 10^{-3} m/s

Unit - 2

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b) The drift velocity V_d is related to electric current I as I = nAV_dq, n is number density, A is area of cross section and e charge of an e^-.

c) Drift velocity , $V_d = \mu E = \mu \frac{V}{d}$, where is mobility d) Positive

9. a) i) 50 w ii) 100 w b) P_1= 50 w & P_2=100 W

As $P = V^2/R$; $P_1/P_2 = R_2/R_1$

$\therefore R_1/R_2 = \frac{100}{50} = 2$

In series $P = I^2R$ ie, $P \propto R$

$\frac{P_1}{P_2} = \frac{R_1}{R_2} = 2$ $P_1 = 2P_2$

In Parallel $P = V^2/R$ ie $P \propto 1/R$

$P_1/P_2 = \frac{R_2}{R_1} = \frac{1}{2}$ ie $P_2 = 2P_1$

c) same brightness d) $P_1 = I^2R_1$ and $P_2 = I^2R_2$

10. a) Yes. b) These metals are at the extreme ends of the thermoelectric series. c)

11. a) 40 w bulb.

b) ii) Electric lamp iii) safety fuse iv) Electric heater v) Electric iron

c) P = 100 w, V =230 V

$P = V^2/R \quad \therefore R = V^2/P = 230^2/100 = 489\,\Omega$

If Supply voltage is V =115 V $H = \frac{V^2}{R} t = \frac{115^2}{489} \times 20 \times 60$

12. a) The internal resistance of a car battery decreases with increase in temperature.

b) $i = E/(R+r)$. To get a high current from low voltage, the external resistance R should be reduced. If the internal resistance r of the supply is high, the maximum current in the circuit, $i_{max} = E/R$ will be low. Hence to get high current `r' must be low . c) E = 1.08 v $l_1 = 80cm \quad R = 5\Omega$ $r = \frac{R(l_1 - l_2)}{l_2} = 5 \times \left(\frac{80-65}{65}\right)$

13. a) potentiometer b) Conversion of galvanometer into ammeter - Refer text

c) G = 100Ω ; $i_g = 1 \times 10^{-3}$A; i = 1.5 A

S = $\frac{i_g G}{(i - i_g)}$ = Resistance of ammeter, R = $\frac{GS}{G+S}$

14. a) Current density b) It is the current flowing through unit area. c) Vector

15. a) The slope of the graph gives resistance.

The graph with greater slope has greater resistivity. Thus X has (or T_2) greater resistivity.

b) 250000Ω; ±5%

16. a) Kirchoff's current and voltage laws Refer text

b) Refer text c) Refer text

d) $P/Q = R/S$; If the cell and galvanometer are intercharged, no change in balancing condition

17. a) Refer text. P = X ; Q = R ; R = lr ; S = (100 - l) r b) Refer text

18. a) i) series E eq = $E_1 + E_2 + E_3 + \text{-------} En$

r eq = $r_1 + r_2 + r_3 + \text{-------} rn$.

ii) Parallel E eq = $r_{eq}\left[\left(E_1/r_1\right) + \left(E_2/r_2\right) + \left(\frac{E_3}{r_3}\right) + \text{--------} \frac{E_n}{r_n}\right]$

$1/r_{eq} = 1/r_1 + 1/r_2 + 1/r_3 + \text{--------} + 1/r_n$

b) In parallel, if the cells are identical each of emf E and internal resistance `r', then r_{eq}=nr

MOVING CHARGES & MAGNETISM

1. a) Biot - savart's law. b) The direction of field is normal to the plane containing $d\vec{l}$ and $\vec{r}$.

c) dB = $\mu_0/4\pi \frac{Idl\sin\theta}{r^2}$ d) The direction of magnetic field also gets reversed

2. a) Device accelerate +vely charged particles like proton, deutron etc.

b) r = mv/Bq c) No. frequency is independent.

3. a) G = 100Ω ; I g = 2×10^{-3}A i) i = 5 A ; S = $igG/i-ig$

By connecting shunt resistance `S' to galvanometer, we can convert it into an ammeter.

ii) v = 10 v ; R = $V/I_g - G$ =

By connecting R in series with galvanometer, we can convert it into voltmeter.

b) An ammeter is connected in series with electrical circuits being it is of low resistance device. Voltmeter is a high resistance device, hence it is always parallel to electric circuits.

4. a) Right hand grip rule. b) fig (i) Zero.

fig (ii) B = $\frac{\mu_0 i}{2\pi r} + \frac{\mu_0 i}{2r}$ fig (iii) B = $\frac{\mu_0 i}{2\pi r} - \frac{\mu_0 i}{2r}$

5. a) Flemming's left hand rule b) F and v are perpendicular. So W = 0 c) Refer text

6. a) Circular path b) No. c) Refer text

7. a) Towards b) The force between parallel wires, $F = \frac{\mu_0}{4\pi} \frac{2I_1I_2}{r} l$

8. a) It will rotate. b) Refer text

c) For a circular loop carrying current, the torque acting on is $\tau = MB\sin\theta = iAB\sin\theta$

By changing its shape to circular in nature, its area is minimum. Thus τ will be minimum.

Unit - 3

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9. a) Refer text b) Refer text

c) $B = \frac{\mu_0 Ni}{l} = \frac{4\pi \times 10^{-7} \times 250 \times 0.32}{125 \times 10^{-3}}$

10. a) 200 units

b) (i) If the magnet is cut transverse to its length, its magnetic moment becomes half as its length become half

(ii) Magnetic moment becomes half, as pole strength is reduced to half

c) $\theta = 30^0$, B = 0.16 T, $\tau = 0.032$ J, As $\tau = MB\sin\theta$

Magnetic moment , $m = \frac{\tau}{B\sin\theta} = \frac{0.032}{0.16 \times \sin 30}$

11. a) closed b) Magnetic poles c) Voltmeter d) Acts as a magnet

12. a) (i) North polarity (ii) South polarity

b) On equatorial line. c) points where magnetic field strength becomes zero.

13. a) carbon steel piece b) Refer text

14. a) Force is attractive in nature b) Flemings left hand rule

c) Refer text. d) Force becomes repulsive

15. a) Refer text b) Dip is 0^0 at equator and 90^0 at poles

16. a) A solenoid bent.into the form of a circle is called toroid.

b) Refer text c) Refer text

17. a) Insulated copper wires wound over a soft iron core and acts as a magnet is called solenoid. b) Amperes circuital law. c) Refer text

18. a) Forces on vertical sides are equal and opposite hence

constitute a couple.

b) Plane or the coil is parallel or antiparallel to the magnetic field

c) Refer text d) Moving coil galvanometer e) Refer text

Electro Magnetic IndUction and Alternating Current

1. a) Current lags behind the emf b) current leads the emf

c) If $X_L = X_C$; Impedence Z = R

d) Current becomes maximum at resonant frequency and current decreases with increase in frequency.

2. a) Rate of change of flux b) Induced emf c) rms value

d) Left hand Rule

3 a) $\pi/2$ b) $\pi/2$ c) 0^0

4. a) Yes $L = \frac{\mu_0 \mu_r N^2 A}{l}$ b) Refer text

c) $E = -\frac{d\phi}{dt} = -(9.2t + 6) = -18t - 6$ put t = 35

$\therefore E = -18 \times 3 - 6 = -54 - 6 = -60$ V $I = E/R = -60/12 = -5A$

5. a) B_2 b) Yes. when key K is closed current through inductance increases and reaches steady value after some time. After this, both bulbs are equally bright.

6. a) Refer text b) The conductor AB will $\perp^r$ to the plane of the paper and into it.

The point `A'. c) *l*l =0.4 m; V = 7 m | s, $B = 0.9$ wb/m^2

Induced emf, E = B | V = $0.9 \times 0.4 \times 7$

7. a) Refer text b) E = $\alpha \frac{dt}{dt}$ V = $2\pi nV \alpha r$ $\frac{2\pi nV}{V} = \frac{1}{3}$ $\therefore V = 6\pi nV$

Unit - 4

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c) M = 0.06 H , $\frac{di}{dt} = 7.5 \times 10^3$ E = $-\frac{d\phi}{dt} = -\frac{d(Mi)}{dt} = -M\frac{di}{dt} = -0.06 \times 7.5 \times 10^3$

8. a) If $X_L = X_C$, Impedence Z = R, This is the condition for resonance

b) P = E c) Q = $\frac{X_L}{R}$ or $\frac{X_C}{R}$

9. a) Series LCR circuit b) Radio tuning

c) At resonance, series LCR accepts maximum current through the circuit

d) Refer text

10. a) Mechanical energy.

b) Refer text - electromagnetic induction

c)

11. a) Transformer

b) For d.c. voltage, there is no change in magnetic flux and hence no emf will be induced.

c) To reduce eddy currents, laminated cores are used.

d) Eddy current loss, hysterisis loss, copper loss, Iron loss

12. a) $f = \frac{1}{2\pi\sqrt{LC}}$ b)

c) At resonance, series LCR circuit admits maximum current through the circuit. The resonant frequency, $f = {}^{1}\!/_{2\pi\sqrt{LC}}$. For suitable values of L and C, we can tune series LCR circuit at resonance.

13. a) $f = {}^{1}\!/_{2\pi\sqrt{LC}} = {}^{1}\!/_{2\pi\sqrt{5\times80\times10^{-6}}}$

b) $Z = \sqrt{R^2 + \left(L\omega - \frac{1}{C\omega}\right)^2}$ (Refer text)

Amplitude of current, $I = \frac{V}{Z}$ at resonance Z = R

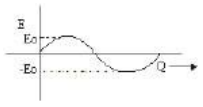
$\therefore I = {}^{V}\!/_{R}$ or ${}^{E}\!/_{R} = {}^{230}\!/_{40}$ c) p. d across resistor, $V_R = IR$

p. d across Inductor, $V_L = I \times L = I.L\omega = I.L.\ 2\pi f$

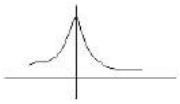
p. d across capacitor, $V_C = I \times C = I.\frac{1}{C\omega} = I.{}^{1}\!/_{C}.\ 2\pi f$

14. a) Change in magnetic flux will induce an emf by electro magnetic induction

b) Refer text. c) No d) Yes, Eddy Current



I f



15. a) Lenz's rule

b) The direction of Induced emf is always such as to oppose the cause producing the change of flux

c) The work done aganist the induced emf in a circuit is not get wasted up and is stored in the circuit as P.E Thus it obeys law of conservation of energy.

16. a) & b) When the current is switched on, the flux linked with the disc changes, and eddy current is produced in the disc. If the upper end of the electro magnet becomes north pole, the lower side of the disc acquires north polarity. The disc is seen to thrown up because of the magnetic repulsive force.

17. a) Yes, E_{rms} = 230 V b) $E_{rms} = E_0/\sqrt{2}$

Peak value, $E_0 = \sqrt{2} E_{rms} = 230\sqrt{2}$

c) Mean value of ac for a half cycle, $E_{ac} = \frac{2E_0}{\pi}$ d) f = 50 Hz

18. a) Transformer b) B = $\mu_0 ni$, n is no. of turns per unit length

c) Magnetic flux, $\phi_B = N_2 A B$ d) Refer text

Electromagnetic WAVES

1. a) (i) V = $\frac{1}{\sqrt{\mu_0 \varepsilon_0}}$ (ii) $\frac{1}{\sqrt{\mu \varepsilon}}$ b) $\mu_0 \varepsilon_0 = \frac{1}{C^2} = \frac{1}{9\times10^{16}} \approx 10^{-17}$

c) $\mu\varepsilon = 1/C^2 = 1/(ms^{-1})^2 = 1/m^2 s^{-2} = m^{-2}s^2$

2. (A) (B) 0.1 m - 10^{-3}nm (C) $\lambda = c/\nu = \frac{1}{\sqrt{\mu_r \varepsilon_r}\,\nu}$

(D) 3 GHz (E) f = = =

3. a) None

b) $E = h\nu = hc/\lambda = \frac{6.6\times10^{-34}\times3\times10^8}{3000\times10^{-10}} J = \frac{6.6\times10^{-34}\times3\times10^8}{3000\times10^{-10}\times3.6\times10^5}$ eV

4. a) yes. Accelerated charge can produce time varying electric and magnetic fields which results an em wave.

b) v = $1/\sqrt{\mu_0 \varepsilon_0}$ c) E = 1.5 N | c we know C = E/B; $\therefore B = E/C$

Then magnetic flux density = $B^2/2\mu_0$

5. a) Transverse in nature b) Z direction c) ; ==m

6. a) Refer text b) (iv) Displacement current

7. a) 0 - 12 km - Troposphere 12 km - 50 km - Stratosphere

50 km - 80 km - Mesosphere 80 km - 500 km - Ionosphere

b) For stratosphere temp. decreases with height. For troposhere, mesosphere and ionosphere temp - increases with height.

c) No. ozone layer is on the top of stratosphere which extends

from 25 km - 50km

8. a) Infrared rays b) Refer text

c) Ozone layer absorb ultraviolet radiations coming from the sun and hence humanity is saved from the ill effects of the ultraviolet rays from the sun .

Unit - 5

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9. a) $B_0 = 2\times10^{-7}$ Tesla

b) Here By = $2\times10^{-7}\sin(0.5\times10^{3} + 1.5\times10^{11}t)$ general eqn is By = $B_0 \sin(kx + \omega t)$

Thus k = 0.5×10^{3} and $\omega = 1.5\times10^{11}$

$\therefore \lambda = 2\pi / 0.5\times10^{3}$; $\frac{2\pi}{\lambda} = 0.5\times10^{3}$; $2\pi f = 1.5\times10^{11}$

f = $1.5\times10^{11} / 2\pi$ l = 12.56 mm f = 23.9 GHz

c) Here $B_0 = 2\times10^{-7}$ we know that c = E_0 / B_0 ; $E_0 = cB_0 = 60 V/m$

An em wave in Z direction $E_x = 60\sin(0.5\times10^{3}Z + 1.5\times10^{11}t)$

10. a) X ray astronomy use space waves for transmission

b) Velocity of these rays are the same (C = 3×10^{8} m | s)

c) Velocity, C = $1/\sqrt{\mu_0\varepsilon_0} = 3\times10^{8}$ m | s

11. a) Maxwell b) Refer text

c) Average temp. will be lower than present temp. Green house effect is the phenomenon by which the surface of earth keeps warm. A s there is no atmosphere, It radiates all the incident radiation from the sun and no light will remain here .

12. a) Micro waves

b) Ground wave propogation causes some losses due to absorption of the surface of earth, oxygen and water vapour present in the lower atmosphere. These losses are frequency dependent. At higher frequencies , the losses are higher. Hence they are suitable upto 1500 kHz. c) Refer text

14. CT scan - X-ray sterilization - UV

Radar - Microwave Photography - Infrared ray

Nuclear radiation - Gamma ray

15. a) Refer text

b) Refer text - By introducing the concept of displacement current

c) Refer text d) Refer text

OPTICS

1. a) Two b) Angle of minimum deviation c) Yes, n = (Refer text)

d) Yes, deviation d = $i_1 + i_2 - A$

2. a) P = $\frac{1}{f_1} - \frac{1}{f_2} = P_1 - P_2$ b) $\frac{w_1}{f_1} + \frac{w_2}{f_2} = 0$, where and are dispersive powers c) Yes.

3. a) Yes. b) bright (path difference is zero) c) Band width,

As d d) Coloured fringe can be seen except central white fringe.

4. a) Refraction (Refer text) b) Refer text

c) i = 30^0, r = ? n = $\frac{4}{3}$ n = $\frac{\sin i}{\sin r}$

5. a) Total internal reflection

b) Refer text. (i) Light must pass from denser to rarer medium

Unit - 6

2f 2f f f

(ii) Angle of incidence must be greater than critical angle of the medium.

c) C = ? ; n = 2.42 n = $\frac{1}{\sin C}$; C = $\sin^{-1}\left(\frac{1}{n}\right)$

6. a) Refer text. $\frac{1}{f} = \left(\frac{n_2}{n_1} - 1\right)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

b) c) m = 2 ; f = 20 cm; u = ? m = $\frac{f}{u + f}$

7. a) For sun glasses $R_1 = R_2 = R$

Also R_1 is +ve and R_2 is -ve $\frac{1}{f} = (n-1)\left(\frac{1}{R} - \frac{1}{R}\right) = 0$

$\therefore f = \infty$; Hence power is zero.

b) Refer text for Dioptre. c) P = 0.04 D ; $m = 2$; u = ? m = $\frac{f}{u + f}$

8. a) Total internal reflection b) Scattering of light

c) Reflection d) Interference e) Refraction

9. a) No, they are not coherent b) Refer text c) Refer text for $\beta = \frac{\lambda D}{d}$

10. a) Sound wave b) (i) tan $i = n$ or tan $P = n$ ii) $P + r = 90^0$ c) Refer text

11. a) Virtual and erect b) Refer text c) Refer text

12. a) No, they always produce virtrial images

b) R = 2f (Refer text) c) Refer text.

13. a) Rainbow b) Total Internal reflection c) See answer of 5 (b)

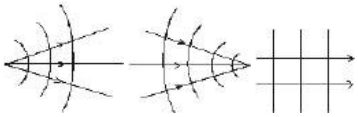
14. a) Lens of small power 0.1 dioptrer b) Refer text c) Refer text for m =

15. a), b) and c) - Refer text

16. a) eye. b), c), d) and e) Refer text.

17. a) , b) and c) Refer text

18. a) polarisation, Interference b) Polarisation c) and (d) Refer text.

19. a) 

b) and c) Refer text.

DUAL NATURE OF MATTER AND RADIATION

1. a) Intensity of incident light b) $h\upsilon_0$ c) matter waves

d) Einstein e) frequency of incident light

2. a) =2.14 eV $\upsilon = 6 \times 10^{14}$ Hz K.E_{max} = ?

2f

Unit - 7

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Using Einstein's photoelectric equation $h\upsilon = h\upsilon_0 + \frac{1}{2}mv^2$

ie, K.E_{max} = $h\upsilon - h\upsilon_0$ b) $K.E_{max} = eV_0$

stopping potential, $V_0 = \frac{K.E_{max}}{e}$ c) $K.E_{max} = \frac{1}{2}mv^2$ V = $\sqrt{\frac{2K.E_{max}}{m}}$

3. a) No. There must be a minimum frequency of light called threshold frequency to just cause photo electric emission. b) An application of photo cell.

4. a) Photo elctric effect. b) Refer text c) Refer text.

5. a) matter waves b) Derive deBroglie wave length - $\lambda = \frac{h}{p}$

6. a) $\lambda = 6328 \times 10^{-9}$ m $p = 9.42 \times 10^{-3}$ w

E = ? E = hu = hc/λ p = ? $\lambda = h/p$; $p = h/\lambda$

b) E = nhu $\therefore n = E/hu = \frac{P \times t}{hu}$

c) Same , since de- Broglie wave length, $\lambda = h/mv = h/p$

7. a) Photo electric effect b) Refer text

c) photo electric current remains the same since it is proportional to intensity of incident radiation.

8. A de Broglie wave length $\lambda = h/p$ B. K.E of photo electron $= eV_0 = 1.6 \times 10^{-19} \times 1.5$

C $1u = 931.5$ Mev D $+1\ e^{\circ}$ (positron)

9. (1) de Broflie wave (2) sound wave (3) e.m wave

(4) e.m wave (5) de - Broglie wave length (6) e.m. wave

10. a) When the accelerating potential reduced to zero and becomes negative, the current becomes zero only for a - ve potential called stopping potential.

b) laws of photo electric emission - Refer text

c) When the anode potential becomes zero, the current decreases and reaches minimum value for a particular reverse potential called stopping potential becomes the anode can attract negatively charged e^- from cathode even though its potential is zero.

11. a) de- Broglie wavelength $(\lambda = h/mv)$ Refer text b) Refer text

c) The appearance of the peak in a particular direction in the graph of intensity or the scattered e^- verses scattering angle is due to the constructive interference of electron scattered from different layers of regularly spaced atoms of the crystals. The wavelength of matter waves is in agreement with de Broglie waves. Then Davission - germer confirmed matter waves. d) K.E , E = 100 eV $\lambda = \frac{h}{\sqrt{2mE}}$

12. a) Intensity of incident light is directly proportional to photo electric current.

b) For a particular Frequency of incident radiation, the minimum -ve potential given to the anode plate for which photoelectric current stops or becomes zero is called stopping potential. c) $K.E_{max} = eV_0$ d)

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0 % of CD

Unit - 8

=

13. a) b) =

14. a) and b) - Refer text. c) K.E and hence velocity of photo electron increases

15. a) Like light, radiation has also both particle and wave nature. b) Refer text

c) (i) Davisson - germer expt. (ii) Photo electric effect

16. a) 54 V b) 50^0

c)

Atomic Nucleus

1. a) To slow down neutrons b) To absorb neutrons

c) To liberate the excess heat energy produced by nuclear fission

d) To protect or avoid from harmful nuclear radiations liberated by fission

2. a) No. b) ; If the proton no. is equal to neutron no, the nuclei is stable. Heavier nuclei are found to be unstable.

3. a) 1 amu = mass of C - 12 atom 1 amu = kg

b) R = ; fermi c) Refer text

4. a) true b) gold - foil experiment (scattering experiment)

c) The -rays emitted from a radioactive source are repelled by the central core. Being particle +ve; the nucleus should also be +ve .

5. a) Radioactivity . Refer text. b) and c) Refer text.

6. a) $= 180^0$ b) As the impact parameter increases scattering angle decreases and finally becomes zero.

c) For - ray scattering size of the gold foil must be very low (10^{-3} mm)Being gold foil malleable, it is suitable. d) No. It is suitable only with malleable metals.

7. a) b) - Refer text

c)

0

% of AB

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8. a) K.E = b) P.E = c) Refer text

9. a) = 180^0 b) An particle close to the nucleus suffers large scattering. For low energy scattering angle is large.

c)

d) The mass of the atom is concentrated in a small volume.

10. a) , b) & c) Refer text

11. a) The mass of the resultant nucleus is always less than the mass its constituent nucleons and is called mass defect.

It is due to the energy taken up from the nucleons to get combined.

b) Binding energy c) As the B.E / nucleon is high, the atom is stable

12. a) Refer text

b) Refer text c) Refer text

13 a) Natural Uranium suitable for nuclear fission is called Enriched Uranium

b)

c) In nuclear reactor controlled chain reaction takes place. Nuclear bomb is uncontrolled chain reaction

14. a) Spherical b) Fission c) Refer text

15. a) By pair production Neutron inside the nucleus decays to form proton and electron

b) Refer text

16. a) Refer text

17 a) Refer text

18. a) Refer text b) c) Lyman, Balmer, Paschen, Bracket, Pfund d) Refer text

SOLIDS & SEMI CONDUCTOR DEVICES

1. a) No current flow b) Supplying proper current and voltage to a p - n junction diode for their working is known as biasing.

c)

d) (i) Reverse bias (ii) Forward bias (iii) Forward bias (iv) Reverse bias

2. a) stabilization b) It is a properly doped reverse biased diode having sharp breakdown voltage, used for voltage regulation.

3. a) decreases due to the increase in base current b) No charge in emitter current

c) Current gain becomes low.

4. a) free electron b) holes c) No, Input junction is of small layer than output

d) emitter is heavily doped and collector is moderately doped.

5. a) ohm's law b)

Unit - 9

Unit - 10

c) Diode of smaller barrier potential is germanium, ie they show earlier increase in current than Si.

6. A B C

P N diode Rectification

Zener diode Voltage regulator

LED Conversion of electrical energy into light energy

Photo diode Conversion of light energy to electrical energy

7. a) n - p - n transistor. b) The emitter terminal of the transistor is connected in common to both input and output. c) Brightness of the lamp is reduced with the increase in collector current

8. A; Ic = 0.95 = 1 - 0.95 = 0.05

B; A = 1 B = 0 = A + B = 1

C; Eg 1eV D; Carbon

9. a) forward biased .....reverse biased... b) Refer text

c) Refer text d) Refer text e) zero

10. a) Forward and reverse biasing b), c) Refer text.

11. a) common emitter configuration common Base configuration

common collector configuration

b) strengthening of weak ac signal c) Current gain

d) , = 5.2 mA ; =? , =? =

12. a), b) Refer text c) Ri = 680 ; ;

Voltage gain

13. a) Y = (NOR gate) For truth table Refer text.

b) i) If both inputs are low (o) ii) When both inputs are high (I)

iii) When both inputs are high or either of inputs are high c) NAND

14. a) pure form - Intrinsic semi conductor Impure form - Extrinsic semi conductor

b) Depending upon the nature of impurity added extrinsic are semi conductor are 2 types.

(1) n - type Semiconductor (2) p - type Semiconductor -Refer text -

15. a) Refer text b) Refer text-

16. a, b, and c - Refer text Knee voltage is a particular forward voltage at which the current increases sharply

17. a, b, c and d - Refer text

18. a, b, c - Refer text

Principles of Communication

1. a) amplitude and phase b) Refer text

2. a) Refer text

3. a) ii) carrier wave is sinusoidal b) , Refer text c)

4. a) RADAR b) satellite communication

5. INSAT Geostationary satellite

KU Band SW

Half wave rectifier AM demodulator

Digital modulation ASK