Objective
Paper Code
8472

FSD

Intermediate Part Second FBO-42-21 ☆

Roll No. : _____

PHYSICS (Objective) GROUP - II
Time: 20 Minutes   Marks: 17

Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.

S.#	Questions	A	B	C	D
1	A particle of mass m and charge q is released from rest in a uniform electric field E. The K.E. attained by the particle after moving a distance 'd' is:	$\frac{Ed}{q}$	qE^2d	qEd	$\frac{qE}{d^2}$
2	The energy stored in the capacitor is:	K.E.	P.E.	Electrical K.E.	Electrical P.E.
3	On increasing the length of wire specific resistance of the wire:	Increases	Decreases	Remains unchanged	First increase then decrease
4	An electron is moving in a circle of radius 'r' in a uniform magnetic field, suddenly the field is reduced to B/2, the radius of circle now becomes:	$\frac{r}{2}$	$\frac{r}{4}$	$2r$	$4r$
5	Force on current carrying conductor per unit length is given by:	$ILB \sin\theta$	ILB	IB	$IB \sin\theta$
6	The current flowing through a coil due to induced emf in it depends upon:	Shape of the coil	Resistance of the coil	Area of the coil	Magnetic flux
7	The induced emf primarily produced at the cost of:	Internal energy	Chemical energy	Electrical energy	Mechanical energy
8	At low frequency the current through a capacitor of A.C. circuit will be:	Large	Small	Zero	Infinite
9	The inductance and capacitance behave a function of:	Voltage	Frequency	Time	Current
10	Impurity atoms are doped in semi-conductor to increase:	Free electrons	Holes	Conductivity	Resistivity
11	The specially designed semi-conductor diode used as indicator lamp in electronic circuit are:	The switch	Solar cells	Photodiodes	Light emitting diode
12	Which diode is used for detection of light?	Light emitting diode	Photo diode	Photo voltaic cell	All these
13	Rest mass of photon is:	Zero	Infinity	$\frac{hf}{c}$	$\frac{hc}{\lambda}$
14	Threshold wavelength for metal having work function ϕ_o is λ_o. What is threshold wavelength for metal having work function $2\phi_o$ is?	$\frac{\lambda}{2}$	4λ	2λ	$\frac{\lambda}{4}$
15	Production of X-rays can be regarded as inverse of:	Compton effect	Photoelectric effect	Annihilation of matter	Pair production
16	The energy released per unit mass is greater in:	Fission reaction	Fusion reaction	Chemical reaction	Nuclear reaction
17	Energy needed to create an electron-hole pair in a solid state detector is:	2 - 3 eV	3 - 4 eV	4 - 5 eV	5 - 6 eV

SECTION – I

2. Write short answers to any EIGHT parts. 16

(i) How can you identify that which plate of a capacitor is positively charged?
(ii) Do electrons tend to go to region of high potential or of low potential?
(iii) State Gauss's law and write its mathematical expression.
(iv) Give a comparison between electric and gravitational forces.
(v) Describe the change in magnetic field inside a solenoid carrying a steady current I, if the number of turns is doubled but the length remains the same.
(vi) If a charged particle moves in a straight line through some region of space, can you say that the magnetic field in the region is zero?
(vii) Define magnetic flux density and write its unit.
(viii) What is Lorentz force? Write its mathematical expression.
(ix) How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?
(x) Does the induced emf always act to decrease the magnetic flux through a circuit?
(xi) Write the factors upon which mutual inductance depends.
(xii) State Faraday's law of electromagnetic induction and write its mathematical expression.

3. Write short answers to any EIGHT parts. 16

(i) Why does the resistance of a conductor rise with temperature?
(ii) Explain why the terminal potential difference of a battery decreases when the current drawn from it is increased?
(iii) Differentiate between resistance and resistivity. Also give their units.
(iv) A sinusoidal current has 'rms' value of 10A. What is the maximum or peak value?
(v) In R-L circuit, will the current lag or lead the voltage? Illustrate your answer by a vector diagram.
(vi) At what frequency will an inductor of inductance 1.0H have reactance of 500Ω.
(vii) What is meant by hysteresis loss? How it is used in the construction of a transformer?
(viii) Define modulus of elasticity. Show that unit of modulus of elasticity and stress are same.
(ix) Differentiate between curie temperature and critical temperature.
(x) Why charge carriers are not present in the depletion region?
(xi) Why a photo diode is operated in reverse biased region?
(xii) A transistor has I_C = 10mA and I_B = 40mA. Calculate the current gain.

4. Write short answers to any SIX parts. 12

(i) As a solid is heated and begin to glow, why does it first appear red?
(ii) Can pair production take place in vacuum? Explain.
(iii) What is the energy of photon in a beam of infra-red radiation of wavelength 1240nm?
(iv) Is energy conserved, when an atom emits a photon of light?
(v) What is meant by CAT-Scanner?
(vi) Why are heavy nuclei unstable?
(vii) Describe a brief account of interaction of various types of radiations with matter.
(viii) What factors make a fusion reaction difficult to achieve?
(ix) What is self-quenching in working of GM-Counter?

SECTION – II

Attempt any THREE questions. Each question carries 08 marks.

5. (a) Define capacitance. Also derive a relation for capacitance of a parallel plate capacitor for air and dielectric as a medium. 05

(b) 0.75A current flows through an iron wire with a battery of 1.5V is connected across its ends. The length of the wire is 5.0m and its cross-sectional area is $2.5 \times 10^{-7} m^2$. Compute the resistivity of iron. 03

6. (a) Derive the relation of e/m of an electron. 05

(b) Two coils are placed side by side. An emf of 0.8V is observed in one coil when the current is changing at the rate of 200As⁻¹ in the other coil. What is the mutual inductance of the coils? 03

7. (a) What is an operational amplifier? Derive a relation for gain of operational amplifier as inverting amplifier. 05

(b) Find the capacitance required to construct a resonance circuit of frequency 1000kHz with an inductor of 5mH. 03

8. (a) Define and explain fusion reaction in detail. 05

(b) A 1.0m long copper wire is subjected to stretching force and its length increases by 20cm. Calculate the tensile strain and the percent elongation which the wire undergoes. 03

9. (a) What is de-Broglie hypothesis? How Davisson and Germer verify it? Explain. 05

(b) The wavelength of K X-ray from copper is 1.377×10^{-10} m. What is the energy difference between the two levels from which this transition results? 03