PHYSICS		TIME : 20 MINUTES
GROUP : SECOND		MARKS :17

OBJECTIVE

NOTE: You have four choices for each objective type question as A , B , C and D . The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question.

QUESTION NO. 1 DGK-2-24

1 A test charge experiences force due to applied electric field
(A) Parallel (B) Anti - Parallel (C) Perpendicular (D) Oblique

2 Unit +ve charge is placed over a spherical hollow surface, flux crossing it outwards is
(A) $\frac{1}{\varepsilon_o}$ (B) Zero (C) $\frac{2}{\varepsilon_o}$ (D) $2\,\varepsilon_o$

3 Heat energy is converted to electrical energy by
(A) Primary cells (B) Thermo-couples (C) Solar cells (D) Generators

4 A high speed graph plotting device is
(A) Voltmeter (B) Galvanometer (C) Ammeter (D) C.R.O

5 Lamp and scale arrangement is used in galvanometers to measure deflection
(A) Stable (B) Dead beat (C) Sensitive (D) Astatic

6 The behaviour is like resistors in alternating current
(A) Capacitor (B) Motor (C) Inductor (D) Generator

7 A transformer with many secondary coils is used for
(A) Door bell (B) TV receiver (C) Power transmission (D) Transistor radio

8 An alternating quantity can be represented by a
(A) Static vector (B) Rotating vector (C) Scalar (D) Straight line

9 At resonance, the voltage of inductor and capacitor in series RLC circuit are
(A) In phase (B) Out of phase (C) Perpendicular (D) Oblique

10 The reverse current to reduce the magnetization to zero is called
(A) Retentive (B) Remanance (C) Coercive (D) Magnetization

11 A fast switching device responding in nano – seconds is
(A) PN Junction (B) Photo diode (C) LED (D) Photo – voltaic cell

12 When output of non – inverting amplifier is fed back directly to inverting input, gain is
(A) Zero (B) R_2/R_1 (C) One (D) $1 - \frac{R_2}{R_1}$

13 Second postulate of special theory of relativity is
(A) Wrong (B) Virtual (C) Experimental fact (D) Sometimes correct

14 For low energy quanta, dominant properties are
(A) Particle nature (B) Wave nature (C) Dual nature (D) Multi nature

15 Longest wavelength of Paschen series is (R_H = Rydberg's constant)
(A) $9/R_H$ (B) $144/7R_H$ (C) $1/R_H$ (D) $400/9R_H$

16 For a radioactive sample of initial population No, decayed fraction after 4 half – lives is
(A) $1/16$ (B) $1/4$ (C) $3/4$ (D) $15/16$

17 The energy output per nucleon in fusion is greater than energy output per nucleon in fission
(A) 25 times (B) 6 to 7 times (C) 17 times (D) 200 times

GROUP : SECOND | SUBJECTIVE PART | MARKS : 80

SECTION – I

DGK-2-24

QUESTION NO. 2 Write short answers any Eight (8) of the following 16

i	Summarize the properties of electric field lines.
ii	Find electric field intensity inside a hallow charged spheres.
iii	The potential is constant throughout a given region of space. Is the electric field zero or non zero in this region ? Explain
iv	Define capacitance of a capacitor. Also define its unit.
v	Draw circuit diagram of conversion of galvanometer into an Ohm meter.
vi	Write down any two uses of C.R.O
vii	How can we use a magnetic field to separate isotopes of chemical element ?
viii	Why the voltmeter should have a high resistance ?
ix	If someone swallow an α - source and a β- source which would be more dangerous to him ? Explain Why ?
x	Why are heavy nuclei unstable ?
xi	Comment on some radiations in the environment added by human activities.
xii	What is radiography ? Explain briefly.

QUESTION NO. 3 Write short answers any Eight (8) of the following 16

i	Describe the circuit which will give a continuously varying potential ?
ii	Why does the resistance of a conductor rise with temperature ?
iii	What is temperature coefficient of resistance ? Give its mathematical form.
iv	What is inductor ? When does it behave as a choke ?
v	Write the properties of parallel resonance circuit at resonant frequency.
vi	What is meant by A.M and F.M
vii	Define crystal lattice. Illustrate yours answer with example.
viii	Distinguish between crystalline, amorphous and polymeric substances ?
ix	What is coercivity in a ferromagnetic materials ?
x	Define rectification. How many types of rectification ?
xi	Give the truth table of XOR – Gate ?
xii	Why ordinary silicon diodes do not emit light ?

QUESTION NO. 4 Write short answers any Six (6) of the following 12

i	Is it possible to change both the area of the loop and the magnetic field passing through the loop and still not have an induced emf in the loop ?
ii	Derive an expression $\mathcal{E} = -N\frac{\Delta\Phi}{\Delta t}$
iii	What is the cause of induced emf ?
iv	Photon **A** has twice the energy of photon **B**. What is the ratio of the momentum of **A** to that of **B** ?
v	What advantages an electron microscope has over an optical microscope ?
vi	Write some important results of photoelectric effect.
vii	An electron is accelerated through a potential difference of 50 V. Calculate its de-Broglie wavelength.
viii	What is meant by a line spectrum ? Explain , how line spectrum can be used for the identification of elements ?
ix	What do you mean by spectroscopy ? What are the main types of spectra ?

SECTION-II

Note: Attempt any Three questions from this section (Part A = 5Marks & Part B=3Marks 8 x 3 = 24)

Q.5.(A)	What is Electromotive force and terminal potential difference ? Explain
(B)	A capacitor has a capacitance of 2.5×10^{-8} F. In the charging process , electrons are removed from one plate and placed on the other one. When potential difference between the plates is 450 V, how many electrons have been transferred ? ($e = 1.6 \times 10^{-19}$ C)
Q.6.(A)	State Lenz's law. Explain how energy conserved in case of movement of bar magnet and metal rod placed on parallel metal rails in uniform magnetic field.
(B)	How fast must a proton move in magnetic field of 2.50×10^{-3} T. Such that the magnetic force is equal to its weight.
Q.7.(A)	Define rectification. Explain half wave rectification and full wave rectification in detail.
(B)	What is the resonance frequency of a circuit which includes a coil of inductance 2.5 H and a capacitance 40 μF ?
Q.8.(A)	What is Compton effect ? Calculate the Compton wavelength OR Compton shift at an angle $\theta = 90^{\circ}$
(B)	A 1.0 m long copper wire is subjected to stretching force and its length increases by 20 cm. Calculate the tensile strain and the percent elongation which the wire undergoes.
Q.9.(A)	What is nuclear reactor ? Describe function of its main parts.
(B)	An electron jumps from a level $E_i = -3.5 \times 10^{-19}$ J to $E_f = -1.20 \times 10^{-18}$ J. What is the wavelength of the emitted light ?