140

Roll No. : _____

Objective
Paper Code :
8477

Intermediate Part Second - 103

PHYSICS (Objective) GROUP - I

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.coa**

FBD-91-22

S.#	Questions	A	B	C	D
1	If an iron core coil of reactance 628Ω is placed in series with 450Ω resistance in AC circuit. The phase difference will be:	51.5°	60°	30°	45°
2	Energy band theory based on:	Wave mechanical model	Bohr atomic model	Pauli exclusion principle	Electronic configuration of electrons
3	In transistor with common emitter configuration, output voltage is at phase difference of:	90°	100°	120°	180°
4	An electronic computer is vast arrangement of electronic switches which are made from:	Resistors	Inductors	Capacitors	Transistors
5	$\frac{h}{m_0 c}$ has the unit of:	Time	Distance	Velocity	Acceleration
6	An electron moving with speed of $1\times10^{6}ms^{-1}$ has wavelength:	$7\times10^{-10}m$	$7\times10^{-9}m$	$7\times10^{10}m$	$7\times10^{-8}m$
7	Velocity of electron of hydrogen in different orbits is:	Same	Quantized	Increase in higher orbits	Independent of orbit number
8	It is believed that quark cannot exist in:	Free state	Bound state	Quark, antiquark combination	Three quark combination
9	Ultra violet radiation cause:	Healthy growth	Saver crop damage	Fast hair grow	Formation of ozone
10	Joule per Coulomb is equal to:	Second	Newton	Watt	Volt
11	Gravitational force cannot be:	Mass dependent	Distance dependent	Shielded	Stronger than electric force
12	In carbon resistance, colour bands are red, red, red and silver. The numerical value of resistance will be:	2200Ω±10%	220Ω±5%	22000Ω±20%	22Ω±10%
13	The torque on a current carrying rectangular coil placed outside the magnetic field will be:	Maximum	NIAB	Zero	IA cos θ
14	Sensitivity of moving coil galvanometer can be increased by:	Decreasing area of coil	Decreasing number of turns	Using thick suspension wire	Increasing magnetic field
15	When motor is just started, the current passing through the coil will be:	Large	Small	Zero	Average
16	The windings of electromagnet in DC motor are called:	Solenoids	Field coils	Inductors	Loops
17	When 10V is applied to an AC circuit with current of 10mA then impedance will be:	100Ω	10Ω	1000Ω	0.1Ω

Intermediate Part Second Roll No. _____

PHYSICS (Subjective) GROUP - I

Time: 02:40 Hours Marks: 68 FBD-G1-22

SECTION – I

2. **Write short answers to any EIGHT parts.**

(i) If a point charge 'q' of mass 'm' is released in a non-uniform electric field with electric field lines pointing in the same direction, will it make a recti linear motion?
(ii) Describe the force or forces on a positive point charge when placed between parallel plates (i) with similar and equal charges (ii) with opposite and equal charges.
(iii) What is the potential gradient? Write its unit.
(iv) What is EEG and ERG?
(v) How can you use a current loop to determine the presence of a magnetic field in a given region of space?
(vi) Why the resistance of an ammeter should be very low?
(vii) Why parallel current attract and opposite current repel?
(viii) Distinguish between sensitive and dead-beat galvanometer.
(ix) How can radioactivity help in the treatment of Cancer?
(x) What do we mean by the term critical mass?
(xi) If $^{238}_{92}U$ decays twice by α-emission, what is the resulting isotope?
(xii) Write two advantages of solid-state detector?

3. **Write short answers to any EIGHT parts.**

(i) Write the heating effect of the current.
(ii) Why does the resistance of a conductor rise with temperature?
(iii) Explain why the terminal potential difference of a battery decreases when the current drawn from it is increased
(iv) What is a choke?
(v) How does doubling the frequency affect the reactance of a capacitor?
(vi) A sinusoidal current has rms value of 10A. What is the maximum or peak value?
(vii) Distinguish between hard magnetic material and soft magnetic material.
(viii) Define the terms yield point and ultimate tensile stress.
(ix) How the hysteresis loss is used in the construction of a transformer?
(x) Why is the base current in a transistor very small?
(xi) Write the truth table and Boolean expression of NAND gate.
(xii) What is the biasing requirement of the junctions of a transistor for its normal operation?

4. **Write short answers to any SIX parts.**

(i) Show that ε and $\frac{\Delta\phi}{\Delta t}$ have the same units.
(ii) Can an electric motor be used to drive an electric generator with the output from the generator being used to operate the motor?
(iii) State Lenz's law. Does it agree with the law of conservation of energy?
(iv) Define mutual inductance and also define its unit.
(v) Is it possible to create a single electron from energy? Explain.
(vi) We do not notice de-Broglie wavelength for a pitched cricket ball. Explain why?
(vii) If the speed of light were infinite what would be the equations of special theory of relativity reduced?
(viii) Calculate the longest wavelength of radiation for Paschen series.
(ix) Is energy conserved when an atom emits a photon of light?

SECTION – II Attempt any THREE questions. Each question carries 08 marks.

5. (a) What is Wheatstone Bridge? How it can be used to find the unknown resistance? 0

(b) Determine the electric field at the position $\vec{r} = (4\hat{i} + 3\hat{j})m$ caused by a point charge $q = 5.0 \times 10^{-6}C$ placed at origin. 0

6. (a) State and explain Faraday's Law of electromagnetic induction. 0

(b) A power line 10m high caries a current 200A. Find the magnetic field of wire at the ground. 0

(Continued P/2)

. (a) Derive an expression for the resonance frequency in R.L.C series circuit. Also give properties of series resonance circuit. 05

(b) The current flowing into the base of a transistor is 100μA. Find its collector current I_C, its emitter current I_E and the ratio $\frac{I_C}{I_E}$; if the value of current gain β is 100. 03

. (a) Explain energy band theory of solids. How does it help to distinguish between conductors, insulators and semi-conductors? 05

(b) What is the de-Broglie wavelength of an electron whose Kinetic energy is 120eV ? 03

). (a) Write three postulate of Bohr's atomic model. Derive an expression for radii of quantized orbit of hydrogen atom? 05

(b) Find the energy associated with the following reaction:

$${}^{14}_{7}N + {}^{4}_{2}He \rightarrow {}^{17}_{8}O + {}^{1}_{1}H .$$

What does negative sign indicate? 03

70

Roll No. : _____

Objective Paper Code **8474**

Intermediate Part Second - 103

PHYSICS (Objective) GROUP - II

Time: 20 Minutes Marks: 17

FBD-G2-22

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.coa**

S.#	Questions	A	B	C	D
1	The energy released by fusion of two deuterons into a helium nucleus is about:	24 MeV	200 MeV	1.02 MeV	7.2 MeV
2	One Joule of energy absorbed in a body per kg is equal to:	1 rad	1 rem	Sievert	Gray
3	Paschan series is obtained when all the transitions of electron terminate on:	2nd orbit	3rd orbit	4th orbit	5th orbit
4	Platinum wire becomes yellow at room temperature of:	900°C	1300°C	1600°C	500°C,
5	If object moves with the speed of light, its mass become:	Zero	Small	Same	Infinity
6	The thickness of a base in a transistor is of the order of:	10^{-3}m	10^{-4}m	10^{-6}m	10^{2}m
7	$X = \overline{A \cdot B}$ is the mathematical notation for:	NAND gate	NOR gate	OR gate	AND gate
8	The critical temperature for mercury is:	7.2K	4.2K	1.18K	3.7K
9	Resistance of choke is:	Zero	Very small	Large	Infinite
10	In three phase, voltage across any two lines is:	220V	230V	400V	430V
11	In DC generator, split rings acts as:	Capacitor	Commutator	Inductor	Resistor
12	Energy stored in the inductor is:	$\frac{1}{2}L^2I$	$\frac{1}{2}LI$	$\frac{1}{2}LI^2$	$\frac{1}{2}L^2I^2$
13	A galvanometer becomes more sensitive when the factor $\frac{C}{BAN}$ will be:	Large	Small	Constant	Zero
14	Force on a moving charge in a uniform magnetic field will be maximum, when the angle between $\vec{V}$ and $\vec{B}$ is:	0°	30°	60°	90°
15	Kirchhoff's first rule is based on conservation of:	Energy	Voltage	Charge	Mass
16	Coulomb per volt is called:	Farad	Ampere	Joule	Ohm
17	If the distance between two point charges is halved. the electric force becomes:	Half	Double	¼ times	4 times

Intermediate Part Second Roll No. _____

PHYSICS (Subjective) GROUP - II

Time: 02:40 Hours Marks: 68 FBD-92-22

SECTION – I

2. **Write short answers to any EIGHT parts.** 16

(i) Is E necessarily zero inside a charged rubber balloon if balloon is spherical? Assume that charge is distributed uniformly over the surface.

(ii) Describe the force or forces on a positive point charge when placed between parallel plates (a) with similar and equal charges (b) with opposite and equal charges.

(iii) Derive relation for potential gradient $E = -\frac{\Delta V}{\Delta r}$

(iv) Write similarities and differences between electrostatic and gravitational forces.

(v) Define CRO and write the names of its parts.

(vi) Define tesla and write its formula.

(vii) Why does the picture on a TV screen become distorted when a magnet is brought near the screen?

(viii) What should be the orientation of a current carrying coil in a magnetic field so that the torque acting upon the coil is (a) maximum (b) minimum ?

(ix) What do you understand by "back ground radiation"? State two sources of this radiation.

(x) What do you mean by the term critical mass?

(xi) Define absorbed dose and gray.

(xii) Write the names of basic forces of nature.

3. **Write short answers to any EIGHT parts.** 16

(i) Is the filament resistance lower or higher in a 500W, 220V light bulb than in a 100W, 220V bulb?

(ii) Why does the resistance of conductor rise with temperature?

(iii) State Kirchhoff's second rule and write its mathematical formula.

(iv) Write any two properties of parallel resonance circuit.

(v) How does doubling the frequency affect the reactance (a) an inductor (b) a capacitor?

(vi) How the reception of a particular radio station is selected on your radio set?

(vii) Define modulus of elasticity. Show that units of modulus of elasticity and stress are the same.

(viii) What is meant by strain energy?

(ix) Distinguish between crystalline solids and amorphous solids.

(x) Why is the base current in a transistor very small?

(xi) Why charge carriers are not present in the depletion region?

(xii) Write the names of three parts of a transistor.

4. **Write short answers to any SIX parts.** 12

(i) Does the induced emf in a circuit depend on the resistance of the circuit? Does the induced current depend on the resistance of the circuit?

(ii) Four unmarked wires emerge from a transformer. What steps would you take to determine the turns ratio?

(iii) What factors can change the mutual inductance of two coils?

(iv) If the length of solenoid is doubled keeping all other factors same, what will be change in energy density of current carrying solenoid?

(v) Why do not we observe a Compton's effect with visible light?

(vi) Will higher frequency light eject greater number of electrons than low frequency light?

(vii) Explain NAVSTAR navigation system.

(viii) Can the electron in the ground state of hydrogen absorb a photon of energy 13.6eV and greater than 13.6eV?

(ix) Explain bremsstrahlung in x-rays spectrum.

SECTION – II Attempt any THREE questions. Each question carries 08 marks.

5. (a) State Gauss's law and apply it to find out the electric intensity due to infinite sheet of charge. 05

(b) A rectangular bar of iron is 2cm by 2cm in cross-section and 40cm long. Calculate its resistance. 03

(Resistivity = $11\times10^{-8}\Omega m$)

6. (a) State Ampere's law and apply it to find the magnetic field due to a current carrying solenoid. 05

(b) When current through a coil changes from 100mA to 200mA in 0.005s, an induced emf of 40mV is produced in the coil. What is the self-inductance of the coil? 03

(Continued P/2)

. (a) What is transistor? Describe its construction and operation. Also show that how current flows in n-p-n transistor? 05

(b) Find the value of current flowing through a capacitance 0.5μF, when connected to a source of 150V at 50Hz. 03

. (a) What are intrinsic and extrinsic semi-conductors? How the p-type and n-type materials are formed? 05

(b) X-rays of wavelength 22pm are scattered from a carbon target. The scattered radiation being viewed at 85° to the incident beam. What is Compton shift? 03

. (a) Describe atomic spectrum of hydrogen. Show that energy of electron in hydrogen atom is quantized. 05

(b) Calculate the energy (in MeV) released in the following fusion reaction: 03

$${}_{1}^{2}H + {}_{1}^{3}H \rightarrow {}_{2}^{4}He + {}_{0}^{1}n .$$