FSD

Roll No. : _____

Objective
Paper Code
8477

Intermediate Part Second (New Scheme)
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.**

S.#	Questions	A	B	C	D
1	Choke consumes extremely small:	Current	Charge	Power	Potential
2	In RLC series resonance circuit, at resonance frequency, impedance Z is:	$\sqrt{R^2+X_L^2}$	R	$\sqrt{R^2+X_C^2}$	X_L
3	Henry can be written as:	VsA^{-1}	$Vs^{-1}A^{-1}$	$Vs^{-1}A$	$V^{-1}sA$
4	One of the applications of mutual induction is:	Choke	Rectifier	Rheostat	Step up transfer
5	The magnetic force on an electron, travelling at $10^6 ms^{-1}$ parallel to the magnetic field of strength 1T is:	$10^{-12}N$	10^3N	0	$16\times10^{-12}N$
6	The relation $B=\frac{\mu_0 I}{2\pi r}$ is called:	Ampere's law	Faraday's law	Lenz's law	Gauss's law
7	Heat generated by a 50 watt bulb in one hour is:	36000 J	48000 J	18000 J	180000 J
8	Electric flux is maximum, when angle between $\vec{E}$ and surface area is:	0°	90°	180°	45°
9	The force on an electron in a field of $1\times10^8 NC^{-1}$ will be:	$1.6\times10^{-8}N$	$1.6\times10^{-11}N$	$1.6\times10^{-19}N$	$1.6\times10^{-27}N$
10	Which group belongs to Hadrons?	Protons and neutrons	Mesons and neutrinos	Photons and electrons	Positrons and electrons
11	Half life of iodine-131 is 8 days and it weighs 20mg. After 4 half lives, the amount left behind will be:	2.5mg	1.25mg	0.625mg	0.312mg
12	An electron can reside in the meta stable state for about:	10^3s	$10^{-8}s$	10^8s	$10^{-3}s$
13	If velocity of a body becomes equal to "C", then its mass becomes:	0 kg	$m=m_0$	$m\to\infty$	$m=\frac{m_0}{2}$
14	If an electron is accelerated through a potential difference of 10 V, then energy gained by electron is:	$1.6\times10^{-20}J$	1.6 eV	10 eV	$1.6\times10^{-19}eV$
15	In a comparator circuit, when intensity of light decreases, then resistance of LDR:	R_L increases	R_L decreases	V_R decreases	V_- increases
16	$X=\overline{A\cdot B}$ is the mathematical notation for:	NAND gate	OR gate	NOR gate	AND gate
17	A single domain in paramagnetic substance contains nearly:	10^8-10^{10} atoms	$10^{15}-10^{20}$ atoms	$10^{12}-10^{20}$ atoms	$10^{12}-10^{16}$ atoms

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Intermediate Part Second (New Scheme) Roll No. _____

PHYSICS (Subjective) GROUP - I

Time: 02:40 Hours Marks: 68

SECTION – I

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

(i) Define potential gradient and show that $E = -\frac{\Delta V}{\Delta r}$

(ii) Write two differences between electrical and gravitational forces.

(iii) How can you identify that which plate of a capacitor is positively charged?

(iv) Suppose that you follow an electric field line due to positive point charge. Do electric field and the potential increase or decrease?

(v) What do you know about sensitivity of galvanometer?

(vi) What are the uses of CRO ?

(vii) How can you use a magnetic field to separate isotopes of chemical element?

(viii) Why the resistance of an ammeter should be very low?

(ix) What are the factors upon which the mutual inductance depends?

(x) What is the back motor effect in generators?

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

(xii) Show that ε and $\frac{\Delta\phi}{\Delta t}$ have the same units.

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

(i) State the Kirchhoff's first and second rule.

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

(iii) What is meant by the tolerance in a resistor? Write the value of tolerance of silver and gold.

(iv) What is a choke?

(v) What is meant by AM and FM ?

(vi) A circuit contains an iron cored inductor, a switch and a DC source arranged in series. The switch is closed and after an interval reopened. Explain why a spark jumps across the switch contacts?

(vii) Define diamagnetic and ferromagnetic substances. Give their examples.

(viii) Distinguish between crystalline and amorphous solids.

(ix) What is the mechanism of electrical conduction by holes and electrons in a pure semiconductor element?

(x) Why ordinary silicon diodes do not emit light?

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

(xii) What is solar cell? Give its uses.

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

(i) What advantages an electron microscope has over an optical microscope?

(ii) When does light behave as a wave? When does it behave like a particle?

(iii) Calculate the value of Compton wave length of electron.

(iv) Explain why laser action could not occur without population inversion between atomic levels?

(v) How K_α and K_β X-rays are emitted?

(vi) How can radioactivity help in the treatment of Cancer?

(vii) What do you understand by background radiations? State two sources.

(viii) Differentiate between Hadrons and Leptons.

(ix) Write any two uses of radiography.

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

5. (a) What is capacitor? Derive a relation for the capacitance of parallel plate capacitor. Show that capacitance varies in the presence of dielectric between the plates of capacitor. 05

(b) The resistance of an iron wire at 0°C is $1\times10^4\Omega$. What is the resistance at 500°C if the temperature coefficient of resistance of iron is $5.2\times10^{-3}K^{-1}$? 03

6. (a) Explain the phenomena of mutual induction, mutual inductance and define its units. 05

(b) Alpha particles ranging in speed from $1000ms^{-1}$ to $2000ms^{-1}$ enter into a velocity selector where the electric intensity is $300Vm^{-1}$ and the magnetic induction 0.20T. Which particle will move undeviated through the field? 03

7. (a) What is transistor? How it is used as an amplifier? Derive its voltage gain equation. 05

(b) At what frequency will an inductor of 1.0H have a reactance of 500Ω ? 03

8. (a) Describe de-Broglie's hypothesis and explain Davisson and Germer experiment to confirm this hypothesis. 02,03

(b) What stress would cause a wire to increase in length by 0.01% if the Young's modulus of the wire is $12\times10^{10}Pa$. What force would produce this stress if the diameter of the wire is 0.56 mm? 03

9. (a) What is radioactivity? Discuss emission of alpha (α), beta (β) and gamma (γ) radiations from radioactive nuclei. 05

(b) Compute the shortest wavelength radiation in the Balmer series. What value of "n" must be used? 03

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Roll No. : _____

Objective
Paper Code
8472

Intermediate Part Second (New Scheme)
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	Which one is photoconductor?	Copper	Selenium	Mercury	Aluminium
2	A charge of 4 Coulomb is in the field of intensity 4 N/C. The force on the charge is:	8 N	16 N	4 N	1 N
3	$mhom^{-1}$ is the SI unit of:	Conductance	Conductivity	Resistance	Resistivity
4	The magnetic induction has the same unit as of:	Flux	Flux density	Electric intensity	Magnetization
5	The Lorentz force on charged particle is:	$F = F_e + F_b$	$F = F_e - F_b$	$F = \frac{F_e}{F_b}$	$F = F_e \times F_b$
6	Lenz's law is in accordance with the law of conservation of:	Momentum	Angular momentum	Charge	Energy
7	Working principle of transformer is:	Mutual induction	Self induction	Faraday's law	Lenz's law
8	When the motor is running at maximum speed, the back emf will be:	Maximum	Minimum	No back emf	Varies
9	The peak to peak value is:	V_0	$-V_0$	$\sqrt{2}\ V_0$	$2V_0$
10	SI unit of modulus of elasticity is:	Coulomb	Volt	Pascal Nm^{-2}	Ampere
11	In transistor the central region is known as:	Base	Emitter	Collector	Inductor
12	The open loop gain of op-amplifier is of the order of:	10^3	10^5	10^6	10^4
13	Amount of energy released due to complete conversion of 1 kg mass into energy is:	9×10^{16} J	9×10^{9} J	9×10^{20} J	3×10^{8} J
14	The unit of Planck's constant is:	Joule	Joule-s	Watt	Candela
15	If transition of electron in hydrogen atom ends at third orbit then radiation emitted lies in:	Balmer	Lyman	Paschen	Bracket
16	The bombardment of nitrogen with α-particle will produce:	Neutron	Proton	Electron	Positron
17	The quantity called the absorbed dose "D" is:	E/m	E/C	m/C	C/E

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Intermediate Part Second (New Scheme) Roll No. _____

PHYSICS (Subjective) GROUP - II

Time: 02:40 Hours Marks: 68

SECTION – I

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

(i) Electric lines of force never cross. Why?
(ii) Do electrons tend to go to region of high potential or of low potential?
(iii) What is meant by potential gradient?
(iv) Define capacitance and its unit Farad.
(v) How can you use a magnetic field to separate isotopes of chemical element?
(vi) Why the resistance of an ammeter should be very low?
(vii) What is sweep or time base generator?
(viii) Distinguish between magnetic flux and magnetic flux density.
(ix) Can a D.C motor be turned into D.C generator? What changes are required to be done?
(x) Show that "ε" and $\frac{\Delta\phi}{\Delta t}$ have the same units.
(xi) Define Henry.
(xii) How the efficiency of transformer can be improved?

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

(i) What are thermistors? How are they made?
(ii) Is the filament resistance lower or higher in a 500W, 220V light bulb than in a 100W, 220V bulb?
(iii) Why does the resistance of a conductor rise with temperature?
(iv) What do you understand about the terms (a) phase lag (b) phase lead ?
(v) A sinusoidal current has rms value of 10A. What is the maximum or peak value?
(vi) How does doubling the frequency affect the reactance of (a) an inductor (b) a capacitor ?
(vii) What are ductile and brittle substances? Give an example of each.
(viii) How would you obtain n-type and p-type material from pure silicon? Illustrate it by schematic diagram.
(ix) Differentiate between para and ferromagnetic substances.
(x) What is normal operation of a transistor? Show it with diagram.
(xi) Why a photodiode is operated in reverse biased state?
(xii) What is the net charge on a n-type or a p-type substance?

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

(i) Show that any material object cannot be accelerated to the speed of light 'c' in free space.
(ii) Which photon, red, green or blue carries the most (a) energy (b) momentum ?
(iii) If an electron and a proton have the same de-Broglie wavelength, which particle has greater speed?
(iv) Differentiate between spontaneous and stimulated emissions.
(v) What are the advantages of lasers over ordinary light?
(vi) What is natural radioactivity? Name types of radiations emitted from radioactive elements.
(vii) What are leptons? Write its examples.
(viii) Why does a Geiger Muller tube for detecting γ-rays not need a window at all?
(ix) Find the mass defect of tritium, if the atomic mass of tritium is 3.016049 u.

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

5. (a) What is Wheatstone Bridge? Give its principle, circuit diagram and working. How it can be used to determine an unknown resistance? 05
(b) A particle having a charge of 20 electrons on it falls through a potential difference of 100 volts. Calculate the energy acquired by it in electron volts (eV). 03

6. (a) State Ampere's law and apply it to find the magnetic field due to current carrying solenoid. 05
(b) A coil of 10 turns and 35cm^2 area is in a perpendicular magnetic field of 0.5T. The coil is pulled out of the field in 1.0 sec. Find the induced emf in the coil as it is pulled out of the field. 03

7. (a) Define rectification and describe the working of a full wave rectifier. 05
(b) A 10mH, 20Ω coil is connected across 240V and 180/π Hz source. How much power does it dissipate? 03

8. (a) What is meant by strain energy? Derive the relation for strain energy from force extension graph. 05
(b) The life time of an electron in an excited state is about 10^{-8}s. What is its uncertainty in energy during this time? 03

9. (a) Derive the relations for quantized radii and energies for hydrogen atom. 05
(b) Find the mass defect and binding energy of the deuteron nucleus. The experimental mass of deuteron is 3.3435×10^{-27} kg. 03