

Objective
Paper Code
8471

Intermediate Part Second **FBD-41-21**
PHYSICS (Objective) GROUP - I

Roll No. : _____



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	Electrical field intensity between two oppositely charged parallel plates is:	$\frac{2\sigma}{\epsilon_0}$	$\frac{\sigma}{\epsilon_0}$	$\frac{\sigma}{2\epsilon_0}$	$\frac{\epsilon_0}{\sigma}$
2	When a dielectric material is inserted between the plates of a capacitor, the potential difference between the plates:	Does not change	Increases	Decreases	Increases then decreases
3	Kirchhoff's first rule is based on law of conservation of:	Mass	Momentum	Energy	Charge
4	Magnetic field strength is measured in terms of:	Wbm^{-2}	Wb	NmA^{-1}	Js
5	In CRO the output waveform of time base generator is:	A ripple	Square wave	Sinusoidal	Saw tooth
6	Mutual inductance of two coils does not depend on:	Number of turns of the coils	Area of cross-section of coils	Density of material of coils	Nature of the core material
7	If the magnetic field intensity is doubled then magnetic energy density becomes:	Four times	Double	Half	Eight times
8	Direct current cannot flow through:	Resistor	Capacitor	Inductor	Ammeter
9	In RLC series circuit, the condition for resonance is:	$X_C > X_L$	$X_C = X_L$	$X_C < X_L$	$X_L = Z$
10	Dimensions of strain are same as that of:	Stress	Pressure	Young's modulus	Relative permittivity
11	Forward resistance of the p-n junction is:	Very large	Of the order of $\text{k}\Omega$	A few Ohms	In mega Ohms
12	In a transistor greater concentration of impurity is added in:	Emitter	Collector	Both emitter and collector	Base
13	Value of Plank's constant is:	$6.34 \times 10^{-43} \text{Js}$	$6.43 \times 10^{-34} \text{Js}$	$6.64 \times 10^{-19} \text{Js}$	$6.63 \times 10^{-34} \text{Js}$
14	A gamma radiation has an energy of the order of:	1 MeV	1 keV	100 eV	1 eV
15	Rydberg constant is given in units of:	kg^{-1}	m^{-1}	s^{-1}	Js
16	In a nuclear transmutation, radium changes into radon, the emitted particle is:	A neutron	A proton	An alpha particle	A beta particle
17	The average number of neutrons produced per fission of uranium-235 atom is:	2.5	3	2	4

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FSD

Intermediate Part Second
PHYSICS (Subjective) GROUP - I

Roll No. _____

Time: 02:40 Hours

Marks: 68 **FSD-41-21****SECTION - I****2. Write short answers to any EIGHT parts.**

- (i) Do electrons tend to go to region of high potential or of low potential? 16
- (ii) Define electron volt. Show that $1 \text{ eV} = 1.60 \times 10^{-19} \text{ J}$
- (iii) Is E necessarily zero inside a charged rubber balloon if balloon is spherical? Assume that charge is distributed uniformly over the surface.
- (iv) What are differences between electric force and gravitational forces?
- (v) How can you use a magnetic field to separate isotopes of chemical element?
- (vi) Why does a picture on a TV screen become distorted when a magnet is brought near the screen?
- (vii) Define the terms magnetic flux and magnetic flux density.
- (viii) Determine the magnitude of force on a charged particle in an electric and magnetic field.
- (ix) Define induced current and induced emf.
- (x) Show that ϵ and $\frac{\Delta\phi}{\Delta t}$ have same units.
- (xi) How the induced current can be increased?
- (xii) Is it possible to change both the area of the loop and magnetic field passing through the loop and still not have an induced emf in the loop?

3. Write short answers to any EIGHT parts.

- (i) Describe a circuit which will give a continuously varying potential. 16
- (ii) Explain why the terminal potential difference of a battery decrease when the current drawn from it is increased?
- (iii) What is meant by tolerance? Give example.
- (iv) How does doubling the frequency affect the reactance of an inductor and a capacitor?
- (v) In a R-L circuit, will the current lag or lead the voltage? Illustrate your answer by a vector diagram.
- (vi) Write four properties of parallel resonance circuit.
- (vii) What is meant by hysteresis loss?
- (viii) Define stress and strain. What are their SI units?
- (ix) What are ductile and brittle substances? Give an example of each.
- (x) What is the net charge on a n-type or a p-type substance?
- (xi) How does the motion of an electron in a n-type substance differ from the motion of holes in a p-type substance?
- (xii) What is operational amplifier?

4. Write short answers to any SIX parts.

- (i) Which has lower energy quanta? Radiowave or X-ray? 12
- (ii) Why do not we observe Compton effect with visible light?
- (iii) Define work function and give its unit.
- (iv) What are the advantages of laser light over ordinary light?
- (v) Define ionization potential and excitation potential.
- (vi) If a nucleus has half-life of 1 year, does it mean that it will be completely decayed after 2 years? Explain it.
- (vii) What do you mean by term critical mass?
- (viii) Define half-life. Give its expression.
- (ix) Define Hadrons and Leptons.

SECTION - II

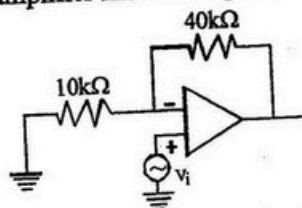
Attempt any THREE questions. Each question carries 08 marks.

5. (a) Explain electric potential at a point due to a point charge. Derive its relation. 05
 (b) A rectangular bar of iron is 2.0cm by 2.0cm in cross-section and 40cm long. Calculate its resistance if the resistivity of iron is $11 \times 10^{-8} \Omega \text{ m}$ 03
6. (a) Determine $\frac{e}{m}$ of an electron. Derive its relation. 05
 (b) Two coils are placed side by side. An emf of 0.8V is observed in one coil when current is changing at the rate of 200 As^{-1} in the other coil. What is the mutual induction of the coils? 03

(Continued P/2)

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7. (a) Describe the behaviour of an inductor in an A.C. circuit and write expression for reactance of an inductor. 05
(b) Calculate the gain of non-inverting amplifier shown in figure: 03



8. (a) Describe the formation of energy bands in solids. Explain the difference of electrical behaviour of conductors, insulators and semi-conductors in terms of energy band theory. 05
(b) A sheet of lead 5.0mm thick reduces the intensity of a beam of γ -rays by a factor of 0.4. Find half value thickness of lead sheet which will reduce the intensity to half of its initial value. 03
9. (a) What is meant by inner shell transition and characteristics X-rays. How X-rays are produced? 05
Write any two properties and uses of X-rays. 03
(b) An electron is accelerated through a potential difference of 50V. Calculate its de-Broglie wavelength.

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