

FBD-12-2-23

Roll No. : _____

Objective
Paper Code
8476

Intermediate Part Second - 136
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	The reactance of an inductor at 50Hz is 10Ω its reactance at 100Hz becomes:	20Ω	5Ω	2.5Ω	3Ω
2	The winding of the electromagnetic motor are usually called:	Magnetic coils	Field coils	Electric coils	All of these
3	Transformer is a device which step up or step down the input:	Current	Voltage	Energy	Power
4	The unit of \vec{E} is NC^{-1} and that of \vec{B} is $\text{NA}^{-1}\text{m}^{-1}$ then the unit of $\frac{\vec{E}}{\vec{B}}$ is:	ms^{-2}	$\text{m}^{-1}\text{s}^{-1}$	ms	ms^{-1}
5	The value of high resistance which can be used to convert galvanometer in voltmeter:	$R_h = \frac{I_g}{V} - R_g$	$R_h = R_g - \frac{V}{I_g}$	$R_h = \frac{V}{I_g} - R_g$	None
6	Energy consumed by 60 watts bulb in 2 minutes is equal to:	720 Joule	7.2 kilo Joule	120 Joule	7600 Joule
7	Unit of relative permittivity is:	No unit	NC^2m^{-2}	Nm^2C^{-2}	$\text{N}^{-1}\text{C}^{-2}\text{m}^{-2}$
8	Force experienced per unit positive test charge at a point in an electric field is:	Electric potential	Electric potential energy	Electric field strength	Electric field
9	The dead time for Geiger-Muller counter is:	10^{-4} s	10 s	10^{-2} s	10^{-3} s
10	Cobalt-60 is the source for:	α -rays	γ -rays	β -rays	Neutron
11	Helium-Neon laser discharge tube contains Helium:	10%	15%	25%	85%
12	Using relativistic effects, the location of an aircraft after an hour flight can be predicted about:	20m	76km	50m	780m
13	Mathematical form of Stephen-Boltzmann law is:	$E = \sigma T^2$	$E = \sigma T^3$	$E = \sigma T^4$	$E = \sigma T^6$
14	In photo voltaic cell current is directly proportional to:	Wavelength of light	Energy	Frequency of light	Intensity of light
15	A diode can be used as:	Amplifier	Rectifier	Oscillator	Transistor
16	When silicon crystal doped with a pentavalent impurity, the doped semi-conductor is:	n-type	p-type	Both A & B	None of these
17	Ohm is not a unit for:	Reactance	Resistance	Inductance	Impedance

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SECTION - I

2. Write short answers to any EIGHT parts.

16

- If a point charge 'q' of mass 'm' is released in a non-uniform electric field with field lines pointing in the same direction, will it make a rectilinear motion?
- Is it true that Gauss's law states that the total number of lines of forces crossing any closed surface in the outward direction is proportional to the net positive charge enclosed with in surface?
- Define Gauss's law for n-point charges.
- What is effect of relative permittivity of different dielectrics on electric force?
- How can you use a magnetic field to separate isotopes of chemical element?
- What should be the orientation of a current carrying coil in a magnetic field so that torque acting upon the coil is (a) maximum (b) minimum?
- How radial magnetic field is produced in a galvanometer?
- Find the radius of orbit of an electron moving at a rate of $2 \times 10^7 \text{ ms}^{-1}$ in a uniform magnetic field of $1.20 \times 10^{-3} \text{ T}$.
- What information is revealed by the length and shape of the tracks of an incident particle in Wilson cloud chamber?
- What do we mean by the term 'critical mass'?
- What is meant by nuclear fission reaction? Give its uses.
- What are types of nuclear reactors?

3. Write short answers to any EIGHT parts.

16

- What are sources of current?
- State Kirchhoff's rules.
- Is the filament resistance lower or higher in a 500W, 220V light bulb than in a 100W, 220V bulb?
- What is meant by phase lag and phase lead?
- Name the device that will (a) permit flow of direct current but oppose the flow of alternating current (b) permit flow of alternating current but not the direct current.
- How many times per second will an incandescent lamp reach maximum brilliance when connected to a 50Hz source?
- Write any two properties of semi-conductors.
- Differentiate between retentivity and coercivity.
- Write a brief note on superconductors.
- What are applications of photodiode?
- What is meant by closed loop gain and open loop gain of an operational amplifier?
- Why a photodiode is operated in reverse biased state?

4. Write short answers to any SIX parts.

12

- What is step up and step down transformer?
- Why is the transformer used to transmit the A.C current over long distance?
- A square loop of wire is moving through a uniform magnetic field. The normal to the loop is oriented parallel to the magnetic field. Is a emf induced in loop? Give a reason for your answer.
- Will higher frequency light eject more electrons from a metal surface than low frequency light?
- If an electron and a proton have the same de-Broglie wavelength, which particle has greater speed?
- What is dual wave-particle nature?
- What is Compton shift? At what angle, Compton shift will be maximum?
- What is meant by quantized radii of hydrogen atom?
- Is energy conserved when an atom emits a photon of light?

SECTION - II

Attempt any THREE questions. Each question carries 08 marks.

- State Gauss's law and apply it to find electric field intensity due to an infinite sheet of charge by pointing out the importance of Gaussian surface.
- How many electrons pass through an electric bulb in one minute if the 300mA current is passing through it?

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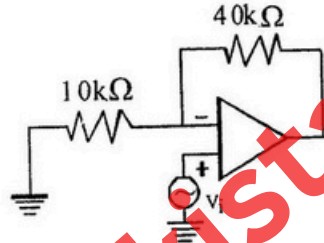
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(Continued P/2)

FBD-12-2-23

- 2 -

6. (a) Determine e/m ratio of electron in terms of B and V (accelerating voltage).
(b) A D.C. motor operates at 240V and has a resistance of 0.5Ω . When the motor is running at normal speed, the armature current is 15A. Find the back emf in the armature.
7. (a) How capacitor behave in A.C circuit? Write expression for capacitive reactance.
(b) Calculate the gain of non-inverting amplifier shown in figure given below:



8. (a) Explain energy band theory of solids. How does it help to distinguish between conductor, insulator and semi-conductor.
(b) What is the energy of photon in a beam of infrared radiation of wavelength 1240nm?
9. (a) What is radioactivity and explain nuclear transmutation?
(b) What are the energies in eV of quanta of wavelength $\lambda = 400\text{nm}$, 500nm and 700nm ?

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