

INSTRUCTIONS:

- Attempt this section on the **MCOs Answer Sheet** only.
- Use black ball point or marker for shading only one circle for correct option of a question.
- No mark will be awarded for cutting, erasing, over writing and multiple circles shading.

Q. 1:- Choose the correct option i.e. A,B,C, or D.

- Which of these has the shortest wave length?
☒ A γ - rays ☐ B X-rays ☐ C Microwaves ☐ D Radio waves
- Which of these materials is more ductile?
☐ A Bricks ☐ B Concrete ☒ C Copper ☐ D Glass
- In p-type material, minority charge carriers are
☐ A Holes ☒ B Electrons ☐ C Protons ☐ D Photons
- The idea of matter wave is presented by
☐ A Plank ☐ B Einstein ☒ C De-Broglie ☐ D Bohr
- The value of ground state energy for hydrogen atom is
☐ A 13.6 eV ☒ B -13.6 eV ☐ C -10.6 eV ☐ D -5.6 eV
- The mass of nucleus is of the order of kg.
☐ A 10^{27} ☐ B 10^{-31} ☐ C 10^{-19} ☐ D 10^{-27}
- The value of relative permittivity (ϵ_r) for vacuum is
☒ A 1 ☐ B 3 ☐ C 5 ☐ D 1.006
- Which of the following is an ohmic material?
☐ A P-type ☐ B N-Type ☒ C Metals ☐ D Thermistor
- One Tesla is equal to Gauss.
☒ A 10^4 ☐ B 10^{-4} ☐ C 10^6 ☐ D 10^8
- A wire is stretched to double of its length. The strain produced is
☒ A 1 ☐ B 2 ☐ C 0.5 ☐ D 0
- The energy of photon is given by
☐ A $\frac{1}{2}mv^2$ ☐ B m_0c^2 ☒ C hf_{\max} ☐ D eV_0
- 1 amu is equal to MeV.
☐ A 9.31 ☐ B 93.1 ☐ C 0.931 ☒ D 931
- If the K.E doubles then de-Broglie wave length changes by a factor of
☒ A $\frac{1}{\sqrt{2}}$ ☐ B 2 ☐ C $\sqrt{2}$ ☐ D $\frac{1}{2}$
- In pure inductor, current lags behind the voltage by
☐ A 0° ☐ B 45° ☒ C 90° ☐ D 180°
- Coulomb per volt is equal to
☒ A Farad ☐ B Ampere ☐ C Joule ☐ D Watt
- The resistance of a conductor does not depend upon
☐ A Length ☐ B Area ☐ C Resistivity ☒ D Mass
- The unit of magnetic flux is
☐ A Henry ☐ B Tesla ☒ C Weber ☐ D Watt
- Lenz's law is manifestation of the law of conservation of
☐ A Mass ☐ B Spin ☒ C Energy ☐ D Momentum

"Section-B"

Marks: 40

Q. 2. Write short answers of any Ten (10) of the following parts. Each part carries equal marks.

- (i) Differentiate between electric field and electric field intensity.
- (ii) Define electron Volt (eV).
- (iii) State and explain Kirchhoff's Voltage rule.
- (iv) How galvanometer can be converted to voltmeter?
- (v) Explain why no power is dissipated in an inductive circuit?
- (vi) What is meant by crystal structure?
- (vii) Explain half wave rectification.
- (viii) Calculate the threshold wavelength for a photon to produce pair production.
- (ix) Differentiate between excitation energy and excitation potential.
- (x) Briefly explain fission reaction.
- (xi) Discuss back emf effect in electric motors.
- (xii) Mathematically explain temperature co-efficient of resistance.
- (xiii) What is the cyclotron frequency of a charged particle moving in a magnetic field?

"Section-C"

Marks: 27

Note: Answer any Three (3) questions. Each question carries equal marks.

- Q. 3. (a) Define Gauss's law. Derive an expression for electric field intensity due to an infinite charged sheet.
(b) A $50\ \Omega$ resistor has a P.D. of 100 V D.C across one hour. Calculate power and energy.
- Q. 4. (a) Derive a relation for a force on a current carrying conductor in a uniform magnetic field.
(b) Calculate the wave length of de-Broglie waves associated with electrons accelerated by a potential difference of 200 V.
- Q. 5. (a) What is meant by natural radio activity? What is half life?
(b) The electron in hydrogen atom makes a transition from $n = 2$ to $n = 1$. Calculate the wave length of the emitted photon.
- Q. 6. Write detail notes on any Two of the following.
(a) Transistor.
(b) Electromagnetic waves.
(c) Magnetic materials.