

Roll No. of Candidate : _____

PHYSICS

(INTERMEDIATE PART-II) 421 - (I)

Paper II

(Group - II)

Time: 20 Minutes

OBJECTIVE

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Code: 8472

GUT 42-21

Marks: 17

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.

1. Electric flux through a closed surface depends upon
(A) charge (B) medium (C) geometry (D) charge and medium
2. Coulomb per volt is called
(A) farad (B) ampere (C) joule (D) henry
3. The substance having negative temperature co-efficient of resistance
(A) silver (B) gold (C) carbon (D) tungsten
4. One Tesla is equal to
(A) $1 \text{ N}^{-1} \text{ Am}$ (B) 1 NA m (C) $1 \text{ NA}^{-1} \text{ m}^2$ (D) $1 \text{ NA}^{-1} \text{ m}^{-1}$
5. Magnetic flux density at a point due to current carrying coil is determined by
(A) Ampere's law (B) Gauss's law (C) Faraday's law (D) Lenz's law
6. Mutual induction has a practical role in the performance of the
(A) radio choke (B) transformer (C) A.C generator (D) D.C generator
7. The self-induced emf is sometimes called _____ emf.
(A) motional (B) constant (C) back (D) variable
8. Power dissipated in a pure inductor is
(A) large (B) small (C) infinite (D) zero
9. At resonance frequency the impedance of RLC parallel circuit is
(A) zero (B) infinite (C) minimum (D) maximum
10. Above the curie temperature iron is
(A) paramagnetic (B) diamagnetic (C) ferromagnetic (D) remain same
11. A P-n junction cannot be used as
(A) amplifier (B) rectifier (C) detector (D) LED
12. The width of central region of a transistor is
(A) 10^{-4} m (B) 10^{-6} m (C) 10^{-3} m (D) 10^{-9} m
13. When platinum wire is heated it becomes orange at
(A) 500°C (B) 900°C (C) 1100°C (D) 1300°C
14. The value of plank's constant h is
(A) $6.63 \times 10^{-34} \text{ JS}$ (B) $6.63 \times 10^{-34} \text{ JS}^{-1}$ (C) $6.63 \times 10^{-34} \text{ JS}^2$ (D) $6.63 \times 10^{-34} \text{ JS}^{-2}$
15. Helium - Neon Laser discharge tube Contain Neon
(A) 85% (B) 80% (C) 30% (D) 15%
16. A pair of quark and antiquark makes a
(A) meson (B) hadron (C) lepton (D) baryon
17. A device that shows the visible path of ionizing particle is called
(A) G.M. counter (B) solid detector (C) scalar (D) Wilson Cloud Chamber

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Note: Section I is compulsory. Attempt any three (3) questions from Section II.

(SECTION – I)

2. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- i. Define electron volt and prove that $1\text{ev} = 1.6 \times 10^{-19}\text{J}$.
- ii. Give a comparison between electric force and gravitational force.
- iii. Upon what factors electric flux does depend?
- iv. Do electrons tend to go to region of high potential or of low potential?
- v. State Ampere's law and write down its formula.
- vi. Define magnetic flux and flux density.
- vii. A plane conducting loop is located in a uniform magnetic field that is directed along the x-axis. For what orientation of the loop, is the flux a maximum? For what orientation is the flux a minimum?
- viii. Why does the picture on a TV screen become distorted, when a magnet is brought near the screen?
- ix. 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?
- x. Does the induced emf always act to decrease the magnetic flux through a circuit?
- xi. Define motional emf and write down its formula.
- xii. Upon what factors self-inductance does depend?

3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- i. Define the temperature co-efficient of resistance. Write down an expression for temperature co-efficient of resistance in terms of resistivity.
- ii. Do bends in a wire affect the electrical resistance? Explain.
- iii. Explain why the terminal potential difference of a battery decreases when the current drawn from it is increased?
- iv. Define impedance and write down its SI units.
- v. What is the main advantage of three phase A.C supply?
- vi. A circuit contains an iron-cored inductor, a switch and a D.C. source, arranged in series. The switch is closed and after an interval reopened. Explain why a spark jumps across the switch contacts?
- vii. Draw a stress-strain curve for a metallic wire and mention the points representing proportional limit, elastic limit, UTS or nominal strength and fracture stress.
- viii. Define modulus of elasticity. Also discuss its three kinds.
- ix. What is meant by hysteresis loss? How is it used in the construction of a transformer?
- x. What is photovoltaic cell?
- xi. What does it mean when we say that output of an amplifier is 180° out of phase with its input?
- xii. What is the net charge on an n-type or a p-type substance?

4. Write short answers to any SIX questions.

(2 x 6 = 12)

- i. What advantages an electron microscope has over an optical microscope?
- ii. Write down some important results of photoelectric effect.
- iii. If the following particles have the same energy, which has the shortest wavelength? Electron, alpha Particle, neutron, proton.
- iv. What do we mean when we say that atom is excited?
- v. Explain de-Broglie's interpretation of Bohr's orbits.
- vi. Why are heavy nuclei unstable?
- vii. What factors make a fusion reaction difficult to achieve?
- viii. Write down the name of basic forces of nature.
- ix. Differentiate between mass defect and binding energy.

(Turn Over)

(SECTION - II) 40J-42-21

5. (a) State Gauss's law. Find electric field intensity between two oppositely charged parallel plates. 5
(b) A platinum wire has resistance of 10Ω at 0°C and 20Ω at 273°C . Find the value of temperature co-efficient of resistance of platinum. 3
6. (a) State Faraday's law of electromagnetic induction and also derive the relation for induced emf. 5
(b) A solenoid 15.0 cm long has 300 turns of wire. A current of 5.0 A, flows through it. What is the magnitude of magnetic field inside the solenoid. 3
7. (a) How can we use a transistor as an amplifier? 5
(b) A 10 mH, 20Ω coil is connected across 240 V and $\frac{180}{\pi}$ Hz source. How much power does it dissipate? 3
8. (a) Differentiate between insulators, conductors and semi-conductors on the basis of energy band theory. 5
(b) Find the mass defect and binding energy of the deuteron nucleus. The experimental mass of deuteron is 3.3435×10^{-27} kg, and that of proton and neutron 1.6726×10^{-27} kg and 1.6749×10^{-27} kg respectively. 3
9. (a) What is photoelectric effect? What is the effect of frequency of light on photoelectric current? 5
Derive the Einstein's photoelectric equation.
(b) Electrons in an x-ray tube are accelerated through a potential difference of 3000 V. If these 3
Electrons were slowed in a target, what will be the minimum wavelength of x-rays produced?

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