

GUJ-G2-12-19

Roll No. of Candidate:

Physics (New Scheme)
Time: 20 Minutes

(INTER PART-II) 419-(I)
OBJECTIVE
Code: 8472

Group: II

Paper: II
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 other blank.

1. Selenium is a
A) conductor B) insulator C) photoconductor D) semi-conductor
2. The electron volt (eV) is the unit of
A) electric current B) electric energy C) electric potential D) electric flux
3. The drift velocity of electrons is of the order of
A) 10^{-2} m/s B) 10^{-3} m/s C) 10^3 m/s D) 10^6 m/s
4. If a charge is at rest in a magnetic field then the force on charge is
A) $q(\vec{V} \times \vec{B})$ B) $qVB \sin\theta$ C) qVB D) zero
5. The SI unit of magnetic induction is
A) weber B) henry C) tesla D) gauss
6. Emf is induced due to change in
A) electric flux B) magnetic flux C) electric potential D) electric current
7. Mutual induction has a practical role in the performance of the
A) motor B) generator C) choke D) transformer
8. In RLC series circuit, the current at resonance frequency is
A) minimum B) maximum C) zero D) infinite
9. At high frequency, the value of reactance of capacitor will be
A) large B) small C) zero D) infinite
10. Which one of the following is a polymeric solid
A) glass B) nylon C) copper D) zinc
11. In P-type substances, the minority charge carriers are
A) holes B) protons C) electrons D) neutrons
12. The output resistance of an operational amplifier is
A) high B) low C) zero D) equal to input resistance
13. Wave nature of light appears in
A) pair production B) Compton effect C) photoelectric effect D) interference
14. The unit of Planck's constant is
A) Volt B) JS C) JS^{-1} D) eV
15. Balmer series lies in the region of electromagnetic spectrum
A) infra-red B) visible C) ultraviolet D) far infrared
16. The S.I unit of radiation dose is
A) roentgen B) curie C) grey D) rem
17. The binding energy per nucleon is maximum for
A) uranium B) platinum C) hydrogen D) iron

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(SECTION - I)

2. Write short answers to any EIGHT questions.

(2 × 8 = 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 rectilinear motion.
- Electric lines of force never cross; why?
- Prove that: $E = -\frac{\Delta V}{\Delta r}$
- Find electric intensity of field inside a hollow charged sphere.
- Why the voltmeter should have a very high resistance?
- How can you use a magnetic field to separate isotopes of chemical element?
- How can we increase the sensitivity of galvanometer?
- What is the function of 'X' and 'Y' plates in C.R.O?
- Can an electric motor be used to drive an electric generator with the output from the generator being used to operate the motor?
- How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?
- What is the function of the commutator in D.C motor?
- Discuss the relation: $V = \epsilon + IR$

3. Write short answers to any EIGHT questions.

(2 × 8 = 16)

- Define Kirchhoff's Second Rule.
- Why does the resistance of a conductor rise with temperature?
- A potential difference is applied across the ends of a copper wire. What is the effect on the drift velocity of free electrons by decreasing the length and the temperature of the wire?
- At what frequency will an inductor of 1.0 H have a reactance of 500 Ω ?
- Explain the conditions under which electromagnetic waves are produced from a source.
- In a R-L circuit, will the current lag on lead the voltage? Illustrate your answer by a vector diagram.
- What is meant by paramagnetic and diamagnetic substances? Give example for each.
- What is meant by hysteresis loss? How is it used in the construction of a transformer?
- Define intrinsic and extrinsic semiconductor.
- How gates are used in controlling systems?
- Why ordinary silicon diodes do not emit light?
- What is the net charge on an n-type or a p-type substance?

4. Write short answers to any SIX questions.

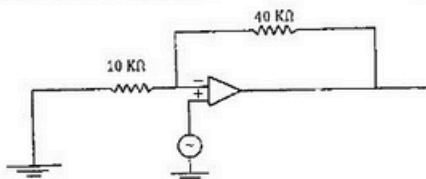
(2 × 6 = 12)

- Write two postulates of special theory of relativity.
- What are the measurements on which two observers in relative motion will always agree upon?
- Why do not we observe a "Compton Effect" with visible light?
- Write postulates of Bohr's Model of the hydrogen atom.
- What do we mean when we say that the atom is excited?
- Define the term "Isotopes" and give one example.
- Differentiate between "Mass Defect" and "Binding Energy".
- Why are heavy nuclei unstable?
- What do we mean by the term "Critical Mass"?

(Turn Over)

(SECTION - II)

5. (a) What is a capacitor and capacitance of a capacitor? Give S.I unit of capacitance. 4+1
Derive the expression for energy stored in capacitor.
- (b) How many electrons pass through an electric bulb in one minute if the 300 mA current is passing through it. 3
6. (a) What is Ampere's Law. By applying Ampere's law, find the magnetic field inside the current carrying solenoid. 5
- (b) A circular coil has 15 turns of radius 2 cm each. The plane of the coil lies at 40° to a uniform magnetic field of 0.2 T. If the field is increased by 0.5 T in 0.2 S, then find the magnitude of induced emf. 3
7. (a) Describe the behaviour of A.C through R-C series circuit. 5
Calculate the impedance and phase angle of R-C series circuit.
- (b) Calculate the gain of non-inverting amplifier shown in the figure: 3



8. (a) What is de-Broglie's hypothesis? How did Davisson and Germer verify it? Explain 5
- (b) What stress would cause a wire to increase in length by 0.01% if the young's modulus of the wire is 12×10^{10} Pa. What force would produce this stress if the diameter of the wire is 0.56 mm? 3
9. (a) Explain the principle, construction and working of Geiger Muller counter. 1+4
- (b) The wavelength of K x-rays from copper is 1.377×10^{-10} m. What is the energy difference between the two levels from which this transition results? 3

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