



Roll No _____ to be filled in by the candidate

(For All Sessions)

Physics (Objective) *Rwp-12-2-23* **(Group-II)**

Time: 20 Minutes

Marks: 17

Note: Write Answers to the Questions on the objective answer sheet provided. Four possible answers A, B, C and D to each question are given. Which answer you consider correct, fill the corresponding circle A, B, C or D given in front of each question with Marker or Pen ink on the answer sheet provided.

1.1. LDR becomes necessary when op-amplifier is used as:

- (A) Comparator (B) Rectifier (C) Inverter (D) Night switch

2. If velocity of body becomes equal to 'C' then its mass becomes:

- (A) 0 kg (B) $m = m_0$ (C) $m \rightarrow \infty$ (D) $m = m_0/2$

3. Which one is low energy photon?

- (A) Visible light (B) Infrared light (C) Ultraviolet light (D) x-ray

4. In Helium - Neon Laser, the percentage of Helium is:

- (A) 75% (B) 65% (C) 60% (D) 85%

5. The number of neutron present in the nucleus is given by:

- (A) $N = A - Z$ (B) $N = A + Z$ (C) $N = Z - A$ (D) $N = A \times Z$

6. The binding energy per nucleon is maximum for:

- (A) Radium (B) Polonium (C) Iron (D) Helium

7. Electric flux through a closed surface depends upon:

- (A) Charge (B) Medium (C) Charge & Medium (D) Geometry

8. The negative of potential gradient is:

- (A) Electrostatic force (B) Electric field intensity (C) Potential difference (D) Electromotive force

9. Charge carrier in electrolyte are:

- (A) Positive & negative ion (B) Protons (C) Electron (D) Holes

10. The sum of electric and magnetic force is called:

- (A) Maxwell force (B) Lorentz force (C) Newton force (D) Centripetal force

11. Current passing through the coil of galvanometer is:

- (A) $\frac{CN\theta}{BA}$ (B) $\frac{NAB\theta}{C}$ (C) $\frac{AN}{BC}$ (D) $\frac{C\theta}{BAN}$

12. Induced emf can be increased by:

- (A) Increase resistance of coil (B) Decrease resistance of coil (C) Increase number of turns (D) Decrease magnetic flux

13. The working principle of transformer is:

- (A) Self induction (B) Faraday Law (C) Mutual induction (D) Electromagnetic induction

14. The wave form of alternating voltage is a:

- (A) Sine curve (B) Tan curve (C) Cotangent curve (D) Cosine curve

15. The main advantage of use of A.C is:

- (A) Minimum line losses (B) Long distance (C) Step up to required voltage (D) Step up to required current

16. Which of the following does not go plastic deformation:

- (A) Copper (B) Wrought iron (C) Lead (D) Glass

17. The output voltage of rectifier is:

- (A) Smooth (B) Pulsating (C) Perfectly direct (D) Alternating

Physics (Subjective)

(GROUP-II)

Time: 2:40 hours

SECTION-I

Rwp-12-2-23

2. Write short answers of any eight parts from the following: (8x2=16)
- What are the photo conductors?
 - Show that $v/m = N/C$.
 - Do electrons tend to go region of high potential or of low potential?

- Electric lines of force never cross why?
- Describe the change in magnetic field inside a solenoid carrying a steady current 'I'. If the number of turns is double, but length remains same?
- Why does the picture on a TV screen becomes distorted when a magnet is brought near screen?
- Why the resistance of an ammeter should be very low?
- What is Lorentz force? Give the role of electric and magnetic force in this regard.
- How can radioactivity help in the treatment of cancer?
- What do we mean by the term critical mass?
- What do you understand by "background radiation"? State two sources of radiation.
- What is the self-quencing in Geiger Muller Counter?

3. Write short answers of any eight parts from the following: (8x2=16)

- What are the difficulties in testing whether the filament of a lighted bulb obeys Ohm's Law?
- Write down the statement of Kirchoff's current rule and Kirchoff's voltage rule.
- What is meant by temperature coefficient of resistance? Give its S-I unit.
- Draw diagram and wave shape of three phase A.C generator.
- How does doubling of frequency affect the reactance of: (a): An inductor (b): A capacitor
- In a R-L circuit, will the current lag or lead the voltage? Illustrate your answer by a vector diagram.
- Discuss the mechanism of electrical conduction by holes and electrons in a pure semi-conductor element.
- What are high temperature super conductors? Give some examples.
- Define hysteresis and draw hysteresis curve.
- Why ordinary silicon diode do not emit light?
- Draw diagram and explain working of transistor as a switch in its 'ON' state.
- Write down two characteristics of an operational amplifier.

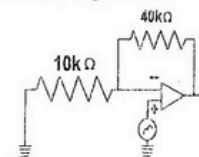
4. Write short answers of any six parts from the following: (6x2=12)

- What is electromagnetic induction?
- Does the induced emf always act to decrease the magnetic flux through a circuit?
- How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?
- The period of a pendulum is measured to be 3.0 s in the inertial reference frame of the pendulum. What is its period measured by an observer moving at a speed of 0.95 c with respect to the pendulum?
- Define Compton effect and write relation for its wavelength.
- Which has the lower energy Quanta? Radio waves or X-rays.
- Can pair production take place in vacuum? Explain.
- State postulates of Bohr's model of hydrogen atom.
- What are the advantages of lasers over ordinary light?

SECTION-II

Note Attempt any three questions. Each question carries equal marks: (8x3=24)

- Derive an expression for the energy stored in the electric field of a capacitor. 5
 - A platinum wire has a resistance of 10Ω at 0°C and 20Ω at 273°C . Find the volume of temperature co-efficient of resistance of this wire. 3
- Derive an expression for self induce emf i.e. $\mathcal{E} = vBL \sin \theta$. Define unit of self induction. 5
 - A power line 10.0 m high carries a current 200 A. Find the magnetic field of wire at the ground. 3
- Find out expression of resonance frequency for the case of series resonance circuit. Also describe its properties? (1+4)
 - Calculate the gain of non-inverting amplifier shown in figure. 3



- What is wave nature of particle? How this ideas was confirmed by Davison and Germer? 1+4
 - A wire 2.5 m long and coress section area 10^{-6}m^2 is stretched 1.5mm by a force of 100N in the elastic region calculate (i) Strain (ii) Young's modulus. 3
- Write a note on construction and working of Wilson Cloud Chamber to detect unknown radiations. 5
 - Calculate the longest wavelength of radiations for the Paschen Series. 3

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