☆☆☆☆☆

Roll No _____ to be filled in by the candidate

HSSC-(P-II)-A/2023 | Paper Code | 8 | 4 | 7 | 7 |

(For All Sessions)

Physics (Objective) Rwp-12-1-23 (Group-I)

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. The basic circuit element in a D.C circuit is:

(A) Capacitor (B) Inductor (C) Battery (D) Resistor

2. The critical temperature of mercury is:

(A) 4.2 k (B) 1.18 k (C) 3.72 k (D) 7.2 k

3. The open loop gain of op-amplifier is of the order of:

(A) 10^2 (B) 10^3 (C) 10^5 (D) 10^4

4. $X = A + B$ is the mathematical notation for:

(A) AND gate (B) OR gate (C) NOR gate (D) NAND gate

5. The momentum of a moving photon is:

(A) $P = h/\lambda$ (B) $P = \lambda/h$ (C) $P = hf$ (D) $P = mc^2$

6. Pair production can take place by using:

(A) X − rays (B) $\propto -rays$ (C) $\beta - rays$ (D) $\gamma - rays$

7. The value of Ryd berg's constant is:

(A) $1.0974 \times 10^7 m^{-1}$ (B) $1.0974 \times 10^{-7} m^{-1}$ (C) $1.0974 \times 10^{-7} m$ (D) $1.0974 \times 10^7 m$

8. Half life of uranium −238 is:

(A) 4.5×10^{12} years (B) 4.5×10^{11} years (C) 4.5×10^{10} years (D) 4.5×10^9 years

9. The potential difference between anode and cathode in a neon bromine filed G.M counter is:

(A) 200 v (B) 300 v (C) 400 v (D) 220 v

10. The number of electron in one coulomb charge is:

(A) 6.2×10^{18} (B) 1.6×10^{-19} (C) 6.2×10^{21} (D) 1.6×10^{-27}

11. The S-1 unit of electric flux is:

(A) Nmc^{-1} (B) Nm^2c^{-1} (C) Nm^2c (D) $Nm^{-2}c^{-1}$

12. A rheostat can be used as:

(A) Transformer (B) Amplifier (C) Oscillator (D) Potential divider

13. Lorentz force is known as:

(A) $\vec{F} = I(\vec{L} \times \vec{B})$ (B) $\vec{F} = q(\vec{v} \times \vec{B})$ (C) $\vec{F} = q\vec{E} + q(\vec{v} \times \vec{B})$ (D) $\vec{F} = q\vec{E}$

14. DMM stands for:

(A) Digital millimeter (B) Digital multimeter (C) Digital measuring meter (D) Digital ammeter

15. When the back emf in a circuit is zero it draws:

(A) Zero current (B) Steady average current (C) Minimum current (D) Maximum current

16. The principle of AC generator is based on:

(A) Mutual induction (B) Self induction (C) Electromagnetic induction (D) All of these

17. The graph between A.C voltage with time is:

(A) Cosine curve (B) Tangent curve (C) Sine curve (D) Cot curve

Roll No _____ to be filled in by the candidate | HSSC-(P-II)-A/2023 (For All Sessions) | Marks : 68

Physics (Subjective) Rwp-12-1-23 (GROUP-I) Time: 2:40 hours

SECTION-I

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

i. Electric lines of force never cross. why?
ii. Draw the circuit diagram of charging and discharging of a capacitor.
iii. Suppose that you follow an electric field line due to a positive point charge. Do electric filed and electric potential increase or decrease?
iv. How Millikan's measured the radius of Droplet during measuring the charge on an electron?
v. Is it possible to orient a current loop in a uniform magnetic field such that loop will not tend to rotate? Explain.
vi. How lamp and scale arrangement is used to measure the angle of deflection of a coil of galvanometer?
vii. Why the 'Voltmeter' should have very high resistance?
viii. What is the use of 'Grid' in cathode ray oscilloscope?
ix. What do you understand by back ground radiation? State the two sources of this radiation.
x. Why thermal nuclear reactor so called thermal?
xi. What factors make a fusion reaction difficult to achieve?
xii. Describe briefly about 'Leptons'.

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

i. What is a short circuit and an open circuit?
ii. Write the equation of balanced Wheatstone Bridge and draw its diagram.
iii. Why has a thin filament of light bulb more possibility to burn than the thicker one?
iv. Explain why a spark jumps across a switch contacts when it is reopened in a circuit with D.C source?
v. Describe frequency modulation with diagram.
vi. Explain the relation between frequency of A.C signal and inductive reactance.
vii. What is strain energy? How it can be calculated from the force-extension graph?
viii. Differentiate elasticity and plasticity of materials.
ix. Illsutrate by diagram, the energy bands for conductors and insulators.
x. What are the semi conductors? Give their examples.
xi. Draw diagrams of n-p-n transistor with (a): Common-Emitter and (b): Common-Base Configurations.
xii. What is an operational amplifier? Draw its diagram.

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

i. How power is transferred in a transformer without transfer of charge?
ii. In a certain region, earth's magnetic field points vertically down. When a plane flies due south, which wing is negatively charged?
iii. What are the field coils in DC motor? How are they connected with armature coil?
iv. Calculate Compton shift for scattering angle of 180^{o}.
v. Define work function. Write its SI unit.
vi. What are advantages of an electron microscope over an ordinary optical microscope?
vii. Why radio waves show wave nature while gamma rays do not?
viii. Why resonant cavity is necessary to sustain laser action?
ix. Can the electron in ground state of hydrogen absorb a photon of energy 13.6eV and greater than 13.6eV?

SECTION-II

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

5. (a) Define resistivity and write its unit. And derive temperature coefficient in terms of resistivity. 5
(b) Determine the electric field at the position $\vec{r}=(4\hat{i}+3\hat{j})$ m caused by a point charge $q = 5.0 \times 10^{-6} C$ placed at origin. 3

6. (a) Define motional emf. Explain how emf induced by motion of conductor across magnetic field. 5
(b) A power line 10.0 m high carries a current 200A. Find the magnetic field of wire at the ground. 3

7. (a) What is meant by Rectification? Explain the action of semi conductor diode as Half-wave and Full-wave rectification. 5
(b) What is the resonant frequency of a circuit, which includes a coil of inductance 2.5 H and a capacitance 40 μF? 3

8. (a) Define and explain photoelectric effect. Give Einstein's explanation of photoelectric effect. 5
(b) A 1.25 cm diameter cylinder is subjected to a load of 2500 kg . Calculate the stress on the bar in mega Pascal. 3

9. (a) What is laser? Write down its properties. Explain how Helium-neon laser works? 5
(b) How much energy is absorbed by a man of mass 80Kg who receives a lethal whole body equivalent dose of 400 3