Sargodha Board Group-I *(First Annual Examination 2025)*

1225 Warning:- Please write your Roll No. in the space provided and sign. **Roll No** _____
(Inter Part - II) **(Session 2021-23 to 2023-25)** **Group - I** **Sig. of Student** _____
Physics (Objective) **Paper (II)**
Time Allowed: 20 minutes **PAPER CODE 4477** **Maximum 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. Write PAPER CODE, which is printed on this question paper, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q1.

1. **The reactance of a capacitor at 50 Hz is 30Ω . Its reactance at 100 Hz will be:**
   (A) 30Ω (B) 60Ω (C) 10Ω (D) 15Ω
2. **An example of diamagnetic substance is:**
   (A) iron (B) Cobalt (C) Nickel (D) Copper
3. **The magnitude of voltage gain of a transistor amplifier having r_{ie} = 5Ω , β = 50 and Rc = 2 KΩ is:**
   (A) 200 (B) 2000 (C) 20000 (D) 1000
4. **The closed loop gain of non-inverting OP – AMP is:**
   (A) Zero (B) Equal to or greater than 1 (C) Less than 1 (D) Negative
5. **A battery supplies 10J energy to 2C charge. The emf of battery is:**
   (A) 20 V (B) 10 V (C) 5 V (D) 0.2 V
6. **The value of Wein's constant is:**
   (A) $2.9\times10^{-3}\ mK$ (B) $6.63\times10^{-34}\ Js$ (C) $5.67\times10^{-8}\ Wm^{-2}K^{-4}$ (D) $3\times10^{8}\ ms^{-1}$
7. **At what speed, the mass m of an electron would become double of its rest mass m_o?**
   (A) 2 C (B) $\frac{3}{2}$C (C) $\frac{\sqrt{3}}{2}$C (D) $\frac{C}{2}$
8. **The nature of X-rays is similar to the nature of:**
   (A) Cathode rays (B) Gamma rays (C) Alpha rays (D) Beta rays
9. **The product of decay constant and half life is equal to:**
   (A) 0.5 (B) 0.693 (C) 1 (D) 2
10. **Which of the following is a Lepton?**
    (A) Electron (B) proton (C) Neutron (D) Hadron
11. **In Millikan's oil drop experiment, the mass of oil droplet is determined by:**
    (A) Coulomb's law (B) Ampere's law (C) Stoke's law (D) Lenz's law
12. **A closed surface encloses and electric dipole. The total electric flux through this surface will be:**
    (A) Maximum (B) Negative (C) Infinite (D) Zero
13. **The direction of magnetic field inside a current carrying solenoid is:**
    (A) Along the axis of solenoid (B) Arbitrary
    (C) perpendicular to axis of solenoid (D) At 45° to axis
14. **The S.I unit of magnetic induction is:**
    (A) Weber (B) Tesla (C) Henry (D) Farad
15. **For an ideal transformer, we have;**
    (A) $V_pI_p = V_sI_s$ (B) $V_pI_p > V_sI_s$ (C) $V_pI_p < V_sI_s$ (D) $V_pI_p \neq V_sI_s$
16. **If a conductor of 1m length is moved with velocity $\vec{V}$ across a magnetic field $\vec{B}$ at an angle 45° with $\vec{B}$, the magnitude of motional emf will be;**
    (A) $\frac{1}{2}vB$ (B) $\frac{1}{2}vBL$ (C) $0.866\ vB$ (D) $0.707\ vB$
17. **In case of sinusoidal A.C., the negative peak value lies at phaseangle;**
    (A) π (B) 2π (C) $\frac{3\pi}{2}$ (D) $\frac{3\pi}{4}$

1225 Warning:- Please do not write anything on this question paper except your Roll No.

Physics (Subjective) (Group - I) (Session 2021-23 to 2023-25) (Inter Part - II) Paper (II)

Time Allowed: 2.40 hours Maximum Marks: 68

SECTION - I

Q2. Answer briefly any Eight parts from the followings: 8×2=16

(i) Electric lines of force never cross. Why?

(ii) Do electrons tend to go to region of high potential or of low potential?

(iii) Show that $1\ \frac{volt}{metre} = 1\ \frac{newton}{coulomb}$

(iv) Why Gauss's law is used in electrostatics? How a Gaussion surface is chosen?

(v) How can you use a magnetic field to separate isotopes of chemical element?

(vi) Why the voltmeter should have a very high resistance?

(vii) Justify that how can we determine position of a charged particle in a uniform electric field.

(viii) How the path of circular trajectory of electrons is made visible under magnetic field in a glass tube?

(ix) What factors make a fusion reaction difficult to achieve?

(x) Why are heavy nuclei unstable?

(xi) How can we classify fundamental particles according to standard model of physics? What is purpose of Higgs Bosons?

(xii) How can we control number of neutrons in a nuclear reactor?

Q3. Answer briefly any Eight parts from the followings: 8×2=16

(i) Is the filament resistance lower or higher in a 500 W, 220 V night bulb than in a 100 W, 220 V bulb?

(ii) What is short - circuit and open circuit mean to you?

(iii) Prove that Volt × Ampere = Watt (iv) What is meant by A.M and F.M?

(v) What do you mean by phase Lag and phase lead?

(vi) When 10V are applied to an A.C circuit the current flowing in it is 100mA. Find its impedance?

(vii) What is meant by hystersis loss? How is it used in the construction of a transformer?

(viii) Energy dissipated per cycle for steel is more as compared to Iron? Why.

(ix) Carbon, Silicon and germanium have four valence electrons? Why carbon is insulator while silicon and Germanium are semiconductors?

(x) What is the net charge on a n-type or a p-type substance?

(xi) What are sensors? Give two examples? (xii) Write some important uses of operational amplifier?

Q4. Answer briefly any Six parts from the followings: 6×2=12

(i) Show that ε and $\frac{\Delta\phi}{\Delta t}$ have same unit.

(ii) Does the induced emf always act to decrease the magnetic flux through circuit?

(iii) Can a step - up transformer increase the Power level?

(iv) What are the measurements on which two observers in relative motion will always agree upon?

(v) Which photon, red, green, or blue carries the most energy and momentum?

(vi) Which has the lower energy quanta? Radio waves or X-rays?

(vii) We do not notice the de-Broglie wavelength for a pitched circket ball. Explain why?

(viii) Is energy conserved when an atom emits a photon of light

(ix) What do we mean when we say that the atom is excited?

SECTION - II

Note: Attempt any THREE questions. (3×8=24)

Q5. (a) What is wheatstone bridge discuss its construction and working.

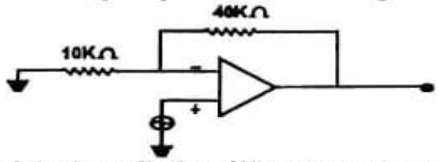
(b) Prove that: ohm × Farad = second

Q6. (a) What is mutual induction? Explain the ratio of average emf induced in the secondary to the time rate of change of current in the primary mathematically.

(b) A power line 10.0 m high caries a current 200A. Find the magnetic field of the wire at the ground.

Q7. (a) Describe the behavior of A.C through a capacitor. Also show that the reactance of capacitor depends upon the frequency of A.C and its capacitance.

(b) Calculate the gain of non - inverting amplifier shown in figure



Q8. (a) Explain black body and black body radiation. What facts the energy distribution curves reveal?

(b) A wire 2.5m long and cross section area $10^{-5}\ m^2$ is stretched 1.5mm by a force of 100N in the elastic region. Calculate the strain and Young's modulus.

Q9. (a) Define and explain nuclear fission. Describe fission chain reaction.

(b) A tungsten target is struck by electrons that have been accelerated through a potential difference of 3000V. If these electrons were slowed down in a target. What will be the minimum wavelength of X-rays produced?