

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.

Q. 1

- 1) The reverse current through a semi conductor diode is due to  
 (A) Minority carriers (B) Majority carriers (C) Holes (D) Electrons
- 2) Amount of energy released due to complete conversion of 1 Kg mass into energy is  
 (A)  $9 \times 10^{16} J$  (B)  $9 \times 10^9 J$  (C)  $9 \times 10^{20} J$  (D)  $3 \times 10^8 J$
- 3) The momentum of photon of frequency ' $f$ ' is  
 (A)  $hc / f$  (B)  $hf / c$  (C)  $f / hc$  (D)  $c / hf$
- 4) An A.C. voltmeter reads 220 V, its peak value will be  
 (A) 255 V (B) 311.12 V (C) 300 V (D) 200 V
- 5) In an electronic transition atom cannot emit  
 (A) Infrared radiation (B) Ultra violet radiation (C)  $\gamma$  - ray (D) Visible light
- 6) The number of neutron present in a nucleus is given by  
 (A)  $N = A + Z$  (B)  $N = A - Z$  (C)  $N = Z - A$  (D)  $N = A \times Z$
- 7) The amount of energy equivalent to 1 a.m.u. is  
 (A) 9.315 MeV (B) 93.15 MeV (C) 931.00 MeV (D) 0.931 MeV
- 8) If electric and gravitational forces on an electron balance each other, then electric intensity will be  
 (A)  $E = \frac{mg}{q}$  (B)  $E = \frac{q}{mg}$  (C)  $E = \frac{F_e}{q}$  (D)  $E = \frac{1}{4\pi\epsilon_0} \frac{q}{r^2}$
- 9) A charge of 4 Coulomb is in the field of intensity 4 N/C. The force on the charge is  
 (A) 8 N (B) 16 N (C) 4 N (D) 1 N
- 10) The reciprocal of resistance is called  
 (A) Reactance (B) Inductance (C) Conductance (D) Conductivity
- 11) The force on current carrying conductor placed in magnetic field is expressed by  
 (A)  $\vec{F} = I \vec{L} \cdot \vec{B}$  (B)  $\vec{F} = I \vec{L} \times \vec{B}$  (C)  $\vec{F} = I^2 \vec{L} \times \vec{B}$  (D)  $\vec{F} = I \vec{B} \times \vec{L}$
- 12) Two parallel wires carrying currents in opposite direction  
 (A) Repel each other (B) Attract each other (C) Neither attract nor repel each other (D) Stick to each other
- 13) Lenz's law is in accordance with the law of conservation of  
 (A) Momentum (B) Angular Momentum (C) Charge (D) Energy
- 14) Which of the following converts electrical energy into mechanical energy?  
 (A) Transformer (B) Motor (C) D.C. generator (D) A.C. generator
- 15) S.I. unit of reactance is  
 (A) Farad (B) Volt (C) Ampere (D) Ohm
- 16) If stress is increased beyond the elastic limit of material, it becomes permanently changed, this behaviour of material is called  
 (A) Elasticity (B) Plasticity (C) Yield Strength (D) Ultimate tensile Strength
- 17) The potential barrier for silicon is  
 (A) 0.3 V (B) 0.7 V (C) 1.0 V (D) 0.1 V

1267A- 1218 -- 12000 (4)

SGD-G1-12-18



1218 Warning:- Please, do not write anything on this question paper except your Roll No.

Physics (Subjective) Group (I) (Session 2015-17 & 2016-18) (Inter Part - II) Paper (II)

Time Allowed: 2.40 hours Section ----- I

Maximum Marks: 68

$8 \times 2 = 16$

2. Answer briefly any Eight parts from the followings:-

- (i) Distinguish between electric field and electric field intensity.
- (ii) Prove that unit of series RC circuit is second.
- (iii) Suppose that you follow an electric field line due to a positive point charge. Do electric field and the potential increase or decrease. (iv) Define dielectric constant and write its formula.
- (v) What is the function of grid in cathode ray oscilloscope. (vi) How can a galvanometer be made more sensitive.
- (vii) How can you use a magnetic field to separate isotopes of chemical element.
- (viii) Why the voltmeter should have a very high resistance?
- (ix) Four unmarked wires emerge from a transformer. What steps would you take to determine the turns ratio?
- (x) Does the induced emf always act to decrease the magnetic flux through a circuit.
- (xi) Define mutual induction, write its S.I unit. (xii) Distinguish between A.C generator and transformer.

3. Answer briefly any Eight parts from the followings:-

$8 \times 2 = 16$

- (i) Define Ohmic and non ohmic devices. (ii) Do bends in a wire affect its electrical resistance? Explain.
- (iii) Describe a circuit which will give a continuously varying potential.
- (iv) Name the device that will (c) permit flow of direct current but oppose the flow of alternating current.
- (v) A sinusoidal current has rms value of 10A. What is the maximum or peak value?
- (vi) Define Alternating current and Choke. (vii) Distinguish between intrinsic and extrinsic semiconductors.
- (viii) What is meant by Dia and Ferromagnetic substances? Give example for each.
- (ix) Define stress and strain. (x) Why ordinary silicon diodes do not emit light?
- (xi) What is AND Gate. (xii) Define Forward Bias and Reversed Bias.

4. Answer briefly any Six parts from the followings:-

$6 \times 2 = 12$

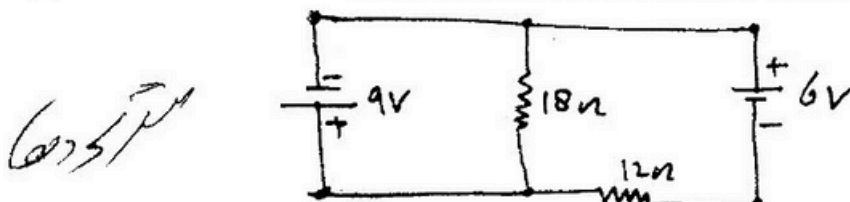
- (i) If electron and a proton have same de-Broglie wavelength, which particle has greater speed?
- (ii) Will bright light eject more electrons from metal surface than dimmer light of the same colour? Explain.
- (iii) Differentiate between special theory of relativity and general theory of relativity.
- (iv) Explain why Laser action can not occur without population inversion between atomic level?
- (v) What is a CAT Scanner? (vi) What is mass defect?
- (vii) A particle which produces more ionization is less penetrating why?
- (viii) What information is revealed by the length and shape of the tracks of an incident particle in Wilson cloud chamber? (ix) Write the names of any four basic forces of Nature.

Note: Attempt any three questions.

Section ----- II

$(8 \times 3 = 24)$

5. (a) Derive an expression for energy stored in an inductor in terms of magnetic field.
- (b) A power line 10 m high carries a current 200 A. Find the magnetic field of the wire at the ground.
6. (a) What are the biasing requirements of the junctions of a transistor for its normal operation? Explain how these requirements are met in a common emitter amplifier. By drawing its circuit diagram calculate its gain.
- (b) A 10 mH, 20  $\Omega$  coil is connected across 240 V and  $\frac{180}{\pi}$  Hz source. How much power does it dissipate?
7. (a) Define strain energy. How can you explain the strain energy in deformed materials? Also derive relation for strain energy.
- (b) A 50 keV photon is Compton scattered by a quasi-free electron. If the scattered photon comes off at  $45^\circ$ , what is its wavelength.
8. (a) What are X - rays ? How are they produced.
- (b) A sheet of lead 5 mm thick reduces the intensity of a beam of  $\gamma$  - rays by a factor 0.4. Find half value thickness of lead sheet which will reduce the intensity half of its initial value.
9. (a) How energy is stored in a capacitor? Derive relations for energy and energy density.
- (b) Find the current which flows in all the resistances of circuit shown below.



S9D-G1-12-18

1268A-- 1218 -- 12000

(SECTION - II)

- (a) What is potentiometer? How can it be used as
- Potential divider
  - Measuring of emf of a cell.
- (b) Two point charges  $q_1 = -1.0 \times 10^{-6} \text{ C}$  and  $q_2 = 4.0 \times 10^{-6} \text{ C}$  are separated by a distance of 3.0 m. Find and justify the zero-field location.
- (a) What is A.C. generator? Give its principle, construction and working of A.C. generator.
- (b) A power line 10 m high carries a current of 200 A. Find the magnetic field of wire at the ground.
- (a) Explain the RLC series resonance circuit. Determine the value of resonant frequency and write down its properties.
- (b) The current flowing into the base of transistor is  $100 \mu\text{A}$ . Find its collector current  $I_C$ . Its emitter current  $I_E$  and the ratio  $\frac{I_C}{I_E}$ , if the value of current gain  $\beta$  is 100.
- (a) What is meant by strain energy? Draw force extension graph for a vertically suspended wire stretched by a variable weight at the other end and by its graph derive a relation to calculate its value.
- (b) An electron accelerated through a potential difference of 50 V. Calculate its de Broglie wavelength.
- (a) What is nuclear reactor? Describe its principle, construction and working.
- (b) Compute the shortest wavelength of radiation in the Balmer series. What value of 'n' must be used?