1221 Warning:- Please write your Roll No. in the space provided and sign. Roll No----------

(Inter Part – II) (Session 2017-19 to 2019-21) Sig. of Student ----------

Physics (Objective) **(Group I)** SGD-I-21 **Paper (II)**

Time Allowed:- 20 minutes **PAPER CODE 4471** 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) A parallel plate capacitor with oil between the plate ($\varepsilon_r = 2$) has a capacitance C. If the oil is removed then capacitance of capacitor becomes.

(A) C (B) $\frac{C}{2}$ (C) $\frac{C}{\sqrt{2}}$ (D) $\sqrt{2C}$

2) An ECG records the _____ between points on human skin generated by electrical process in the heart.

(A) Heart beat (B) Pulse rate (C) Voltage (D) Pressure

3) If the length of the conductor is doubled and its cross sectional area is halved, its conductance will

(A) Increases four times (B) Becomes one-fourth (C) Becomes one-half (D) Remains unchanged

4) For a current carrying solenoid the term 'n' has unit as

(A) No unit (B) m (C) m^{-1} (D) m^{-2}

5) Two long parallel wires carrying current in the same direction.

(A) Attract (B) Repel (C) Turn (D) No effect

6) The current in a coil changes from 0 to 2 A in 0.05 s. If the induced emf is 80 V, the self inductance of the coil is

(A) 1 H (B) 0.5 H (C) 1.5 H (D) 2 H

7) Maximum motional emf in a conductor is given by VBL. At which angle the conductor moves in magnetic field such that emf in it becomes half then its maximum value is

(A) 0 °C (B) 30° (C) 45° (D) 60°

8) At high frequency the current through a capacitor of A.C. Circuit will be

(A) Large (B) Small (C) Infinite (D) Zero

9) With increase in frequency of an A.C. supply, the impedance of RLC series circuit.

(A) Decreases (B) Increases (C) Remains constant (D) Ist decrease, become minimum and then increase

10) Curie temperature for iron is about

(A) 750 K (B) 570 K (C) 1023 K (D) 670 K

11) If R_1 = infinity and $R_2 = 0$, then gain of non-inverting amplifier is

(A) 0 (B) 1 (C) 2 (D) Infinity

12) The term transistor Stands for

(A) Transfer of resistance (B) Transfer of voltage (C) Transfer of current (D) All of these

13) In the equation $\Delta\lambda = \frac{h}{m_o c}(1-\cos\theta)$ which factor is called Compton wavelength

(A) $\frac{h}{m_o c}$ (B) $\frac{1}{m_o c}$ (C) $(1-\cos\theta)$ (D) $\frac{h}{m_o c}(1-\cos\theta)$

14) In photoelectric effect if the intensity of light is made twice than initial value. The maximum K.E of photoelectron becomes

(A) Same (B) Double (C) Half (D) Four times

15) The energy of the 4th orbit in hydrogen atom is

(A) -13.6 eV (B) - 0.85 eV (C) -3.40 eV (D) -1.51 eV

16) In which nuclear detector, visible path of ionizing particle is shown

(A) Wilson cloud chamber (B) GM Counter (C) Solid State detector (D) All of these

17) The binding energy per nucleon is

(A) Greatest for heavy nuclei (B) Least for heavy nuclei (C) Greatest for light nuclei (D) Greatest for medium weight nuclei

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ysics (Subjective) **(Group I)** (Session 2017-19 to 2019-21) (Inter Part - II) **Paper (II)**

me Allowed: 2.40 hours **Section --------- I** Maximum Marks: 68

2. **Answer briefly any Eight parts from the followings:-** SGD-I-21 **8 × 2 = 16**

(i) Is E necessarily zero inside a charged rubber balloon if balloon is spherical? Assume that charge is distributed uniformly over the surface?

(ii) How can you identify that which plate of a capacitor is positively charged?

(iii) State Gauss's law and write mathematical expression. **(iv)** Write four properties of electric field lines.

(v) How can a current loop be used to determine the presence of a magnetic field in a given region of space?

(vi) Why does the picture on a TV screen become distroted when a magnet is brought near the screen?

(vii) State Ampere's circuital law and write its mathematically expression.

(viii) What is CRO? Write only its main parts. **(ix)** Show that ε and $\frac{\Delta\Phi}{\Delta t}$ have the same unit.

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

(xi) Define mutual inductance and write its unit.

(xii) Write the factors upon which self inductance depends?

3. **Answer briefly any Eight parts from the followings:-** **8 × 2 = 16**

(i) What is thermistor? **(ii)** Under what conditions, The emf of a cell and terminal potential are same.

(iii) Explain why the terminal potential of a battery decreases when the current drawn from it is increased.

(iv) In R – L circuit, will the current lag or lead? Illustrate your answer by a vector diagram.

(v) Define instantaneous and peak value of current. **(vi)** Write down two properties of RLC parallel circuit.

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

(viii) Discuss the mechanism of electrical conduction by holes and electrons in semiconductor element.

(ix) What is difference between Elasticity and plasticity. **(x)** Why is the base current is very small?

(xi) The anode of a diode is 0.2 V positive with respect to its cathode. Is it forward biased.

(xii) Define current gain of a transistor. Give its unit.

4. **Answer briefly any Six parts from the followings:-** **6 × 2 = 12**

(i) Which photon, red, green, or blue carries the most. (a) energy and (b) momentum

(ii) Will bright light ejects more electrons from a metal surface than dimmer light of the same colour?

(iii) Define Stefen's Boltzmann Law. Also give the value of Stefen's constant.

(iv) Can X-ray be reflected, refracted, diffracted and polarized just like any other wave? Explain.

(v) Explain why laser action cannot occur without population inversion between atomic levels?

(vi) What do we mean by the term critical mass?

(vii) A particle which produces more ionization is less penetrating. Why?

(viii) If someone accidently swallows an α-source and a β-source. Which would be the more dangerous to him? Explain why? **(ix)** Define the terms mass defect and binding energy.

Note: Attempt any three questions. **Section ---------- II** **(8 × 3 = 24)**

5. **(a)** Explain in detail, electrical power and power dissipation in resistor.
   (b) The time constant of a series RC. circuit is t=RC. Verify that an ohm times farad is equivalent to second.

6. **(a)** Derive an expression for torque on current carrying coil in uniform magnetic field.
   (b) A coil of 10 turns and 35 cm^2 area is in a perpendicular magnetic field of 0.5 T. The coil is pulled out of the field in 1.0 s. Find the induced emf in the coil as it is pulled out of the field.

7. **(a)** What is operational amplifier? How op. Amplifier is used as Non Inverting Amplifier?
   (b) A 10 mH, 20 Ω coil is connected across 240 V and $180/\pi$ Hz source. How much power does it dissipate.

8. **(a)** What are intrinsic and extrinsic semi conductors? Describe the formation of N-type and P-type semi conductors.
   (b) If $^{233}_{92}U$ decays twice by α – emission, what is the resulting isotope?

9. **(a)** State Postulates of Bohr's model of Hydrogen atom and show that hydrogen atom has quantized radii.
   (b) An electron is accelerated through a potential difference of 50 V calculate its de-Broglie wave length.