

Sign. Dy. Supdt.

Fictitious Roll No. (For Office Use)

Sign. Candidate

PHYSICS

019/1

(PART -II)

(INTERMEDIATE)

Marks : 17

(OBJECTIVE PART)

(*)**

Time : 20 Minutes

Note:- Write your Roll No. in space provided. Over writing, cutting, using of lead pencil will result in loss of marks. All questions are to be attempted.

1- Each question has four possible answers, Tick () the correct answer. (17)

| | | | | | | | | |
|----|--|----------------------------------|---|-------------------------|---|----------------------------------|---|----------------------------------|
| 1 | A semiconductor will behave as an insulator at temperature; | | | | | | | |
| | A | 20 k | B | 10 k | C | 5 k | D | 0 k |
| 2 | The value of potential barrier for Ge at room temperature is; | | | | | | | |
| | A | 0.7 V | B | 0.6 V | C | 0.5 V | D | 0.3 V |
| 3 | Number of diodes used in half-wave rectifier circuit are; | | | | | | | |
| | A | 4 | B | 3 | C | 2 | D | 1 |
| 4 | The SI unit of Stefan's constant is; | | | | | | | |
| | A | Wm^2K^{-4} | B | $Wm^{-2}K^4$ | C | $Wm^{-2}K^{-4}$ | D | Wm^2K^4 |
| 5 | The energy of a photon in a beam of infrared radiation of wavelength 124nm is; | | | | | | | |
| | A | 4 eV | B | 3 eV | C | 2 eV | D | 1 eV |
| 6 | The energy required to remove completely an electron from the first bohr orbit is; | | | | | | | |
| | A | Ionization energy | B | Excitation energy | C | Kinetic energy | D | Potential energy |
| 7 | The dead time of the Geiger-Muller Counter is; | | | | | | | |
| | A | $\sim 10^{-7}$ s | B | $\sim 10^{-6}$ s | C | $\sim 10^{-5}$ s | D | $\sim 10^{-4}$ s |
| 8 | The surface temperature of sun is about; | | | | | | | |
| | A | 9000 °C | B | 8000 °C | C | 7000 °C | D | 6000 °C |
| 9 | Electric flux does not depend upon; | | | | | | | |
| | A | Medium | B | Shape of closed surface | C | Charge enclosed | D | Medium and charge enclosed |
| 10 | Electric field intensity due to an infinite sheet of charge is; | | | | | | | |
| | A | $E = \frac{2\sigma}{\epsilon_0}$ | B | $E = 2\sigma\epsilon_0$ | C | $E = \frac{\sigma}{2\epsilon_0}$ | D | $E = \frac{\epsilon_0}{2\sigma}$ |
| 11 | Heat dissipated across the conductor is given by; | | | | | | | |
| | A | IV | B | I^2Rt | C | I^2Vt | D | V^2Rt |
| 12 | Formula for e/m of an electron is; | | | | | | | |
| | A | $\frac{2v}{Br}$ | B | $\frac{2v}{B^2r^2}$ | C | $\frac{V}{B^2r^2}$ | D | $\frac{V}{Br}$ |
| 13 | In lamp scale arrangement, the distance between scale and galvanometer is; | | | | | | | |
| | A | 3 m | B | 2 m | C | 1 m | D | 0.5 m |
| 14 | Formula for energy density in case of inductor is; | | | | | | | |
| | A | $\frac{B^2}{2\mu_0}$ | B | $\frac{\mu_0}{2B^2}$ | C | $\frac{B}{2\mu_0}$ | D | $\frac{B}{2\mu_0^2}$ |
| 15 | A device which converts electrical energy into mechanical energy is called; | | | | | | | |
| | A | A.C. generator | B | D.C. generator | C | D.C. motor | D | Transformer |
| 16 | Root mean square value of alternating voltage is; | | | | | | | |
| | A | $\frac{V^2}{\sqrt{2}}$ | B | $\frac{V_0}{\sqrt{2}}$ | C | $\frac{V_0^2}{2}$ | D | $\frac{3V_0^2}{\sqrt{2}}$ |
| 17 | In RLC series circuit, the condition for resonance is | | | | | | | |
| | A | $X_L = X_C$ | B | $X_L > X_C$ | C | $X_L < X_C$ | D | $X_L > Z$ |

(The End)

Note:- Attempt any TWENTY TWO (22) short questions in all selecting eight from Q. 2 and Q. 3 each and six from Q. 4. (22 x 2 = 44)

SECTION - I

2- Write short answers of any eight questions. (2 x 8 = 16)

| | | | |
|----|--|----|--|
| 1 | Electric lines of force never cross. Why? | 2 | Suppose that you follow on electric field line due to a positive point charge. Do electric field and the potential increase or decrease? |
| 3 | Describe the working of inkjet printer briefly. | 4 | Define electric potential and one volt. |
| 5 | How can you use a magnetic field to separate isotopes of chemical element? | 6 | How can a current loop be used to determine the presence of a magnetic field in a given region of space? |
| 7 | Define the sensitivity of galvanometer. How can a galvanometer be made more sensitive. | 8 | What is the Lorentz force? Write its equation. |
| 9 | Define mutual inductance. Write its formula. | 10 | Why self induced emf is also called as back emf? |
| 11 | Show that ε and $\frac{\Delta\phi}{\Delta t}$ have the same units. | 12 | A suspended magnet is oscillating freely in horizontal plane. The oscillations are strongly damped when a metal plate is placed under the magnet. Explain why this occurs. |

3- Write short answers of any eight questions. (2 x 8 = 16)

| | | | |
|----|---|----|---|
| 1 | A Potential difference is applied across the ends of a copper wire. What is the effect on the drift velocity of free electrons by i. Increasing the potential difference ii. Decreasing the length and the temperature of the wire. | 2 | What is Wheatstone bridge? How it can be used to determine an unknown resistance? |
| 3 | What is thermistor? Give an example of thermistor. | 4 | A sinusoidal current has rms value of 10A. What is the maximum or peak value? |
| 5 | Explain the conditions under which electromagnetic waves are produced from a source? | 6 | Define reactance of a capacitor. Also write down its formula. |
| 7 | Distinguish between crystalline and polymeric solids. | 8 | Define modulus of elasticity. Show that the units of modulus of elasticity and stress are the same. |
| 9 | Define yield point and ultimate tensile stress. | 10 | The anode of a diode is 0.2V positive with respect to its cathode. Is it forward biased? |
| 11 | What is the principle of virtual ground? | 12 | What is rectification? What are its types? |

4- Write short answers of any six questions. (2 x 6 = 12)

| | | | |
|---|--|---|---|
| 1 | As a solid is heated and begins to glow. Why does it first appear red? | 2 | Which has the lower energy quanta? Radio waves or x-rays. Explain |
| 3 | Define pair production and write its equation. | 4 | Is energy conserved when an atom emits a photon of light? |
| 5 | Define meta stable state and population inversion. | 6 | What factors make a fusion reaction difficult to achieve. |
| 7 | A particle which produces more ionization is less penetrating. | 8 | Write the names of basic forces of nature. |
| 9 | Define Nuclear fission and write its reaction. | | |

SECTION - II

Note:- Attempt any three questions. (8 x 3 = 24)

| | | |
|---|---|--|
| 5 | a | Derive the expression for energy density stored in the electric field of the capacitor. (05) |
| | b | How many electrons pass through an electric bulb in one minute if the 300 mA current is passing through it? (03) |
| 6 | a | Derive and explain the relation for force on a current carrying conductor in a uniform magnetic field. (05) |
| | b | A pair of adjacent coils has a mutual inductance of 0.75 H. if the current in the primary coil changes from 0 to 10 A in 0.025s. What is the average induced emf in the secondary coil? (03) |
| 7 | a | Discuss the A.C. through a R-C series circuit? (05) |
| | b | In a certain circuit, the transistor has a collector current of 10 mA and a base current of 40 μA . What is the current gain of the transistor? (03) |
| 8 | a | Describe the formation of energy bands in solids. Explain the difference amongst electrical behavior of Conductors, Insulators and Semi-Conductors in terms of energy band theory. (05) |
| | b | What is the de-Broglie wavelength of an electron whose kinetic energy is 120 eV? (03) |
| 9 | a | Write down the postulates of Bohr's Model of the hydrogen atom and prove that Bohr's radii are quantized. (05) |
| | b | The half life of $^{91}_{38}Sr$ is 9.70 hours. Find its decay constant. (03) |

(The End)