

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 μ A. 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 $^{91}_{38}\text{Sr}$ is 9.70 hours. Find its decay constant. (03)

(The End)