

SECTION-I**QUESTION NO. 2 Write short answers any Eight (8) questions of the following**

16

- (1) Define Coloumb's law. Write its Mathematical formula
- (2) Define electron volt. Show that  $1e.v = 1.6 \times 10^{-19} J$
- (3) Describe the force or forces on a positive point charge when placed between parallel plates  
(a) with similar and equal charge (b) with opposite and equal charge
- (4) Is E necessarily zero inside a charged rubber ballon if ballon is spherical ? Assume that charge is uniformly distributed over the surface
- (5) Define galvanometer. Write down its principle (6) How can we increase sensitivity of a galvanometer ?
- (7) If a charged particle moves in a straight line through some region of space , can you say that magnetic field in the region is zero
- (8) Why the voltmeter should have high resistance ? (9) Define Faraday's law and Lenz's law
- (10) Define step up and step down transformers (11) Can a D.C motor be turned into D.C generator ?
- (12) Four steps would you take to determine the turn ratio ?

**QUESTION NO. 3 Write short answers any Eight (8) questions of the following**

16

- (1) Do bends in wire affect the electrical resistance ?
- (2) Describe a circuit which will give a continuously varying potential
- (3) Define Tolerance , give an example
- (4) Name the device that will (a) Permit flow of D.C but oppose the flow of A.C  
(b) Permit flow of alternating current but not D.C
- (5) How the reception of particular radio station is selected on your radio set ? (6) What is Choke ?
- (7) What is meant by hysteresis loss ? How is it used in the construction of transformer ?
- (8) Define stress and strain (9) What is super conductor ?
- (10) How does the motion of an electron in a n-type differ from the motion of holes in a p-type substances ?
- (11) Why charge carrier are not present in the depletion region ?
- (12) Write two characteristics of Op-amp

**QUESTION NO. 4 Write short answers any Six (6) questions of the following**

12

- (1) What advantages an electron microscope has over an optical microscope ?
- (2) Is it possible to create a single electron from Energy ? Explain (3) List any four uses of photocell
- (4) Describe the types of spectra and give its example
- (5) What are the advantages of lasers over ordinary light (6) What are the subatomic particles ?
- (7) What do we mean by the term critical mass
- (8) Write three types of Interaction of various types of radiations with matter
- (9) Why are the heavy nuclei unstable ?

SECTION-II**Note: Attempt any Three questions from this section**

8 x 3 = 24

- 5.(a) What is temperature coefficient of resistance and resistivity. Derive their formulas 5
- (b) A particle having a charge of 20 electron on it falls through a potential difference of 100 volts. Calculate the energy acquired by it in electron volt 3
- 6.(a) State and explain Faraday's Law of Electromagnetic induction 5
- (b) A 20.0 Cm. wire carrying a current of 10.0 A is placed in a uniform magnetic field of 0.30 T. If the wire makes an angle of  $40^\circ$  with the direction of magnetic field. Find the magnitude of the force acting on the wire 3
- 7.(a) What is meant of strain energy ? How can it be determined from the force-extension graph ? 5
- (b) An A.C voltmeter reads 250 V. What is its peak and instantaneous values if the frequency of alternating voltage is 50 Hz ? 3
- 8.(a) What is OP-Amp. Find the gain of OP-Amp as non inverting amplifies 5
- (b) What is de-Broglie wavelength of an electron whose K.E is 1200 e.V 3
- 9.(a) Write a note on nuclear reaction in the sun 5
- (b) Calculate the longest wavelength of radiation for the Paschen series 3

SECTION - III(PRACTICAL)**10.(A) Give answers to any Four questions**

2x4 = 8

- (i) What is Shunt resistance ? (ii) What are the characteristics of an ideal voltmeter ?
- (iii) Why an Ammeter always connected in series ? (iv) What do you mean by emf of a cell
- (v) What is stopping potential ? (vi) What is photo cell ?
- (vii) Draw the symbolic diagrams and the truth table of the AND Gate

SECTION-I**QUESTION NO. 2 Write short answers of any Eight (8) questions of the following** **16**

- (1) If a point charge  $q$  of mass  $m$  is released in a non uniform electric field, will it make a rectilinear motion?
- (2) IS  $E$  necessarily zero inside a charged rubber balloon if balloon is spherical?  
Assume that charge is distributed uniformly over the surface
- (3) Define electron volt and prove  $1\text{ev} = 1.6 \times 10^{-19} \text{ J}$
- (4) Suppose that you follow an electric field line due to a positive point charge. Do electric field and the Potential increase or decrease?
- (5) Describe the change in the magnetic field inside a solenoid carrying a steady current  $I$ .  
If the length of the solenoid is doubled but number of turns remains the same
- (6) How can you use a magnetic field to separate isotopes of chemical element?
- (7) Why the resistance of an ammeter should be very low?
- (8) Write two uses of C.R.O
- (9) A suspended magnet is oscillating freely in a horizontal plane. The oscillations are strongly damped when a metal plate is placed under magnet. Explain why this occurs?
- (10) Can a step-up transformer increase the power level? Explain
- (11) Show that  $\Sigma$  and  $\Delta\phi/\Delta t$  have same unit
- (12) Can a D.C motor be turned into a D.C generator? What changes are required to be done?

**QUESTION NO. 3 Write short answers of any Eight (8) questions of the following** **16**

- (1) What are thermistors? (2) Describe a circuit which give a continuously varying potential
- (3) Is the filament resistance lower or higher in a 500 w, 220 V light then in a 100 w, 220 V bulb?
- (4) What is Impedance? Give its S.I unit
- (5) A sinusoidal current has rms value of 10 A. What is the maximum value?
- (6) What is meant by A.M? Explain (7) Define Elasticity and plasticity of the material
- (8) What is meant by strain energy?
- (9) Discuss the mechanism of electrical conduction of holes and electrons in a pure semi-conductor element
- (10) Write down the logic expression and logic table for exclusive NOR – Gate
- (11) The anode of a diode is 0.2 V positive with respect to its cathode. Is it forward biased?
- (12) What is the principle of virtual ground?

**QUESTION NO. 4 Write short answers of any Six (6) questions of the following** **12**

- (1) Will bright light eject more electrons from a metal surface than dimmer light of the same colour?
- (2) When light shines on a surface, is momentum transferred to the metal surface?
- (3) Why do not we observe a compton effect with visible light?
- (4) Is energy conserved when an atom emits a photon of light?
- (5) What are the advantages of laser over ordinary light?
- (6) If some one accidentally swallows an  $\alpha$  – source and a  $\beta$  – source, which would be more Dangerous to him? Explain why?
- (7) How can radioactivity help in the treatment of cancer? (8) What are isotopes? (9) What is radioactivity?

SECTION-II**Note: Attempt any Three questions from this section****8 x 3 = 24**

- 5.(a) State and explain Ohm's Law 5
- (b) Two opposite point charges, each of magnitude  $q$  are separated by a distance  $2d$ .  
What is the electric potential at a point  $P$  mid-way between them 3
- 6.(a) Define transformer. Give its principle, construction and working 5
- (b) Find the radius of an orbit of an electron moving at a rate of  $2 \times 10^7 \text{ m/s}$  in a uniform magnetic field of  $1.2 \times 10^{-3} \text{ T}$  3
- 7.(a) Write a note on A.C through capacitor 5
- (b) A 1.25 Cm diameter cylinder is subjected to a load of 2500 Kg. Calculate the stress in mega pascals 3
- 8.(a) Explain Transistor as a common emitter amplifier 5
- (b) What is the de-Broglie wavelength of an electron whose kinetic energy is 120 ev? 3
- 9.(a) Write down the postulates of Bohr's Theory and give the de-Broglie's interpretation 5
- (b) The half life of  ${}_{38}\text{Sr}^{91}$  is 9.70 hours. Find its decay constant 3

ROLL NO .....

PAPER CODE - 8471  
(12<sup>th</sup> CLASS - 12015)

PHYSICS , GROUP FIRST  
(ACADEMIC SESSION : 2012 – 2014 and 2013 - 2015)

TIME: 20 MINUTES  
MARKS: 17

**OBJECTIVE**

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.

**QUESTION NO. 1**

- 1 The toner of the printer is given  
(A) Positive charge (B) Negative charge (C) Neutral (D) First positive then negative
- 2 Due to polarization , electric field E  
(A) Increases (B) Decreases (C) First increases then decreases (D) Remains same
- 3 Drift velocity of electrons is  
(A)  $10^{-1}$  m/s (B)  $10^{-2}$  m/s (C)  $10^{-3}$  m/s (D)  $10^{-4}$  m/s
- 4 The number of electrons in CRO is controlled by  
(A) X – deflecting plates (B) Y-deflecting plates (C) Grid (D) Filament  
In order to increase sensitivity of galvanometer the value of C may by
- 5 (A) increase (B) decrease (C) neither increase nor decrease (D) remains same  
The equation for energy density is given as
- 6 (A)  $\frac{1}{2} B^2 / u_0$  (B)  $B^2 / u_0$  (C)  $2 B^2 / u_0$  (D)  $\frac{1}{2} B / u_0^2$   
With the speed of motor , magnitude of back e.m.f
- 7 (A) remains same (B) Increases (C) decreases (D) first increases then decreases  
In three phase A.C supply coils are inclined at an angle of
- 8 (A)  $0^\circ$  (B)  $90^\circ$  (C)  $120^\circ$  (D)  $180^\circ$   
When we accelerate the charges , which type of waves are produced
- 9 (A) Mechanical waves (B) Travelling waves (C) Stationary waves (D) electromagnetic waves  
Curie temperature for iron is
- 10 (A)  $710^\circ\text{C}$  (B)  $730^\circ\text{C}$  (C)  $750^\circ\text{C}$  (D)  $780^\circ\text{C}$   
Reverse current flows due to
- 11 (A) Majority charge carriers (B) Minority charge carriers (C) electrons (D) holes  
Open loop gain of OP – Amp is of the order of
- 12 (A)  $10^5$  (B)  $10^6$  (C)  $10^7$  (D)  $10^8$   
Inertial frame is a frame in which
- 13 (A) 1<sup>st</sup> law holds (B) 2<sup>nd</sup> law holds (C) 3<sup>rd</sup> law holds (D) Kelvin's law holds  
Which is the most refined form of matter ?
- 14 (A) Smoke (B) fog (C) Light (D) electron  
The value of radius of 1st Bohr's orbit is
- 15 (A) 0.53 nm (B) 0.053 nm (C) 0.0053 nm (D) 0.00053 nm  
Both Xenon and cesium have
- 16 (A) 33 isotopes (B) 34 isotopes (C) 35 isotopes (D) 36 isotopes  
Half life of radon gas is
- 17 (A) 3.8 minutes (B) 3.8 days (C) 3.8 months (D) 3.8 years

ROLL NO.....

PAPER CODE - 8472

(12<sup>th</sup> CLASS – 12015)

PHYSICS , GROUP SECOND  
(ACADEMIC SESSION : 2012 – 2014 and 2013 - 2015)

TIME: 20 MINUTES  
MARKS: 17

OBJECTIVE

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.

QUESTION NO. 1

- 1 For computation of electric flux , the surface area should be  
(A) Parallel (B) Flat (C) Curved (D) Spherical
- 2 The product of resistance and capacitance is equal to  
(A) Force (B) Time (C) Velocity (D) Current
- 3 The reciprocal of resistance is called  
(A) Capacitance (B) Resistance (C) Conductance (D) Inductance
- 4 One Tesla is equal to  
(A)  $\text{NA}^{-1}\text{m}^{-1}$  (B)  $\text{ANm}^{-1}$  (C)  $\text{N}^{-1}\text{Am}$  (D)  $\text{NA}^{-1}\text{m}$   
The sensitivity of galvanometer is given by
- 5 (A)  $\text{CAN/B}$  (B)  $\text{C/BAN}$  (C)  $\text{BAN/C}$  (D)  $\text{BN/CA}$   
If the motor is overloaded , the magnitude of back emf
- 6 (A) increases (B) Decreases (C) becomes zero (D) remains constant  
Lenz's law is in accordance with law of conservation of
- 7 (A) Mass (B) momentum (C) Charge (D) energy  
In R-L series circuit phase angle is given by
- 8 (A)  $\theta = \tan^{-1} \frac{1}{\text{WLR}}$  (B)  $\theta = \tan^{-1} \text{WLR}$  (C)  $\theta = \tan^{-1} \frac{\text{R}}{\text{WL}}$  (D)  $\theta = \tan^{-1} \frac{\text{WL}}{\text{R}}$   
Average value of current and voltage over a complete cycle is
- 9 (A) Positive (B) Negative (C) zero (D) infinite  
The SI unit of stress is same as that of
- 10 (A) Pressure (B) Force (C) Momentum (D) Work  
The potential barrier for silicon at room temperature is
- 11 (A) 0.3 Volt (B) 0.5 Volt (C) 0.7 Volt (D) 0.9 Volt  
For rectification we use
- 12 (A) Transformer (B) Diode (C) Choke (D) Generator  
The minimum energy required by photon to create an electron-positron pair is
- 13 (A) 0.52 Mev (B) 1.51 Mev (C) 1.02 Mev (D) 0.051 Mev  
0.1 Kg is equivalent to the energy of
- 14 (A)  $5 \times 10^8 \text{ J}$  (B)  $6 \times 10^{16} \text{ J}$  (C)  $9 \times 10^{16} \text{ J}$  (D)  $1 \times 10^{15} \text{ J}$   
An excited atom can reside in a meta stable state for
- 15 (A)  $10^{-5} \text{ s}$  (B)  $10^{-8} \text{ s}$  (C)  $10^{-3} \text{ s}$  (D)  $10^{-19} \text{ s}$   
When a nucleus emits an alpha particle , its atomic mass decreases by
- 16 (A) 1 (B) 2 (C) 3 (D) 4  
Energy needed to produce an electron – hole pair in solid state detector is
- 17 (A) 1 to 2 ev (B) 3 to 4 ev (C) 6 to 7 (D) 8 to 9 ev