Paper: Physics	**Time Duration: 2 Hours**
Class: XII (Sci)	**Max. Marks: 85**

SECTION A (MULTIPLE CHOICE QUESTIONS)

Time Allowed: 40 min.   **Max. Marks: 42**

NOTE: i)This section consist of 42 part questions and all are to be answered each question carries one mark.

ii) Do not copy the part questions in your answer book. Write only the answer in full against the proper number of the question and its part.

iii) The code of your question paper is to be written in bold letters in the beginning of the answer script.

iv) The use of scientific calculator is allowed. All notations are used in their usual meanings.

Q1.   Select the most appropriate answer for each from the given options:

i)   Which of the following statements does not represent ohm's law?

* V = I R   * I = $\frac{V}{R}$ * R = $\frac{I}{V}$ * R = $\frac{V}{I}$

ii)   EMF is generated always in a direction where it opposes the change of flux. This statement is called:

* Faraday's law of electromagnetic induction   * Biot & Savarat law

* Lenz's law   * Gauss's law

iii)   Three resistors 2 ohm ,4 ohm and 10 ohm are connected so that the equivalent resistance is 1.18 ohm . The resistors are connected:

* all in series   * all in parallel

* 2 Ohm and 4 Ohm in parallel and the combination in series with 10 Ohm

* 2 Ohm and 4 Ohm in series and the combination in parallel to 10 Ohm

iv)   Galvanometer has resistance,

* Greater than Voltmeter & lesser than Ammeter   * Equal to Voltmeter & Ammeter

* Greater than Ammeter & lesser than Voltmeter   * Lesser than Ammeter & Voltmeter

v)   The working of all electrical instruments depends upon _____ effect of current.

* Magnetic   * Chemical   * Electromagnetic   * no

vi)   For accurate measurement of current through a circuit the resistance of ammeter should be:

* Large compared to the circuit resistance   * Very small compared to the resistance

* Neither too small nor too large   * None of these

vii)   Amplitude Modulation in a signal means:

* Decrease in the time period of signal   * The increase in the vertical width of a signal

* The increase in horizontal width of signal   * All of them

viii)   Transistor is a device which has _____ terminals.

* One   * Two   * Three   * Four

ix)   Geiger counter is a device to detect:

* Mass   * Momentum   * Charge   *Radiation

x)   A Wilson cloud chamber uses:

* Superheated liquid   * Superheated vapours

* Supersaturated vapour   *Saturated vapour

xi)   At constant temperature, the graph between V and 1/P is:

* Hyperbola   * Parabola   * Straight line   * Ellipse

xii)   A set of coordinate axes with respect to which measurements are made is called:

* frame of reference   * inertial frame of reference

* non-inertial frame of reference   * none of these

xiii)   The photoelectrons emitted from a metal surface _____ , when incident radiations having energy
        equal to work function.
        * are all at rest   * have the same kinetic energy
        * have the same momentum   * have speeds varying from zero up to a certain maximum value

xiv)   When we try to stop a very high photon it loses its wave identity and disintegration
        into an electron and a positron. This is called:
        * Pair production   * Annihilation   * X-rays production   * Compton effect

xv)   The force acting on a charged particle projected into a magnetic field of induction 'B' is maximum when the
        angle between B and the velocity of the particle is:
        * 0° * 90° * 60° * 45°

xvi)   What is the capacity of a capacitor when a charge of one Coulomb raises its potential by one volt?
        * 1 Farad   * 2 Farad   * – 2 Farad   * None of them

xvii)   In order to increase the number of electrons in photo electric effect, _____should be
        increased
        * Intensity of source of light   * Threshold frequency
        * Velocity   *K. E

xviii) Isobaric process is the process which takes place at constant:
        * Pressure   * Volume   * Heat   * Area

xix)   Capacitors of capacitance upto 10µ F are usually made of alternate layers of aluminum foil and:
        * Tin   * Paper   * Waxed paper   * Carbon

xx)   A current of 1.6 Amperes is drawn from a battery for 10 minutes. How much charge flows through the circuit
        in this time?
        * 96 C   * 960 C   * 69 C   * 690 C

xxi)   According to Lenz law, the emf opposes the change that induces e.m.f. and it is therefore known as:
        * Forward emf   * Back emf   * conventional emf   * None of these

xxii)   Transistor can never be used as a/an:
        * rectifier   * Amplifier   * Switcher   * None

xxiii) _____ transfers energy to and from its surroundings by the process of heating (or cooling) and the
        process of mechanical work
        * closed system   * Open system   * Both a & b   * None

xxiv)   When the temperature of source and sink of a heat engine become equal, the efficiency will be:
        * Zero   * Maximum   * Minimum   * Negative

xxv)   The temperature at which the gases if they remain in gaseous state exert zero pressure and
        have zero volume is called:
        * 1°C   * 1°F   * 1K   * Absolute Zero

xxvi)   Gas in a closed container at temperature of 27 C has pressure P. what will be the pressure if temperature is
        raised to 127 C?
        * 4 P / 3   * 27 / 127 P   * 3 P / 4   * 127 P / 27

xxvii) The average energy release per fission of U 235 is about:
        * 200 M eV   * 2 M eV   * 2 K eV   * 2 eV

xxviii) The amount of energy required to break the nucleus into its constituent particles is called
        * Mass defect   * binding energy
        * ionization energy   * ionization potential

xxix)   The main source of energy on Sun is:
        * Nuclear Fusion   * Nuclear Fission
        * Nuclear Chain reaction   * all of them

xxx)   According to Bohr's theory of the hydrogen atom, the total energy of the hydrogen atom with its electron
        revolving in the nth stationary orbit is:
        * proportional to n   * proportional to n^2
        * inversely proportional to n   * inversely proportional to n^2

xxxi)   X-rays are a part of electromagnetic spectrum and are characterized by frequencies
        higher than those of:
        * visible radiation   * infrared radiation   * ultra violet radiations * none of these

xxxii) Number of electrons in 1Coulomb charge are:
* 1.097×10^7 * 6.25×10^{18} * 9×10^9 * 1.6×10^{-19}

xxxiii) The SI unit of electromotive force is:
* Newton   * Joule.Sec   * Joule/Sec   * Volts

xxxiv) An electron is moving along the axis of the solenoid carrying a current.
* The force acts radially inwards   * The force acts radially outwards
* The force acts in the direction of motion   * No force acts.

xxxv) The picture on a TV screen become distorted when a magnet is brought near the screen, because :
* The beam of electron will not be deflected due to the magnetic field
* The beam of electron will be deflected due to the magnetic field
* The beam of electron will stop in electron gun
* Magnetic field will destroy the coating of screen

xxxvi) The path along which a unit positive charge moves in an electric field is called:
* Direction of charge   * path of charge   * An electric line of force   * Magnetic line of force

xxxvii) The magnitude of drift velocity is of the order of:
* 0.1 m/s   * 0.01 m/s   * 0.001 m/s   * 0.001 m/s

xxxviii) The charge moving perpendicular to the magnetic field 'B' with a certain velocity 'v' experiences :
* No force   * Maximum force   * Minimum Force   *None of these

xxxix) The direction of magnetic lines of force is given by the:
* head to tail rule   * right hand rule   * left hand rule   * none of these

xxxx) According to Bohr's theory of hydrogen atom, an electron can revolve around a proton indefinitely if its path is:
* a perfect circle of any radius   * a circle of constantly decreasing radius
* a circle of an allowed radius   * an ellipse

xxxxi) According to Bohr's theory of the hydrogen atom, the total energy of the hydrogen atom with its electron revolving in the nth stationary orbit is:
* proportional to n   * proportional to n^2
* inversely proportional to n   * inversely proportional to n^2

xxxxii) Gieger Muller counter contains
* Argon and Alcohol   * Alcohol Only
* ions   * super cooled water vapour

Paper: Physics   **Class: XII (Sci)**

SECTION B (43 Marks)
SHORT-ANSWER QUESTION (25MARKS)

NOTE: Attempt any **five** part questions from this section. All questions carry equal marks. The use of scientific calculator is allowed. All notations are used in their usual meanings. Draw diagram where necessary.

Q.2: i) A pair of adjacent coil has a mutual inductance of 1.5 henry. If current in the primary changes from zero to 20A in 0.050 sec, What is the average induced emf in the secondary? If secondary coil has 800 turns, what is the change of flux in it?

(ii) A galvanometer of resistance 50 Ω gives full scale deflection with a current of 5 mA resistance of 0.1 μΩ is connected in parallel. Which measuring instrument is formed & what will be its range?

(iii) An air storage tank whose volume is 112 litres contains 3Kg of air at a pressure of 18 atmospheres. How much air would have to be forced into the tank to increase the pressure to 21 atmospheres assuming no change in temperature.

(iv) Why there is only magnetic field exist around current carrying conductor?

(v) Determine the longest and shortest wavelength for Balmer's series (R_H = 10967800 m)

(vi)   What will be the relativistic speed and momentum of the particle if relativistic mass of
         the particle will be doubled than the rest mass?

(vii)   A resistor is made by winding on a spool a 40m length of Constantan wire of diameter 0.8 mm. Calculate the
         resistance of wire at   a) 0°C   b) 50°C
         (ρ = 49 x $10^{-8}\Omega$m , α = 0-00001°C^{-1} at 0°C)

(viii)   A capacitor of 100pF is charged to a potential difference of 50V. Its plates are then connected in parallel to
         another capacitor & it is found that the potential difference between its plates fails to 35 volts. What is the
         capacitance of the second capacitor.

(ix)   Find out the decay Constant of $_{84}$Po^{210} , If its half life is 138.38 days. If initial number of atoms are 5x10^{30}
         then what atoms will remain after 365days?

SECTION C

(DETAILED ANSWER QUESTIONS) (18 Marks)

NOTE: Attempt any One question from this section. Draw diagrams, where necessary. The use of scientific
         calculator is allowed. All notations are used in their usual meanings.

Q3: a)   State the basic postulates of Bohar's atomic theory. Derive an expression for the nth radius of hydrogen
          atom.   (06)
   b)   State & explain Gauss's law. Derive relevant expression for magnetic flux through irregular shaped Gaussian
         surface.   (06)
   c)   Derive an expression for the force on a current carrying conductor in a uniform magnetic field.   (06)

Q4:a)   Describe Carnot's cycle. Establish the relation for its efficiency.   (06)
   b)   Why classical wave theory of light is unable to explain the phenomena of photoelectric effect? Also describe
         three important features of photoelectric effect.   (06)
   c)   Describe working principle of a transformer & derive an expression for efficiency of transformer.   (06)