Section-A (MCQ's)

Q.1 Choose the correct answer for each from the given options:

(i) Device which controls the temperature by turning heating and cooling systems or off is called:
(a) Thermostate   (b) Thermometer   (c) Thermocouple
(d) None of these

(ii) Unit of electromotive force is:
(a) Newton   (b) Electron volt   (c) Volt   (d) Kilo watt hour

(iii) Position is an anti-particle of:
(a) Electron   (b) Proton   (c) Neutron   (d) Photon

(iv) Instrument used to detect small current is called:
(a) Ammeter   (b) Volt meter   (c) Galvanometer   (d) Ohm meter

(v) The coefficient of voluem expansion of a material is $6 \times 10^{-1} k^{-1}$, the coefficient of linea expansion is:
(a) $6 \times 10^{-6} K^{-1}$ (b) $4 \times 10^{-3} K^{-1}$ (c) $2 \times 10^{-8} K^{-1}$ (d) $1 \times 10^{-6} K^{-1}$

(vi) During negative beta decay, charge number:
(a) Increases by one   (b) Decreases by one   (c) Remains same
(d) Not defined

(vii) An electron of rest mass energy 940 MeV has a total energy of 1175 MeV. Its kinetic energy is:
(a) 1175 MeV   (b) 940 MeV   (c) 705 MeV   (d) 235 MeV

(viii) Planks constant has the same unit as:
(a) Linear momentum   (b) Angular momentum
(c) Force   (d) Energy

(ix) If the temperature of sink decreases, the efficiency of a Carnot engine:
(a) Increase   (b) Decrease   (c) Remains same
(d) 1st increases and then decreases

(x) X-ray photon collides with an electron at rest, the frequency of scattered photon.
(a) Increases   (b) Decreases   (c) Remains same   (d) None o these

(xi) Two capacitors of capacitance 2C and C respecitvely are connected in series, there equivalent capacitance is:
(a) 2C/3   (b) 3C/2   (c) C/2   (d) 2C

(xii) When Pi-junction working in reversed bias, the depletion region:
(a) Increase   (b) Decreases   (c) Remains same
(d) None of these

(xiii) A photon of frequency "v" has a momentum:
(a) $\dfrac{h}{\lambda}$ (b) $\dfrac{hc}{\lambda}$ (c) $\dfrac{\lambda}{h}$ (d) None of these

(xiv) The thermodynamic process in which volume of a system remains constant is called
_____
(a) Isothermal   (b) Adiabatic   (c) Isobaric   (d) Isochoric.

(xv) How many electrons are contained in 1C:
(a) 625×10^{17} (b) 625×10^{19} (c) 625×10^{16} (d) 625×10^{14}

(xvi) If the cross-sectional area of a conductor multiplied by 4, resistance of conductor,
(a) Increase 16 times   (b) Increase 4 times   (c) Decrease to 1/4   (d) Decrease to 1/16

(xvii) A force of 0.01 N is exerted on a charge of 1.2×10^{-1} C at a certain point, the electric field at a point is:
(A) 12×10^{3} N /C   (b) 5.3×10^{2} N /C   (c) 8.3×10^{4} N /C
(d) 8.3×10^{2} N /C

Section-B (Short Answer)

Note: Answer any EIGHT of the following questions. Each question carries 05 marks.

Q.2 Show that co-efficient of linear expansion is one third of the co-efficient of volume exapansion.

Q.3 How many electrons should be removed from each of the two similar sphere each of 10 grams, so that electrostitic repulsion be balanced by gravitational force.

Q.4 What happes to the temperature of a room in which an air conditioner is left running on a talbe in the middle of the room.

Q.5 Find the velocity acquired by an electron in falling through a potential difference of 2000 volts.

Q.6 Explain why does the resistance of a conductor increase with the rise in temperature.

Q.7 A rectangular bar of iron 2 cm by 2 c in cross section and is 40 c longk what is the resittance of the bar, when resistivity for lorn is 1.1×10^{-7} ?

Q.8 Define henry and escribe self induction with the help of diagram.

Q.9 To coovert galavanomter into an ammeter, what do we need to do? Explain.

Q.10 In the inertial frame of a pendulum the time period is measured to be 3 seconds. What will be period of pendulum for an observer moving at a speed of 0.95 C with respect ot the pendulum?

Q.11 Why it is more difficult to start a Fusion reaction than that of Fission reaction?

Q.12 A capacitor of 100 pF is charged to a potential difference of 50 volts. Its plates are then connected din paralleels to another capacitor and it is found that the potential difference between its plates falls to 35 volts. What is the capacitance of the second capacitor?

Q.13 Find the wave length of the radiation that is emitted when a hydrogen atom undergoes a transition from state n = 3 to n =1, when R = 1.0974×10^{7} /m

Section-C (Descriptive Answer)

Note: Answer any TWO of the following questions.

Q.14 (a) Define molar specific heat at constant pressure and constent voluem and show that Cp - Cv = R.

(b)   Determine force on a current carrying conductor in uniform magnetic field.

Q.15 (a) Explain photoelectric effect on the basis of quantum theory and ferive Einstein's photoelectric equation.

(b)   Using Bohr's theory of atomic structure derive the expression of radius of nth orbit of hydrogen atom.

Q.16 Write notes on any TWO of the following:

(i) Colomb's Law   (ii) Toriod

(iii) Effect of temperature on resistance   (iv) Radio-Activity