DELHI PUBLIC SCHOOL, JAMMU
SAMPLE QUESTIONS FOR TERM EXM 2019-20
(As per pattern of CBSE sample paper)
CLASS XII
Subject: PHYSICS

MULTIPLE CHOICE QUESTIONS (1 mark)

Q1. A sphere of radius R is placed in a uniform electric field E. The total electric flux over the surface of the sphere, is :

(a) $\pi R^2 E$

(c) $4\pi R^2 E$

(b) $2\pi R^2 E$

(d) zero

Q2. Across a metallic conductor of uniform cross-section, a constant potential difference is applied. The quantity which remains constant along the conductor is :

(a) current

(c) electric field

(b) drift velocity

(d) current density

Q3. Resistances in the two gaps of a metre-bridge are 10 Ω and 30 Ω respectively. If the resistances are interchanged, the balance point shifts by:

(a) 33.3 cm

(c) 25 cm

(b) 66.67 cm

(d) 50 cm

Q4. Which of the following is likely to have the largest resistance?

(a) A galvanometer

(c) A millivoltmeter

(b) An ammeter

(d) A voltmeter

Q5. If the horizontal and vertical components of Earth's magnetic field are equal at a certain

place, the angle of dip is:

(a)90°

(c) 45°

(b) 60°

(d) zero

Fill in the blanks (1 mark each)

6.The horizontal and vertical components of earth's magnetic field at a place are equal. The angle of dip at that place is _____ .

Q7 The physical quantity in a nuclear reaction which is considered equivalent to Q-value of the reaction is _____

Q8 In forward biasing , the thickness of depletion layer and the junction resistance _____ .

Q9 Energy distribution of beta rays is continuous because of the emission of _____.

Q10 The minimum amount of energy required to take out an electron from the surface of metal is called its _____.

Very short answer type Questions (1 mark each)

Q11 Give the condition when slide-wire bridge is said to be more sensitive.

Q12 Write two characteristics of a material used for making permanent magnets.

Q13 The hysteresis loop of a soft iron piece has a much smaller area than that of a carbon steel piece. If   the material is to go repeated cycles of magnetization and demagnetization , which piece will dissipate greater heat energy? Which one will you prefer for making temporary magnet?

Q14 Which constituent radiation of the electromagnetic spectrum is used in
   (i)   Radar   (ii) to photograph internal parts of human body

Q15 Why is it necessary that the field lines from a point charge placed in the vicinity of a conductor must be normal to the conductor at every point?

Short answer type questions (2 marks each)

Q16 The current through a conductor varies with time as $I = 2t + 1$ in SI units. Calculate the number of electrons transferred in two seconds.

Q17 A charged particle is moving in + X direction in amagnetic field acting in +Y direction . What will be the direction of force if the charged particle is (i) an electron   (ii) aprotron

Q18 Represent graphically the variation of magnetic field intensity at a point due to an infinitely long straight conductor.

   (a) With change in current I with fixed distance r
   (b) With change in distance r with fixed current I

 Q19 How is the mutual inductance of a pair of coils affected when

   (i)   Separation between the coils is increased
   (ii)   A thin iron sheet is placed between the two coils otherfactors remaining the same.

Q20 A network of four 10 F capacitors is connected to a 500 V supply, as shown. Determine

(a) The equivalent capacitance of the network.
(b) The charge on each capacitor

Short answer type questions (3 marks each)

Q21 The arm PQ of the rectangular conductor is moved from x = 0 outwards. The uniform magnetic field is perpendicular to the plane and extends from x = 0 to x = b and is zero for x > b. only the arm PQ possess substantial resistance r. Consider the situation when arm PQ pulled outwards from x = 0 to x = 2b and is then moved back to x = 0 with constant speed v. Write expressions for the flux, the induced emf and the power dissipated as Joule heat. Sketch the variation of flux and emf induced with distance.

Q22 A coil of inductance 0.50H and resistance 100 is connected to a 240V, 50 Hz ac supply.

(a) What is the maximum current in the coil?
(b) What is the time lag between voltage maximum and current maximum?

Q23 (a)A step-up transformer converts low voltage into high voltage. Does it violate the principle of conservation of energy.? Explain.
   (b) In an ideal transformer, number of turns of primary and secondary are 200 and 1000 respectively. If the power input to the primary is 10KW at 220V, calculate (i) output voltage   (ii) current in the primary.

Q24 The figure shows experimental set-up of a meter bridge. When two resistances X and Y are inserted, the null point D is obtained at 60cm from end A. When a resistance of 15Ω is connected in series with Y, the null point shifts by 10cm towards end A. Find the position of null point when the 30Ω resistance is connected in paralell with resistance Y. Determine the values of resistances X and Y.   (3mks)
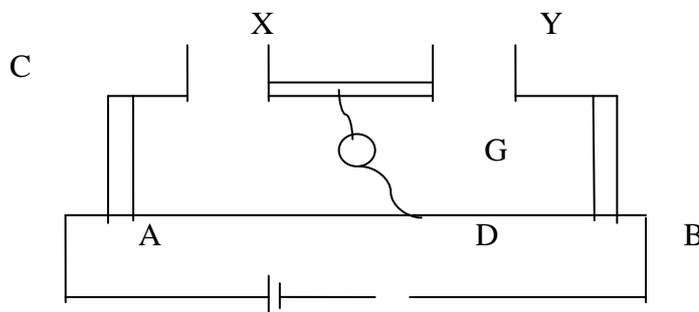

Q25(a) Derive an expression for the force between two parallel straight conductors carrying current in same direction.
  (b) Use this expression to define SI unit of current.

Long answer type questions (5 marks each)

Q26 In the adjoining figure, calculate the ratio of the
     (i) Charge stored in C_1 and C_2.
     (ii) Potential difference across C_1 and C_2.
     (iii) Energy stored in C_1 and C_2.

2 μF   4 μF
C1   C2
12V
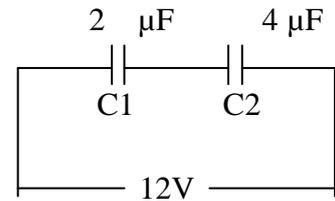
Q27 (a) An alternating emf is applied across an inductor. Show mathematically that the
   current in it lags behind the applied emf by a phase angle of $\pi/2$.
    (b)Show graphically the variation of inductive reactance with the frequency of the
     applied alternating voltage.
    (c) Draw the relevant phasor diagram and graphs of V and I versus ωt for this circuit

Q28 (a) State Lenz's law.
    (b)Derive an expression for mutual inductance of two long coaxial solenoids of same
   length wound   over each other.
    (c)A rectangular loop of sides 8cm and 2cm with a small cut is moving out of a region
of uniform magnetic field of magnitude 0.3T directed normal to the loop. What is the
     emf developed across   the cut if the velocity of the loop is 1cm/s in a direction
normal to the longer side?
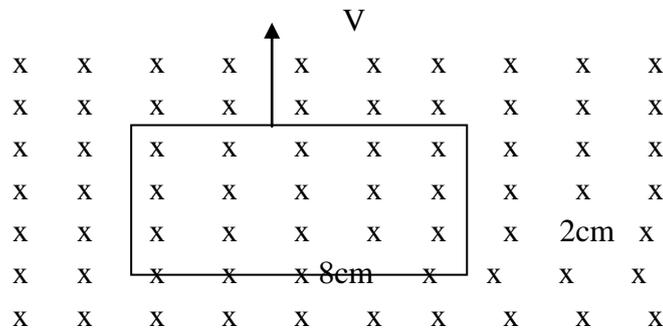
Q29 (a) With the help of a neat and labeled diagram explain the principle of working of a
    moving coil   galvanometer.
    (b)A galvanometer has a resistance of 12Ω and the meter shows full scale deflection
     for a current of   3mA. How will you convert the meter into a voltmeter of range 0 to
18V? (5mks)

Q30 Figure shows a potentiometer with a cell of 2V and internal resistance 0.40Ω
    maintaining a potential drop across the resistance wire AB. A standard cell which
maintains a constant emf of 1.02 V gives a   balance point at 67.3cm length of the
wire. A very high resistance of 600 KΩ is put in series with the cell. The   standard
    cellis then replaced with a cell of unknown emf E and the balance point found
    similarly, turns out to be at 82.3cm length of the wire.

2V 0.4Ω

A   B

600 KΩ
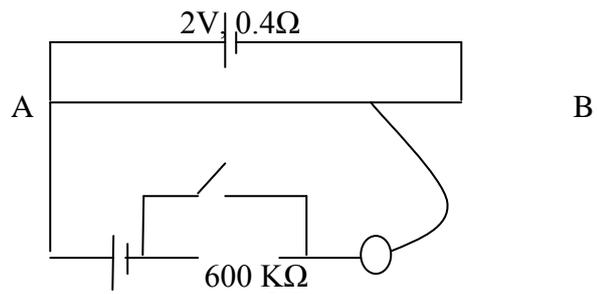
(i)   What is the value of E?

(ii)   What purpose does the high resistance of 600 KΩ have?

(iii)   Is the balance point affected by the internal resistance of driver cell?

(iv)   Would the method work if the driver cell had an emf of 1V instead of 2V?

(v)   Would the circuit work well for extremely small emf of the order of a few mV? If not, how will you modify the circuit?