Name :_____R. No.___ Class/ Sec:_____ Date:_____ Invig. Sign_____

ATOMIC ENERGY CENTRAL SCHOOL, NARORA

CLASS XII PHYSICS UNIT TEST FIRST 2018-19

MM: 50 TIME: 1:30 Hr.

General Instructions:

- All questions are compulsory and marks are mentioned in front of each question.
- Electronic devices are prohibited to use in the examination.
- Use Blue or Black Pen only.
- Don't write answer or objectionable things on question paper.

Q1.(a) .What are the S.I. unit of (i) electric field intensity and (ii) electric dipole moment. [2]
(b) How can you charge a metal sphere positively without touching it? [3]

Q2.(a) The voltage of capacitance 6 p F and 12 p F are connected in series with a battery. The voltage across the 6 p F capacitor is 2 V. Compute the total battery voltage. The voltage of capacitance 6 p F and 12 p F are connected in series with a battery. The voltage across the 6 p F capacitor is 2 V. Compute the total battery voltage. [2]
(b) Explain Coulomb 's law in vector form for repulsive force [3]

Q3 (a). How much positive and negative charge is there in a cup of water? [2]
(b) A system has two charges $q_A = 2.5 \times 10^{-7}$ C and $q_B = -2.5 \times 10^{-7}$ C located at points A: (0, 0, –15 cm) and B: (0,0, +15 cm), respectively. What are the total charge and electric dipole moment of the system? [3]

Q4.(a) What is Physical significance of electric field [2]
(b) Deduce the expression for the electrostatic energy stored in a capacitor of capacitance 'C' and having charge [3]

Q5. (a) Two identical cells, each of emf E, having negligible internal resistance, are connected in parallel with each other across an external resistance R. What is the current through this resistance? [2]
(b) Deduce the expression for capacitance of a parallel plate capacitor when a dielectric slab is inserted between the plates [3]

Q6 (a) Explain with the help of graph, the variation of conductivity with temperature for a metallic Conductor. [2]
(b) Using gauss' law deduce the expression for the electric field due to a uniformly charged spherical conducting shell of radius R at a point (i)outside and(ii)inside the shell. Plot a graph showing variation of electric field as a function of r>R and r<R. (r being the distance from the centre of the shell) [3]

[OR]

(a) Deduce the expression for the torque acting on a dipole of dipole moment P in the presence of a uniform electric field E. [2]

(b)Consider two hollow concentric spheres, S_1 and S_2, enclosing charges 2Q and 4Q respectively

(i) Find out the ratio of the electric flux through them.

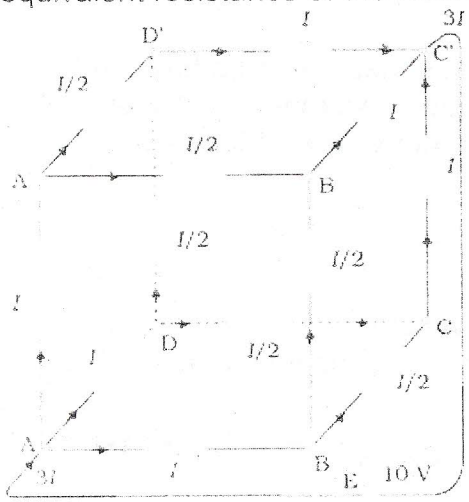
(ii) How will electric flux through the sphere S1 change if a medium of dielectric constant 'E_r' is introduced in the space inside S_1 in the place of air ? Deduce the necessary expression. [3]

Q7. (a) Name the colours corresponding to the digits 4 and 7 in the colour code scheme for carbon resistors. [2]

(b) Explain the term 'drift velocity' of elections an a conductor. Hence obtain the expression for the current through a conductor in terms of 'drift velocity' [3]

Q 8 (a). Draw the equipotential surfaces due to an electric dipole .locate the points where the potential due to the dipole is zero. [2]

(b) A battery of 10 V and negligible internal resistance is connected across the diagonally opposite corners of a cubical network consisting of 12 resistors each of resistance 1 Ω Determine the equivalent resistance of the network and the current along each edge of the cube [3]



Q9 (a) A hollow metal sphere of radius 5 m is charged such that the potential on its surface is 10 v. what is the potential at the centre of the sphere? [2]

(b) Draw With the help of suitable diagram ,explain the principle and construction of Potentiometer. Explain how you will use it to measure the internal resistance of a cell. [3]

Q10 (a) A hollow metal sphere of radius 5 m is charged such that the potential on its surface is 10 v. what is the potential at the centre of the sphere? [2]

(b)Two heating elements of resistances R1 and R2 when operated at a constant supply of voltage, V, consume powers P_1 and P_2 respectively. Deduce the expressions for the power of their combination when they are in turn, connected in (i) series and (ii) parallel across the same voltage supply. [3]