PHYCICS Class: XII ,

1st Screening Test

Total Marks: 50

Time : 1½h

Section –A 1X5=5

1. Why does the electric field inside a dielectric decreases when it is placed in an external electric field ?

2. Define 'intensity of electric field ' at a point . At what points is the electric dipole field intensity parallel to the line joining the charges ?

3. A wire of resistivity 'ρ' and resistance 'R' is stretched to twice its length . What will be its new resistivity and resistance ?

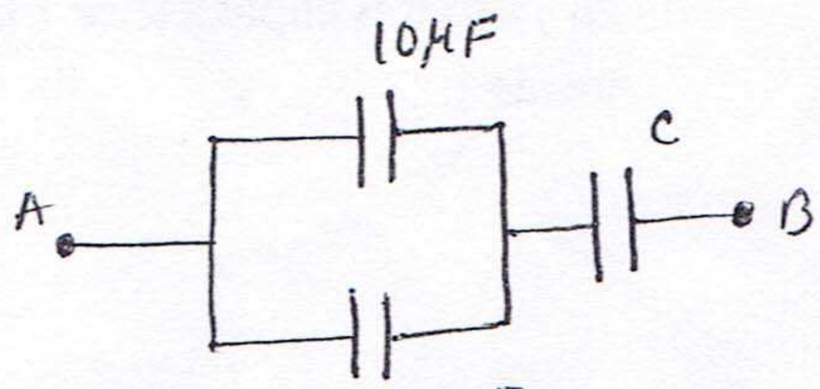
4. A beam of protons on passing through a region in space , is deflected sidewise . Hoe would you be able to tell which of the two fields (electric and magnetic)has caused the deflection ?

5. What is cyclotron frequency ?

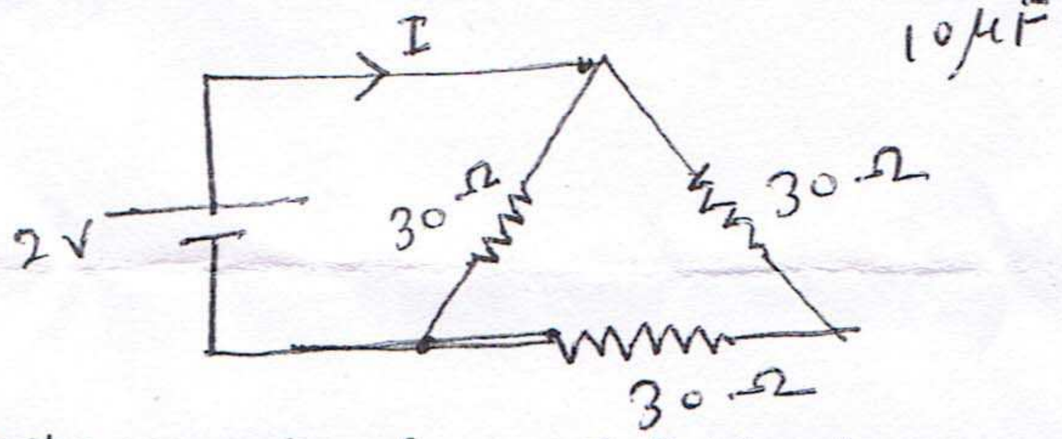
Section –B 2X5=10

6. The dielectric constant of water is 80. What is its permittivity ?

7. Calculate the capacitance of the capacitor (C) in the fig. , if the equivalent capacitance of the combination between A and B is 15 μF .



8. Find the value of 'I' in the circuit shown

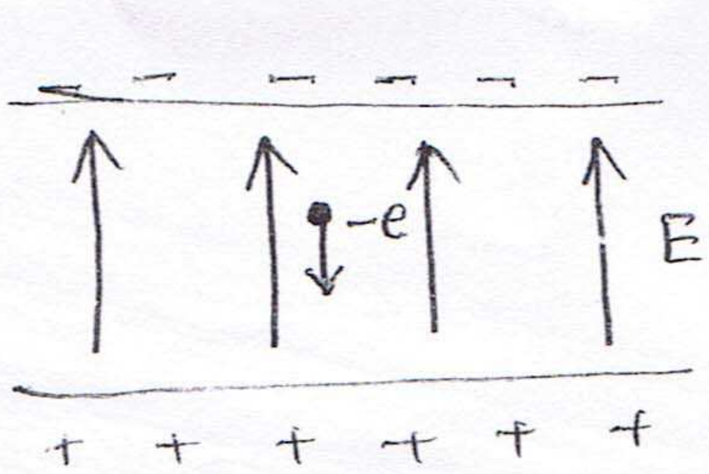


9. State Biot-Savart Law . Apply the law to derive the expression of magnetic field at the center of a circular current loop conductor .

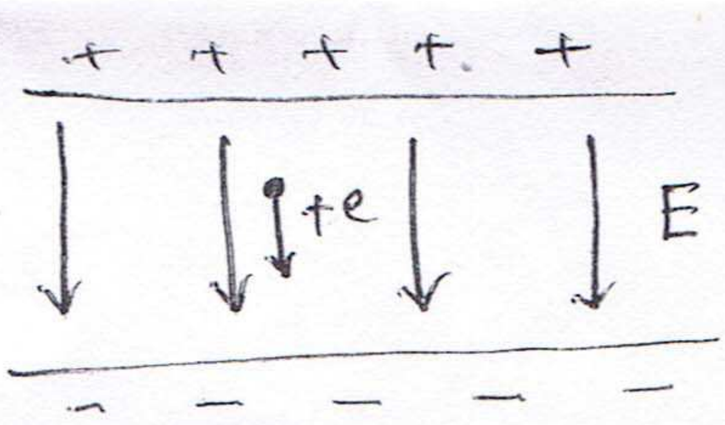
10. What is drift velocity of electron in a conductor carrying current ? Derive the expression of drift velocity if a constant electric field applied across a conductor .

Section –C 3X5=15

11. An electron falls through a distance of 1.5 cm in a uniform electric field of magnitude $2.0\times10^{4}\,NC^{-1}$. The direction of electric field is reversed keeping its magnitude unchanged and a proton falls through the same distance . Compute the time of fall in each case . Contrast the situation (a) with that of ' free fall under gravity '.

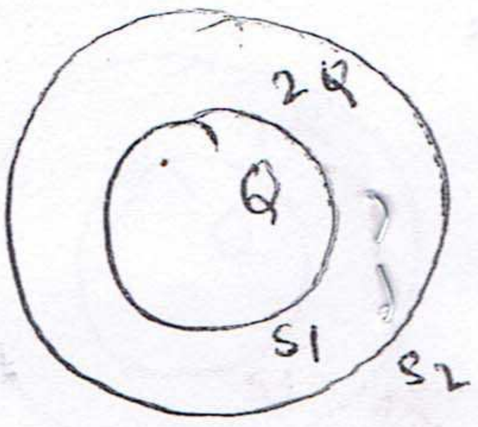


(a)



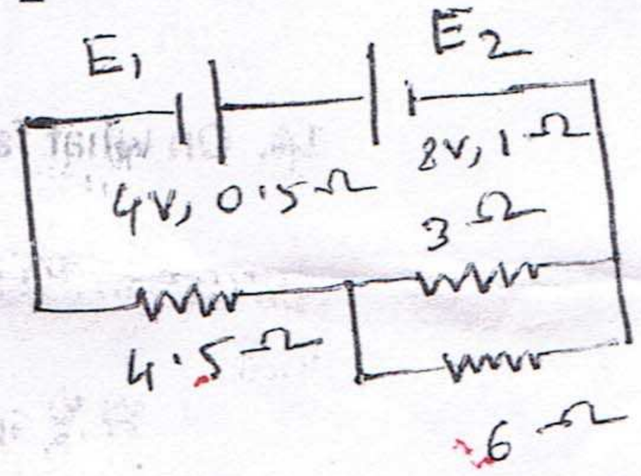
(b)

12. What is electric flux ? State Gauss's Theorem. S_1 and S_2 are two hollow concentric spheres enclosing charges Q and 2Q respectively as shown in fig . What is the ratio of electric flux through S_1 and S_2 ?



13. the capacitor of capacitance 'C' . if its is given 'q' charge on it to give the electric potential 'V' , show that the electric energy stored in the capacitor is equal to the work done $\frac{1}{2}CV^2$.

14. On what factors the resistance of a conductor depends ? Calculate the current in 3Ω resistor , Fig . below . Where , E_1 cell has emf 4V , internal resistance 0.5Ω and E_2 cell has emf 8V , internal resistance 1Ω.

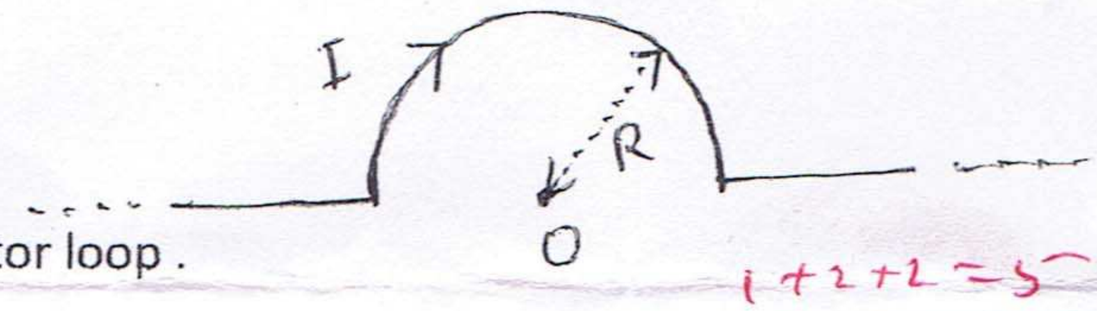


15. State Kirchhoff's laws . Draw a diagram of meter bridge and write its working principle .

Or , What is capacitance ? Derive the expression of capacitance of a parallel plate capacitor (vacuum inside).

Section –D 5X4=20

16. State Ampere's circuital law . Apply the law to derive the expression of magnetic field along the axis of long straight solenoid .

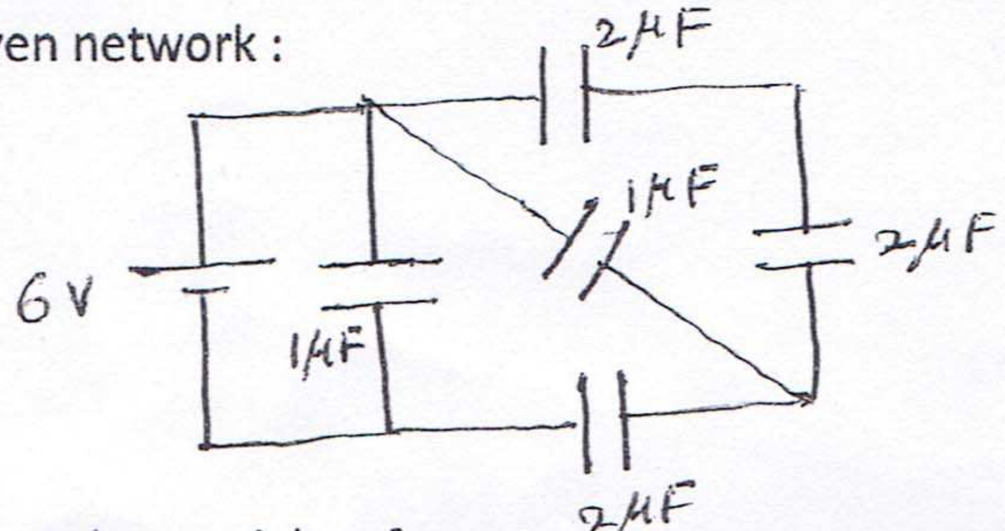


Find magnetic field at the centre 'O' of the Semiconductor loop . 1+2+2=5

17 What is quantization of electric charge ? A charge 'q' is placed at the centre of the line joining two equal charge 'Q' . Show that the system of three charges will be equilibrium if $q = -\frac{Q}{4}$.

What is electric dipole moment ? What is its vector direction ? (1+2+1+1=5)

18. Find the total energy stored in the capacitor in given network :



Show that the electric field lines are always normal to equipotential surfaces .

19. A color code carbon resistor with B_1 =Yellow , B_2 =Green, B_3 =Orange , B_4 =Gold . If 2mA current passes through the resistor find voltage across it .

How can you convert a galvanometer into an ammeter and volt-meter ? With circuit diagram find the expression of resistor used to do so . 3+2=5

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