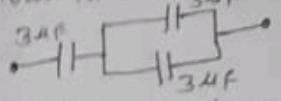
TIME - 1 Hr MONTHLY TEST - electricity + capacitance FM-M

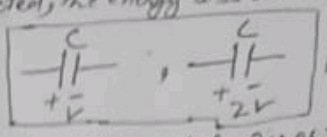
Class-XII
SUBJECT- Physics

Q1. A capacitor of capacitance C is charged to a potential V. The flux of the electric field through a closed surface enclosing the positive plate of the capacitor is: (a) $\frac{CV}{2\varepsilon_0}$ (b) $\frac{2CV}{\varepsilon_0}$ (c) $\frac{CV}{\varepsilon_0}$ (d) Zero.

Q2. The equivalent capacitance of the system shown in circuit is:
(a) 3 μF (b) 6 μF (c) 9 μF (d) 2 μF.

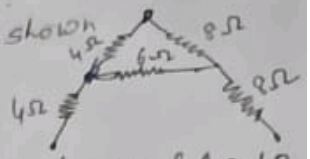


Q3. Two capacitor are charged as shown in fig. When both the +ve terminals of capacitors are connected, the energy loss will be
(a) $\frac{1}{2}CV^2$ (b) $3/4\,CV^2$ (c) $\frac{1}{4}CV^2$ (d) $2CV^2$



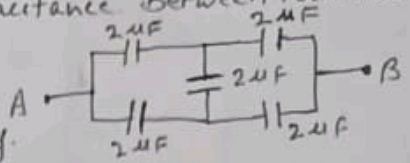
Q4. Two metal wires of identical dimensions are connected in series. If σ_1 and σ_2 are the conductivities of the metal wires respectively, the effective conductivity of the combination is (a) $\frac{\sigma_1\sigma_2}{\sigma_1+\sigma_2}$ (b) $\frac{\sigma_1+\sigma_2}{2\sigma_1\sigma_2}$
(c) $\frac{2\sigma_1\sigma_2}{\sigma_1+\sigma_2}$ (d) $\frac{\sigma_1+\sigma_2}{\sigma_1\sigma_2}$

Q5. The equivalent Resistance between A and B for the mesh shown
(a) 4.8 Ω (b) 7.2 Ω (c) 16 Ω (d) 30 Ω



SECTION-B 2×4=8

Q6. In the circuit, Find the equivalent capacitance between terminal A and B
(a) 2 μF (b) 1 μF (c) 0.5 μF (d) 4 μF
Also calculate it.



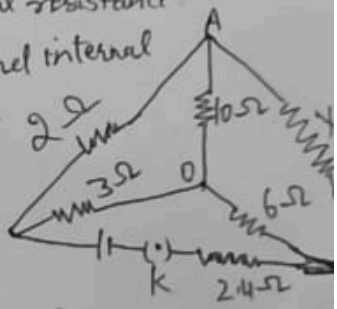
Q7. Derive the expression for the capacitance of a parallel plate capacitor.

Q8. Deduce the ohms law from the concept of drift velocity.

Q9. State Kirchhoff's Rule using sign convention explain 1st rule. Why current is a scaler quantity

SECTION-C 3×4=12

Q10. Find the value of the unknown Resistance X, in the following circuit, if no current flows through the section AO, As shown in diagram calculate the current drawn by the circuit from the battery of emf 6V and negligible internal resistance



Q11. Derive the expression for the equivalent emf and internal resistance of the combination of cell of emf ε_1 and ε_2 in parallel

Q13. Using Kirchhoff's Rule, Verify and state Wheatstone Bridge.

Q14. Using Kirchhoff's Rule, Write/Calculate the currents I_1, I_2 and I_3 in the circuit Diagram as shown below.