(6 pages) **Reg. No. :** .....

Code No. : 41317 E **Sub. Code : SMPH 31**

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2018.

Third Semester

Physics — Main

ELECTRICITY

(For those who joined in July 2007 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The potential at a point due to point charge is $V =$ ————————.

   (a) $\frac{1}{4\pi\varepsilon_0}\cdot\frac{q}{r^2}$ (b) $\frac{1}{4\pi\varepsilon_0}\cdot\frac{q}{r}$

   (c) $\frac{1}{4\pi\varepsilon_0}\cdot\frac{q^2}{r}$ (d) none

2. The electric potential energy $W =$ ————————.

   (a) qV (b) q^2V

   (c) q/V (d) V/q

3. According to Peltier effect, the heat (H) evolved or absorbed is ———————— to the charge passing through the junction.

   (a) directly proportional

   (b) inversely proportional

   (c) independent

   (d) none

4. The unit for Thomson coefficient (σ) is ————————.

   (a) VC (b) VC^{-1}

   (c) VC^2 (d) none

5. The ionic dissociation if potassium chloride is given by $KCl \rightarrow$ ————————.

   (a) $K^+ + Cl^-$ (b) $K^- + Cl^+$

   (c) $2K^+ + Cl^-$ (d) none

6. In secondary cells chemical reactions are _____.

(a) reversible
(b) irreversible
(c) partly reversible
(d) none

7. The resonant frequency for a LCR circuit is $f =$ _____.

(a) $\frac{1}{2\pi\sqrt{LC}}$ (b) $\frac{1}{\pi\sqrt{LC}}$

(c) $\frac{1}{4\pi\varepsilon_0} \cdot \frac{L}{C}$ (d) none

8. If two resistance 50 ohm and 150 ohm are connected in series, the net resistance =

(a) 100 ohm (b) 37.5 ohm
(c) 200 ohm (d) none

9. The value of the operator j is _____.

(a) -1 (b) $\sqrt{-1}$
(c) $\sqrt{1}$ (d) none

10. In a purely capacitive circuit, the current _____ the applied emf of _____.

(a) leads, 180° (b) leads, 90°
(c) lags behind, 90° (d) none

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Obtain Coulomb's law from Gauss law.

Or

(b) State and explain Coulombs law in electrostatics.

12. (a) State and explain Seebeck effect.

Or

(b) What is Peltier effect? Define Peltier coefficient.

13. (a) Give the evidences for Arrhenius theory of electrolytic dissociation.

Or

(b) Explain the working of Nickel-Iron accumulator.

14. (a) Derive expression for the growth of current in a circuit have L and R.

Or

(b) Derive expression for the decay of current in a circuit having L and R.

15. (a) Explain the sharpness of resonance in parallel resonance circuit.

Or

(b) Compare series resonance and parallel resonance circuit.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Using Gauss law, find the electric field intensity due to a line of charge.

Or

(b) What is an electric dipole? Derive the expression for electric potential energy.

17. (a) Describe the method of measuring thermo emf using potential energy.

Or

(b) What is thermoelectric diagram? Explain any one of the application of thermoelectric.

18. (a) Explain the determination of specific conductivity of electrolytes using Kohlrausch.

Or

(b) Derive Gibbs-Helmholtz equation for a reversible cell.

19. (a) Explain the conversion of galvanometer into ammeter and voltmeter.

Or

(b) Describe the method of measuring a high resistance by leakage method.

20. (a) Give the applications of *j*-operator in studying in A.C. circuits.

Or

(b) Derive the expression for the variation of current in a LCR circuit connected in series.

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