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

Code No. : 40559 E **Sub. Code : SMPH 31**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2019.

Third Semester

Physics – Main

ELECTRICITY

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The unit for electric flux is ———— .

   (a) NmC^{-2} (b) Nm^2C^{-1}

   (c) $N^{-1}mC$ (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 Thomson coefficient (σ) is ———— .

   (a) Constant (b) Dont vary

   (c) Not a constant (d) none

5. The ionic dissociation if potassium chloride is given by KCl ————>

   (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 time constant for a L – R circuit is

   (a) R/L (b) L/R

   (c) L^2/R (d) None

8. If two resistances 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 inductive circuit , the current ———— the applied emf by ———— .

(a) leads, 180° (b) leads, 90°

(c) lags behind, 90° (d) None

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Answer should not exceed 250 words.

11. (a) State and prove Gauss law in electrostatics.

Or

(b) State and explain Coulombs law in electrostatics.

12. (a) State and explain Seebeck effect.

Or

(b) Explain Thomson effect. Define Thomson coefficient.

13. (a) State Faraday's laws of electrolysis.

Or

(b) Define electrical conductivity of an electrolyte. Define specific conductivity.

14. (a) Derive expression for the growth of charge in a capacitor through a resistance.

Or

(b). Derive expression for the decay of charge in a capacitor through a resistance.

15. (a) Give the applications of j – operator in studying the A.C circuits.

Or

(b) Compare series resonance and parallel resonance circuits.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Answer should not exceed 600 words.

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

Or

(b) Find the relation connecting electric field and electric potential.

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

Or

(b) Prove that the Peltier Coefficient of a pair of metals is the product of the absolute temperature and thermo electric power.

18. (a) Explain the Arrhenius theory of electrolytic dissociation.

Or

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

19. (a) Explain in detail the working of Wheatstone network.

Or

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

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

Or

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

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