

Bankim Sardar College

Internal Examination 2020

Sem: II

Course: Honours

Paper: CCH3

Group-A

1. Answer all the Questions- 10x1=10
- i) Tesla is a unit of -
 - a) Flux density b) Electricity c) Magnetic Induction d) All of the options
 - ii) A magnetic field exists around
 - a) A moving charge b) Copper c) Aluminium d) All of the above
 - iii) Magnetic Moment is a
 - a) Vector Quantity b) Universal constant c) Scalar Quantity d) none of the above
 - iv) A bar Magnet has-
 - a) Dipole moment b) monopole moment c) a and b both d) none of the above
 - v) In a region of constant potential
 - a) The electric field is uniform b) electric field is zero c) electric field is gradually increasing d) None of the above
 - vi) The dielectric constant of a metal is -
 - a) Infinite b) Zero c) a and b both are correct d) a and b both are false
 - vii) In a parallel plate capacitor, the capacitance increases if
 - a) the area of the plates increases b) distance between the plate increases c) area decreases d) None of the above
 - viii) the law governing the force between two charged body is known as-
 - a) Coulomb law b) Farady Law c) Ohm's Law d) all of the above
 - ix) The phenomenon by which a magnetic substance becomes a magnet when it is placed near a magnet-
 - a) Magnetic induction b) Polarisation c) Electromagnetic effect d) All of the above
 - x) Lenz states that the direction of the induced emf and hence current is determined by-
 - a) Rate of current flux b) rate of change of magnetic flux c) a and b are correct d) None is correct

Group B

2. Answer all Questions 3x10=30
- A. What is a Carey Foster bridge? Write the formula for determining an unknown low resistance by the bridge explaining the symbols.
 - B. Given resistance per unit length of the bridge wire (ρ) 0.02 ohm/cm and known resistances 1,1.1,1.2 ohms find the values of the null points.

- C. With the above data and unknown resistance =2.5 ohm find the values of the null points.

Group C

Answer Question No. 3 and any 6 from the rest.

3. Answer all the Questions 10x2=20
- i) State Gauss's law of electrostatics.
 - ii) What is superposition theorem in electrostatics?
 - iii) What do you understand by equipotential surface?
 - iv) What is Magnetic vector Potential?
 - v) State Kirchhoff's current law (KCL) and Kirchhoff's Voltage law (KVL).
 - vi) What is Ampere's circuital law?
 - vii) What are eddy currents?
 - viii) What is magnetic coefficient of coupling?
 - ix) What is mutual inductance?
 - x) What is uniqueness theorem in electrostatics?
4. Show that Coulomb's law can be derived from Gauss's law 5
5. Show that Capacitance (C) of a parallel plate capacitor is given by $C = \frac{\epsilon_0 A}{d}$ 5
6. State Biot-Savart Law? Derive Laplace's Formula from the Biot-Savart Law. 2+3
7. Draw and explain magnetic hysteresis loop of a hard and a soft magnetic material on the same graph and explain. 2+3
8. Write Farady's law of electromagnetic induction. Deduce the integral form of the Farady's law 2+3
9. What is self inductance? Show that Magnetic energy stored in a inductor is $U = \frac{1}{2} LI^2$ 2+3
10. Calculate the electric field at a point on the axis of a uniformly charged ring. 5
11. What is polarisation of charge? Explain with diagram the polarisation of charges in a dielectric media. 2+3