Seat No. | 1484

B.Sc. (Part - I) (Semester - II) (CBCS) Examination, May-2019
PHYSICS

DSC-2B : Electricity And MAGNETISM - II (Paper - IV)
Sub. Code : 72843

Day and Date : Monday, 06-5-2019   **Total Marks : 50**
Time : 11.00 a.m. to 1.00 p.m.

Instructions :   1)   All questions are compulsory.
              2)   Figures to the right indicate full marks.
              3)   Draw neat, labeled diagrams wherever necessary.
              4)   Use of Scientific calculator is allowed.

Q1) Select the correct alternative from the following :   **[10]**

   a)   At resonance, series LCR circuit behaves like _____ circuit.

      i)   capacitive   ii)   inductive

      iii)   resistive   iv)   capacitive and inductive

   b)   Which of the following is not a unit of magnetic induction _____.

      i)   N-m/A   ii)   Gauss

      iii)   Tesla   iv)   Weber

   c)   The unit of self or mutual inductance is _____

      i)   Farad   ii)   Henry

      iii)   Coulomb   iv)   Ohm

   d)   Electromagnetic waves are _____ waves.

      i)   longitudinal

      ii)   transverse

      iii)   transverse or longitudinal

      iv)   neither transverse nor longitudinal

P.T.O.

e) When a vector is multiplied by j, then it is rotated through _____ degrees.

    i)   0   ii)   90

    iii) 180   iv) 270

f) Diamagnetic material has _____ susceptibility.

    i)   negative   ii)   positive

    iii) zero   iv) infinity

g) Energy stored in magnetic field is _____

    i) $\frac{1}{2}I^2 L$ ii) $\frac{1}{2}I L^2$

    iii) $\frac{1}{2}L^2 I^2$ iv) $\frac{L^2}{2I^2}$

h) The equation of continuity of current is equation of the conservation of _____ .

    i)   mass   ii)   momentum

    iii) energy   iv) charge

i) Impedance 'Z' of series LCR circuit is related to its admittance 'Y' by the relation _____ .

    i) $Z = \frac{1}{Y}$

    ii) $Z = Y$

    iii) $Z = \frac{1}{Y^2}$

    iv) $Z = \frac{1}{\sqrt{Y}}$

j) Divergence of vector B is _____

    i)   zero   ii)   infinity

    iii) 4π iv) $\frac{\mu_0}{4\pi}$

Q2) Attempt any TWO of the following : [20]

a) State and explain self and mutual inductance. Derive expression for energy in magnetic field per unit volume.

b) State and explain Biot-Savart law.

c) For A.C. series LCR circuit explain the terms :

    i) Complex impedance   ii) Reactance

    iii) Complex admittance   iv) Susceptance

    v) Phase angle

Q3) Attempt any FOUR of the following : [20]

a) Write note on Owen's bridge

b) Derive integral and differential forms of Faraday's law

c) Write note on ferromagnetic material

d) Explain Q-factor of a.c. series LCR circuit

e) Derive continuity equation of current

f) State and explain Ampere's law