SW-43

Total No. of Pages : 3

Seat No.

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

PHYSICS

Electricity and Magnetism - I (Paper - III) (DSC - 1B)

Sub. Code : 72843

Day and Date : Saturday, 19- 10 - 2019 **Total Marks : 50**

Time : 12.00 noon to 2.00 p.m.

Instructions : **1)** **All questions are compulsory.**

2) **Figures to the right indicate full mar[illegible]**

3) **Draw neat labelled diagrams wherever nec[illegible]**

4) **Use of scientific calculator is allowed.**

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

a) The gradient of scalar function is _____.

i) the maximum rate of change of a function in the space

ii) the constant

iii) always a scalar function

iv) none of these

b) The divergence of the vector field represents the total flux flowing out _____.

i) per unit volume ii) per unit area

iii) per unit length iv) per unit mass

c) If the vector product of two nonzero vectors is zero, the vectors must be _____.

i) either parallel or antiparallel

ii) perpendicular

iii) inclined at an angle 45 degrees with each other

iv) always antiparallel

P.T.O.

d) Charge on capacitor plates is directly proportional to _____.

i) current ii) electric field intensity

iii) potential difference iv) resistance

e) Unit for electric field intensity is _____.

i) N ii) NC^{-1}

iii) Ns iv) NC

f) Ability of capacitor to store charge depends on _____.

i) area of plates

ii) distance between the plates

iii) type of dielectric used

iv) all of above

g) The Stoke's theorem is used to convert _____.

i) line integral into surface integral

ii) volume integral into surface integral

iii) line integral into volume integral

iv) surface integral into volume integral

h) The divergence of a vector field is _____.

i) a scalar ii) a vector

iii) a constant iv) zero

i) Electric flux ϕ due to electric field E, passing through surface area S is given by _____.

i) $\phi = E \cdot S$ ii) $\phi = E \times S$

iii) $\phi = E - S$ iv) $\phi = \frac{E}{S}$

j) A potential due to a point charge at a distance r from it, is proportional to _____.

i) r ii) $\frac{1}{r}$

iii) r^2 iv) $\frac{1}{2r}$

Q2) Attempt any two of the following : **[20]**

a) Define capacitance and obtain an expression for capacitance of a cylindrical condenser.

b) Obtain Gauss's theorem in dielectric medium.

c) Obtain an expression for divergence of a vector field and explain its physical significance.

Q3) Attempt any four of the following : **[20]**

a) Calculate the work done when a force $\vec{F}=3\vec{i}+2\vec{j}-2\vec{k}$ produces a displacement $\vec{r}=4\vec{i}+\vec{j}+3\vec{k}$.

b) Define cross product of two vectors and state its any three characteristics.

c) Explain the physical significance of the gradient of a scalar field.

d) Write a note on del operator.

e) Obtain an expression for the electric potential due to a point charge at a distance r from it.

f) Explain Electric field and Electric flux.