



DOON UNIVERSITY, DEHRADUN
Mid Semester Examination, Second Semester, 2017-18
School of Physical Sciences
Physics Generic elective
Course: PHM-151: Electromagnetic theory

Time Allowed: 3Hours

Maximum Marks: 30

Note: Attempt All Questions from Sections A, 4 questions for section B and two questions from section C.

SECTION: A Attempt all questions

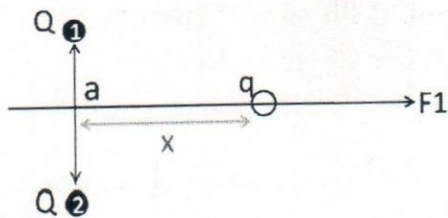
(Marks: 1 X 6=6)

1. Coulomb is the unit of which quantity?
 a) Field strength b) Charge c) Permittivity d) Force
2. Line integral apply to calculate force on
 a) Force b) Area c) Volume d) Length
3. The Gauss divergence theorem converts
 a) line to surface integral b) line to volume integral
 c) surface to line integral d) surface to volume integral
4. The electric field intensity is defined as
 a) Force per unit charge b) Force on a test charge
 c) Force per unit charge on a test charge d) Product of force and charge
5. Gauss law can be evaluated in which coordinate system?
 a) Cartesian b) Cylinder
 c) Spherical d) Depends on the Gaussian surface
6. Find the force on a charge $2C$ in a field $1V/m$.
 a) 0 b) 1 c) 2 d) 3

SECTION: B Attempt any 4 questions.

(Marks 3X4=12)

1. What is Coulomb's law? Find the force on an electron (charge $-1.602 \times 10^{-19}C$), which is 1 nm from the perfectly conducting plane. What is the electric field on the electron?
2. What is Gauss's theorem? What is Stokes theorem?
3. What is electric potential? A point charge $2nC$ is located at origin. What is the potential at $(1,0,0)$?
4. Find the net force on charge q exerted by two individual charges Q at a distance x , as shown in the figure below. Distance between two charges at point 1 and 2 is "a"



5. Calculate Force due to a line of charge.

SECTION: C Attempt any three questions

(Marks: $4 \times 3 = 12$)

1. Calculate force on charge q , due to ring of charge having charge λ per unit length. The charge q is kept at a distance h from the ring.
2. What is gauss law and derive one of its applications to calculate electric field.
3. Calculate electric field due to a surface charge (infinite charge sheet).
4. Derive conservative nature of an electrostatic field.