Question Paper

Exam Date & Time: 05-Jul-2022 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
II SEMESTER B.Sc.(Applied Sciences) in Engg.
END SEMESTER THEORY EXAMINATION-MAY/JUNE 2022

Physics - II [IPH 121]

Marks: 50 **Duration: 180 mins.**

Answer all the questions.

Missing data, if any, may be suitably assumed

Useful constants

Speed of light in vacuum= 3.00×10^{8} m/s	Electron charge = 1.60×10^{-19} C	Mass of proton / neutron= 1.67×10^{-27} kg
Electron mass = 9.11×10^{-31} kg	Boltzmann constant= 1.38×10^{-23} J/ K	Planck's constant = 6.63×10^{-34} J-s
Permittivity of vacuum = 8.85×10^{-12} F/m	Rydberg constant = 1.10×10^{7}/m	Permeability of vacuum = $4\pi \times 10^{-7}$ H/m
Avogadro constant = 6.02×10^{23} /mol		

1) (4)

A) What are the properties of conductor in electrostatic equilibrium? Using Gauss' law show that the electric field just outside a conductor has a magnitude σ/ε_0.

B) (4)

Two charges 10 μC and −10 μC are placed at points A and B separated by a distance of 10 cm. Show this arrangement of charges schematically and find the electric field at a point P on the perpendicular bisector of AB at a distance of 12 cm from its middle point.

C) (2)

The charges shown in Fig. are fixed in space. Find the value of the distance x so that the electric potential energy of the system is zero.

2) (4)

A) Find the electric potential due to a uniform line of positive charge at a perpendicular distance "d" from it and show that the equation reduces to that of a point charge at a very large distance. What happens at d = ☐ ?

B) (3)