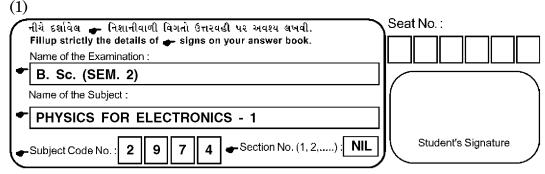# DPP-2974

B. Sc. (Sem. II) Examination
March / April - 2016
Physics For Electronics : Paper - I
(For Electronics Special Course)

Time : **2** Hours]   [Total Marks : **50**

Instructions :
(1)

(2)   Draw neat and clean diagram wherever necessary.
(3)   Symbols used in the paper have their usual meaning.
(4)   Numbers to right indicate full marks of the question.

Constants :
(1)   speed of light (in vacuum) $c = 3 \times 10^8$ *m/s*
(2)   Planck's constant $h = 6.62 \times 10^{-34}$ *js*
(3)   Mass of electron $M_e = 9.1 \times 10^{-31}$ *kg*
(4)   charge on electron $e = 1.6 \times 10^{-19}$ *c*
(5)   Avogadro number $N_A = 6.02 \times 10^{23}$

1   Answer the following ques. in short, each carries two marks :   14

(a)   Define bremsstrahlung.

(b)   Write full form of LASER.

(c)   What is irrotational flow?

(d)   Write disadvantage of rock solt crystal in diffraction of x-rays.

(e)   What is Betatron?

(f)   Write characteristics of Laser light.

(g)   Define hydrostatic pressure.

2 (a) With the help of Archimedes's principle, explain how 8
it can be used in explaining floating and apparent
weight in a fluid.

OR

(a) Derive the equation of continuity for an incompressible 8
fluid.

(b) Ethanol of density $\rho = 791 \, kg/m^3$ flows smoothly 4
through a horizontal pipe that tapers in the cross section
area from $A_1 = 1.2 \times 10^{-3} m^2$ to $A_2 = A_1/2$. The pressure
difference between the wide and narrow sections of pipe
is 4120 Pa. What is the volume flow rate R_v of the
ethanol?

OR

(b) The diameter of one end of a tube is 2 cm and that 4
of another end is 3 cm. Velocity and pressure of water
at narrow end are 2 m/s and $1.5 \times 10^5 \, N/m^2$ respectively.
If the height difference between narrow and broad ends
is 2.5 m, find the velocity and the pressure at the broad
end. (Density of water is $1 \times 10^3 \, kg/m^3$, the narrow end
is higher).

3 (a) Give the mechanism of production of x-rays and 8
explain the distinction between the characteristic and
continuous x-radiation.

OR

(a) What is Bragg's law of reflection of x-rays from atomic 8
planes in a crystal? Prove it with the help of a schematic
diagram using the principle of interference. Describe
and explain a simple x-ray spectrometer using Bragg's
law.

(b) Find the critical voltage that must be applied to an   4
    x-ray tube to excite the K-series of Copper. Given that
    the K-absorption limit is 1.380 A.

OR

(b) Electrons bombarding the anode of a Coolidge   4
    tube produce x-rays of wavelength 1 A°. Find the energy
    of each electron at the moment of impact.

4 Write short note on any two :   12
   (i)   Intensity measurement of x-rays.
   (ii) Modern x-ray tube.
   (iii) Characteristic x-ray lines
   (iv) Laser and Laser light.

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