



**AC-2974**  
**B. Sc. (Sem. II) Examination**  
**March/April – 2015**  
**Physics For Electronics : Paper - I**  
*(For Electronics Special Course)*

Time : 2 Hours]

[Total Marks : 50

Instructions : (1)

<p>नीचे दृष्टावेक निशानीवाणी विगतो उत्तरवडी पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.</p> <p>Name of the Examination : <b>B. SC. (SEM. II)</b></p> <p>Name of the Subject : <b>Physics For Electronics : Paper - I</b></p> <p>Subject Code No. : <b>2</b> <b>9</b> <b>7</b> <b>4</b> Section No. (1, 2,.....): <b>Nil</b></p>	<p>Seat No. : <input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/></p> <div style="border: 1px solid black; border-radius: 15px; height: 80px; display: flex; align-items: center; justify-content: center; margin-top: 10px;">Student's Signature</div>
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- (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 of electron  $e = 1.6 \times 10^{-19}$ C
- (5) Avogadro number  $N_A = 6.02 \times 10^{23}$

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

- (a) Write uses of study of physics of fluids.
- (b) Explain Pascal and atm. Related to the pressure.
- (c) What is Bragg's theory of reflection of x-rays from atomic planes in a crystal ?
- (d) Define Gauge pressure.
- (e) State the law of floatation.
- (f) Define stimulated emission.
- (g) What is an apparent weight ?

- 2 (a) Derive the necessary equation for a venturimeter used to measure the flow speed of a liquid in a pipe. 8
- OR**
- (a) State Bernoulli's equation and give the proof of Bernoulli's equation. 8
- (b) Ethanol of density  $\rho = 791 \text{ kg/m}^3$  flows smoothly through a horizontal pipe that tapers in the cross section area from  $A_1 = 1.2 \times 10^{-3} \text{ m}^2$  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 ? 4
- OR**
- (b) The diameter of one end of a tube is 2 cm and that of another end is 3 cm. Velocity and pressure of water at narrow end are 2 m/s and  $1.5 \times 10^5 \text{ N/m}^2$  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  $1 \times 10^3 \text{ kg/m}^3$ , the narrow end is higher) 4
- 3 (a) Give the mechanism of production of x-rays and explain the distinction between the characteristic and continuous x-radiation. 8
- OR**
- (a) What is Bragg's law of reflection of x-rays from atomic 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. 8
- (b) Find the critical voltage that must be applied to an x-ray tube to excite the K-series of Copper. Given that the K-absorption limit is 1.380 Å. 4
- OR**
- (b) Electrons bombarding the anode of a Coolidge tube produce x-rays of wavelength  $1 \text{ Å}$ . Find the energy of each electron at the moment of impact. 4
- 4 Write short note on any two : 12
- (i) Intensity measurement of x-rays.
- (ii) Properties of x-rays
- (iii) Pascal's law and its one application
- (iv) Venturimeter.