

International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Examination Spring-2018

Course Code: PHY – 1101

Time: 2 hours 30 minutes

Program: B.Sc. Engg. (EEE)

Course Title: Physics - I

Full Marks: 50

Part A

[Answer any two questions from the followings; figures in the right margin indicate full marks.]

- 1(a). Distinguish between Cohesive and Adhesive force. 2
- 1(b). Derive an expression for surface tension. 5
- 1(c). Calculate the amount of energy needed to break a drop of water diameter $2 \times 10^{-3} \text{m}$ into 10^9 droplets of equal size. Surface tension of water is $72 \times 10^{-3} \text{N/m}$. 3
- 2(a). What is Surface tension and Surface energy? 2
- 2(b). Prove that the surface energy of a liquid is numerically equal to its surface tension. 5
- 2(c). A spherical soap bubble of radius 1cm is blown in air. How much energy will be needed to increase the radius to 3cm. [Surface Tension of soap solution is 0.03 N/m]. 3
- 3(a). Define viscosity and coefficient of viscosity. 2
- 3(b). State and explain Bernoulli's theorem of liquid in motion. 5
- 3(c). Calculate the speed at which the velocity head of a stream of water is equal to 0.50m of Hg. 3

Part B

[Answer any three questions from the followings; figures in the right margin indicate full marks.]

- 4(a). What do you mean by time period and wave length of a wave? 2
- 4(b). Explain Doppler's effect for stationary source and moving observer. 5
- 4(c). If the frequency of a tuning fork is 400 Hz and the velocity of sound in air is 320ms^{-1} , find how far sound travels while the fork completes 30 vibrations. 3
- 5(a). State second law of thermodynamics. 2
- 5(b). Write down Carnot's principle and explain Carnot's cycle. 5
- 5(c). A heat engine after doing work in each cycle rejects 70% of heat absorbed from the source, calculate the efficiency of the engine. 3
- 6(a). What is interference and coherent sources? 2
- 6(b). Explain Young's double slit experiment in case of interference of light to produce bright and dark fringes. 6
- 6(c). The straight and narrow parallel slits of 1mm apart are illuminated by monochromatic light. Fringes formed on the screen held at a distance of 1m from the slits are 0.50mm apart. Calculate the wave length of light used. 2
- 7(a). Define two types of diffraction. 2
- 7(b). State and explain Brewster's law in polarization of light. 5
- 7(c). An unpolarized light is incident at an angle equal to the polarizing angle on glass surface. For a refractive index 1.54, what is the value of polarizing angle? 3