# International Islamic University Chittagong
## Department of Electrical and Electronic Engineering

Final Examination Spring-2019
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.]

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|---|---|---:|
| 1(a). | What is meant by adhesive force and cohesive force? | 01 |
| 1(b). | Show that the height to which a liquid rises in a capillary tube of radius r is given by $$h = \left(\frac{2T}{\rho g r}\right) - \frac{r}{3}$$ Where the symbols caries their usual meaning. | 06 |
| 1(c). | Calculate the amount of energy needed to break a drop of water of diameter $2 \times 10^{-3}$ m into $10^9$ droplets of equal size. The surface tension of water is $72 \times 10^{-3}$ N/m. | 03 |
| 2(a). | What are stream line motion and turbulemt motion. | 02 |
| 2(b). | State and explain Bernoulli's theorem of liquid in motion. | 05 |
| 2(c). | In horizontal pipe line of uniform area of cross section , the pressure falls by 5 $n/m^2$ between two points separated by a distance of 1 km. what is the change in kinetic energy per kg of the oil flowing at these points ?density of oil =800 $kg/m^3$. | 03 |
| 3(a) | Prove that the surface tension of a liquid is numerically equal to its surface energy. | 03 |
| 3(b) | Discuss the various forms of energy possesses by liquid in motion. | 04 |
| 3(c) | Water flows through a horizontal pipe line of varying cross section at the rate of $0.2 m^3/s$. Calculate the velocity of water at a point where the area of cross section of the pipe is 0.02m. | 03 |

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

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|---|---|---:|
| 4(a). | Discuss the standing wave. | 02 |
| 4(b). | Explain Doppler's effect for moving source and stationary observer. | 05 |
| 4(c). | A whistling train approaching towards platform with a velocity of 90 $kmh^{-1}$. If the frequency of the whistle is 600Hz and velocity of sound is 325 ms-1 then what will be the apparent of the sound to an observer standing at the platform. | 03 |
| 5(a). | State and explain first law of thermodynamics. | 02 |
| 5(b). | Using first law of thermodynamics, show that in adiabatic process $PV^\gamma = constant.$ | 05 |
| 5(c) | Find the efficiency of the Carnot's engine working between the steam point and the ice point. | 03 |

6(a). Define Fresnel and Fraunhoffer diffraction.     02

6(b). Explain Young's double slit experiment in case of interference of light to produce bright and dark fringes.     06

6(c) In Young's double slit experiment the distance between two slits is 2.0mm. The separation between two consecutive fringes at a distance 1 m from the slits is found to be 0.295mm. Find the wavelength of light .     02

7(a). Define isothermal, adiabatic, reversible and irreversible process.     02

7(b). Derive the differential equation of a simple harmonic motion and solve it.     05

7(c). What is meant by diffraction of light? Distinguish between Fresnel and Fraunhofer diffraction.     03