

**International Islamic University Chittagong**  
**Department of Computer Science and Engineering**

*Special* Final Examination Autumn-2018  
Course Code: PHY-1101  
Time: 2 hours 30 minutes

Program: B.Sc. in CSE  
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). What is wave? Define beat in wave. 2  
1(b). Explain standing wave mathematically. 5  
1(c). Show the whether it is nodes or antinodes for wave length  $\lambda$  3  
And  $3\lambda/2$
- 2(a). What is simple harmonic oscillation? 2  
2(b). Write the differential equation of simple harmonic motion and find the solution for it. 5  
2(c). Determine the angular frequency and initial phase of the simple harmonic motion described by the equation,  $y = 10 \sin(\omega t + \delta)$  3  
In which time period is 30s and displacement is 0.05m initially.
- 3(a). Explain damped and forced oscillation. 3  
3(b). Explain Doppler's effect for moving source and stationary observer. 4  
3(c). A person is standing near a railway track and a train moving with a speed of 36km/hr is approaching him. The apparent pitch of the whistle as heard by the person is 700 Hz. Calculate the actual frequency of the whistle. Velocity of sound is 350m/s. 3

**Part B**

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

- 4(a). What are coherent sources? 2  
4(b). Explain Young's double slit experiment for interference of light to produce bright and dark fringes. 5  
4(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 wavelength of light used. 3
- 5(a). What is superposition of light? 2  
5(b). Explain analytical treatment of interference of light in case of Young double slit experiment. 5  
5(c). In Young double slit experiment the slit width is 0.1 mm and the fringe spacing is 0.05cm at a distance of 1m from the slits. Calculate the wavelength of light. 3

- 6(a). State first law of thermodynamics. 2
- 6(b). Deduce the expression,  $C_p - C_v = R$ , where, the symbols have their usual meaning. 5
- 6(c). Calculate the molar specific heat at constant volume and constant pressure for carbon-dioxide gas. 3
- 
- 7(a). What do you mean by entropy? 2
- 7(b). Distinguish between Fresnel and Fraunhofer diffraction. 3
- 7(c). What is isothermal and adiabatic process? 3
- 7(d). Find the efficiency of the Carnot's engine working between the steam point and the ice point. 2