



Daffodil International University
Department of Electrical and Electronic Engineering
Faculty of Engineering

Final Examination, Summer-2026

Course Code: 0533-111
Section: A, B, C, D, E, F
Full Marks: 40

Course Title: Physics
Level-Term: L1-T1
Exam Date: 22 August 2026

Teacher's Initial: SAT, MMR
Time: 2 Hours

Note: There are three sets of questions in total. Answer all of them. Right hand margin indicates full marks.

- Q1.** (a) Describe sharpness of resonance. CO-1 [2]
(C2)
- (b) Differentiate between wave and oscillation. CO-1 [3]
(C2)
- Q2.** (a) Express the general differential equation of progressive wave motion. CO-3 [3]
(C2)
- (b) Show that simple harmonic motion average potential energy is half of the total mechanical energy for a complete cycle. CO-3 [4]
(C2)
- (c) Estimate the velocity of sound in air using Laplace's correction. CO-3 [4]
(C2)
- (d) Describe the shape of the Lissajous figure formed when the frequency ratio of the two oscillations is 1:1. Explain how the phase difference between the two oscillations affects the shape. CO-3 [4]
(C2)
- Q3.** (a) The sound intensity level of a machine is 100 dB at a distance of 5 m. At what distance from the machine will the intensity level decrease to 80 dB? CO-2 [4]
(C3)
- (b) A progressive wave has the equation $y(x,t)=0.04\sin[2\pi(40t-4x)]$. Calculate the amplitude, wavelength, frequency, wave velocity, angular frequency, and time period. CO-2 [4]
(C3)
- (c) For damped oscillator mass of object 0.35 kg, spring constant $K=87\text{ Nm}^{-1}$ and damping constant $b=0.07\text{ kgs}^{-1}$. Calculate after how many complete oscillations does the amplitude become half of its initial value? CO-2 [4]
(C3)
- (d) A police car is approaching a stationary observer at 90 kmh^{-1} while its siren emits a sound of frequency 750 s^{-1} . If the speed of sound is 340 ms^{-1} , Calculate the frequency does the observer hear? Also the frequency will be heard after the police car passes the observer? CO-2 [4]
(C3)
- (e) A sinusoidal wave of amplitude 10 cm travels along the positive -axis. At a particular instant, the displacement of a particle 20 cm from the origin is +5 cm, while that of another particle 50 cm from the origin is -5 cm. Calculate the wavelength of the wave. CO-2 [4]
(C3)