



Daffodil International University
Department of Electrical and Electronic Engineering
Faculty of Engineering
Mid-Term Examination, Fall-2026

Course Code: 0533-111
Section: A, B, C, D, R
Full Marks: 25

Course Title: Physics
Level-Term: L1-T1
Exam Date: 28 October 2026

Teacher's Initial: MMR
Time: 1.5 Hours

Note: There are three sets of questions in total. Answer all of them. [The second rightmost column indicates the course outcomes (COs) with respective Bloom's level and the rightmost column indicates the allocated marks.]

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| Q1. (a) Describe how interference fringes are produced using biprism. | CO-1
(C2) | [2] |
| (b) Explain seebeck effect. | CO-1
(C2) | [2] |
| Q2. (a) Show that the difference between the two molar specific heats of a gas is equal to the molar gas constant. | CO-2
(C2) | [3] |
| (b) Illustrate the arrangement of a total radiation pyrometer and explain the function of each part. | CO-2
(C2) | [3] |
| (c) Estimate the phase difference of the interfering light waves at a point x units away from the center of the screen in Young's double-slit experiment. | CO-2
(C2) | [3] |
| Q3. (a) An electronic device is specified to operate safely between 35°C and 110°C. Its temperature-monitoring circuit displays temperature in Fahrenheit. Calculate the corresponding operating range in °F. If the over-temperature alarm is set at 221°F, calculate the corresponding Celsius temperature and state whether the alarm threshold lies within the specified operating range. | CO-2
(C3) | [3] |
| (b) A photodetector array is placed on a screen in a Young's double-slit experiment. The wavelength of light is 600 nm, the slit separation is 0.30 mm, and the screen distance is 2.0 m. Calculate the number of complete bright fringes that can occur between $y = -25 \text{ mm}$ and $y = +25 \text{ mm}$, including the central bright fringe. | CO-2
(C3) | [3] |
| (c) In Newton's rings experiment, a lens with a radius of curvature $R = 0.95 \text{ m}$ and an unknown wavelength is used. The 8 th dark ring has a radius of 2.25 mm. Calculate the wavelength of light. Also, if the diameter of the 6 th bright ring is 3.40 mm, verify whether the calculated wavelength is consistent with this measurement. | CO-2
(C3) | [3] |
| (d) A thermal conditioning system in a semiconductor laboratory is supplied with 0.65 kg of ice at -20°C. The ice is heated to saturated steam at 100°C. Calculate (i) the total heat required and (ii) the total entropy change during the complete process. ($S_{\text{ice}} = 2.1 \text{ kJkg}^{-1}\text{K}^{-1}$; $S_{\text{w}} = 4.2 \text{ kJkg}^{-1}\text{K}^{-1}$; $L_f = 334 \text{ kJkg}^{-1}$; $L_v = 2260 \text{ kJkg}^{-1}$) | CO-2
(C3) | [3] |