



Department of Computer Science and Engineering
Faculty of Science and Information Technology

Mid Term Examination, Semester: Spring-2017, Sections: All
Course Code: PHY 113 Course Title: Physics I- Mechanics, Heat and Thermodynamics, Waves and Oscillation, and Optics
Level & Term: L1 T1 Teacher's Initial: All
Time: 1.5 Hours Marks: 25

(Answer any three questions including no 01)

01. a) When velocity is zero, acceleration is not zero- is it possible? Explain your answer. 01
b) Consider an army tank fires a missile making an angle of θ with ground at velocity U_0 . What will be the type of the path? Prove your answer? 05
c) At what angle a particle is projected so that its height attained is equal to half of its horizontal range? 03
02. a) On which factors moment of inertia depends? 01
b) Determine the moment of inertia of a thin uniform rod about an axis passing through one end of the rod and perpendicular to its length. 04
c) A wheel weighing 5 Kg and radius of gyration about an axis is 0.2m. What is its moment of inertia? In order to produce angular acceleration of 2 rad s^{-2} in the wheel what magnitude of torque is to be applied? 03
03. a) How much support force does a table gives on a book whose weight is 15N -
i. When book is placed on the horizontal table?
ii. When hand pushes the book downward with a force 20N? 02
b) Show that, if the final velocity is greater than the initial velocity of the system then the total work done is always positive. 03
c) A 70 Kg box is pulled by a 400 N force at an angle of 30° to the horizontal. If the coefficient of sliding friction is 0.50, find the acceleration of the box. 03
04. a) Write down the main difference between progressive and standing wave. 01
b) Draw a schematic diagram of nodes and antinodes for stationary waves. Derive the equation of a stationary wave and discuss the conditions for the formation of antinodes and nodes. 05
c) A plane progressive wave travelling along the positive x direction has the following characteristics: $A=0.3\text{cm}$, $v=380\text{cm/s}$ and $\lambda = 3\text{m}$. Obtain the displacement at $x=100\text{cm}$ and $t=12\text{sec}$. 02