PRINCE SULTAN UNIVERSITY
جامعة الأمير سلطان

*Department of Mathematics and General Sciences*

# Physics 1 (PHY105)
# Second Major Exam

First Semester, Term 162
Date: Saturday 06/05/2017

| | |
|---|---|
| Name: | |
| ID number: | |
| Section number or time: | 431 (9AM) 435(8AM) |
| Instructor's name: | Dr. Asif Zaidi |

**Important instructions:**

1. Examination time: 1 hour.
2. Write your name now before starting with the questions.
3. Switch off your mobile phone and put any books and notes away.
4. Check that you have 5 pages in total, including this cover page and a scratch paper.
5. You may use a calculator but you may *not* borrow one.

*Good Luck!*

| | Mark |
|---|---|
| **Part 1** | |
| **Part 2** | |
| **Total** | |

**SCECTION I (5 Marks): Circle the letter of the correct answer. Use $g = 9.8\ m/s^2$**

Q.1

Elastic collision between two bodies is defined by:

A) Conservation of linear momentum only.

B) Conservation of Kinetic Energy only.

C) Both by conservation of linear momentum and the kinetic energy.

D) None of the above.

Q.2

A 0.5 kg ball is thrown upwards along + Y axis, with initial speed of 20 m/s. The maximum height ball will go is:

A) 10 m B) 12.5 m C) 15.6 m D) 20.4 m

Q.3

In the conservative field of gravity,

A) Work done around a close path is zero.

B) Potential energy of the body depends on the path the body.

C) Work done around a closed path is not zero D) none is true

Q.4

In a car crash test, a car of mass 1500 kg collides with a wall (located on negative x-axis) and rebounds. The initial and final velocities of the car are – 15 m/s and 2.6 m/s, respectively. If collision time is 0.15 seconds, the average force exerted on the car is,

A) $0.5 \times 10^5$ N. B) $1.76 \times 10^5$ N. C) $2.75 \times 10^5$ N. D) $4.35 \times 10^5$ N

Q5.

A 90 kg diver drops in PSU swimming pool from 3 m above water surface. If work done by non-conservative force is $-5.12 \times 10^3$ J, The diver's depth in water will be:

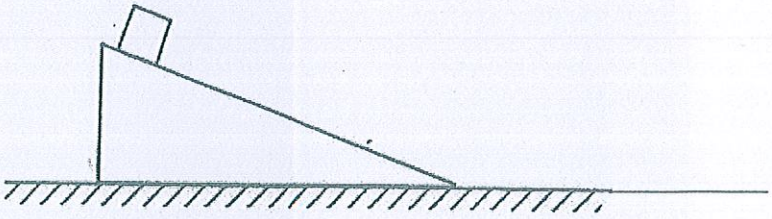
A) 1.5 m B) 2 m C) 2.5 m D) 2.8 m

SCENTION II: ANSWER COMPLETELY SHOW ALL YOUR WORK. $g = 9.8\ m/s^2$.

Q1. (4 marks)

A 50 kg box slides from rest at the top of a frictionless incline of height 20 m. At the bottom of incline plane horizontal surface has coefficient of kinetic friction 0.20.

(a) What is box's speed at the bottom of the incline?



(b) How much distance box will cover sliding ~~of~~ on horizontal surface?

Q.2 (4 marks)

A railcar of mass 2.5 x$10^4$ kg is moving with a speed of 4 m/s. It collides and joins with three other railcars already joined together. Each of the three cars has same mass as 2.5 x$10^4$ kg and moving in the same direction with an initial speed of 2 m/s.

(a) What is the speed of the four joined cars after collision?

(b) How much mechanical energy is lost in this collision?

Scratch paper
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