



# Bahria University, Islamabad Campus

## Department of Computer Science

### Mid Term Examination

Class/Section: BS-IT 1 (A, B)

(Spring 2022 Semester)

Paper Type: Descriptive

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Course:	<b>Applied Physics</b>	Date: 12-05-2022
Course Code:	GSC 114	Time: Session -II
Faculty's Name:	<b>Saeed ur Rehman</b>	Max Marks: 20
Time Allowed:	90 mins	Total Pages: 2 (including this)

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### INSTRUCTIONS:

- I. All questions are compulsory.
- II. There are **total four** questions.
- III. The paper is closed book.
- IV. The students are not allowed any helping material (books, tables, formulas, etc).
- V. Calculators are allowed. Programmable Calculators are NOT allowed.
- VI. Use blue, black or blue-black ink only. Do NOT use lead pencil especially.

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Student's Name: \_\_\_\_\_ Enroll No: \_\_\_\_\_

(USE CAPITAL LETTERS)

**Note: attache the question paper with your answer sheet.**

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### Question # 01: [Marks: 2+2+1+1=6]

- i. Select the appropriate **scalar derived quantities** from the examples and write the names of the base quantities that aid in the formulation of scalar derived quantities. **Examples:**  
a) Moment of force b) Energy c) Friction d) Gravity e) Density
- ii) Vector  $\vec{A}$  is directed from origin to point  $P_1(3, -4, 5)$  in Cartesian coordinate system. Draw the appropriate diagram of Vector  $\vec{A}$  and find out  $|\vec{A}|$ .
- iii) Why does it hurt so much when you stub your toe? Use proper known laws of physics to explain it.
- iv) Your hair grow at the rate of **1mm** per day. Find their growth rate in **nm s<sup>-1</sup>**?

### Question # 02: [Marks: 2+2=4]

- a) Find the **scalar product** and **angle** ( $\Phi_{AB}$ ).

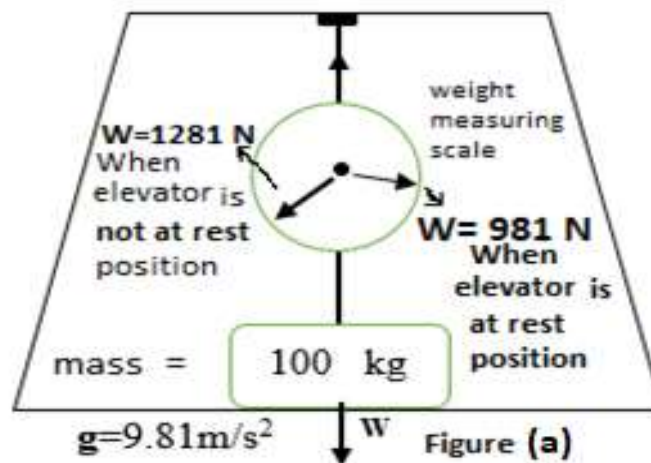
$$\vec{A} = 2\hat{i} + \hat{j} - 3\hat{k} \quad ; \quad \vec{B} = 3\hat{i} + 2\hat{j} + 3\hat{k}$$

- b) Draw and label the proposed elevator motion block diagram that satisfies the given equation's criteria.

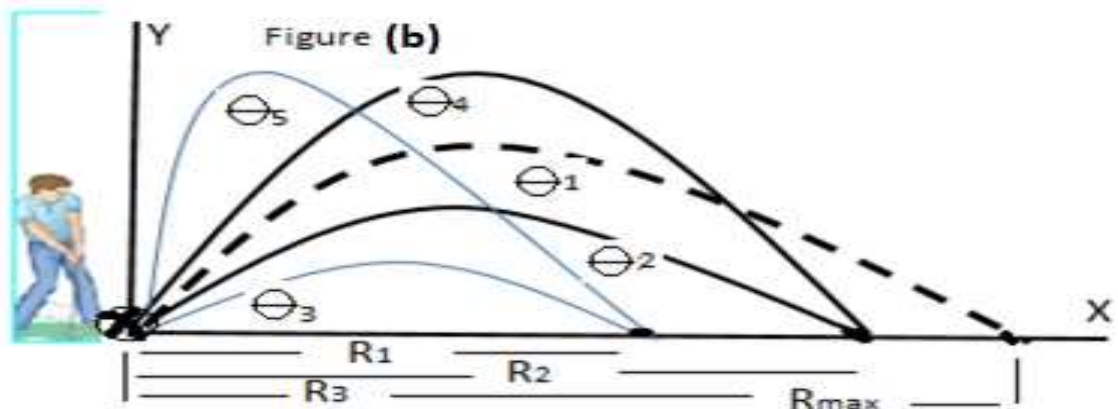
$$W - \sum Fy = F_N$$

### Question # 03: [Marks: 2+2=4]

- a) Find out the magnitude and direction of **acceleration (a)** with the help of given moveable elevator block diagram as shown in **figure (a)** on next page.



- b) The range ( $R_3$ ) of oblique projectile motion is maximum at  $\Theta_1$  as shown in figure (b) below. Find out the angle ( $\Theta_1$  to  $\Theta_5$ ) in degree for each curved path.

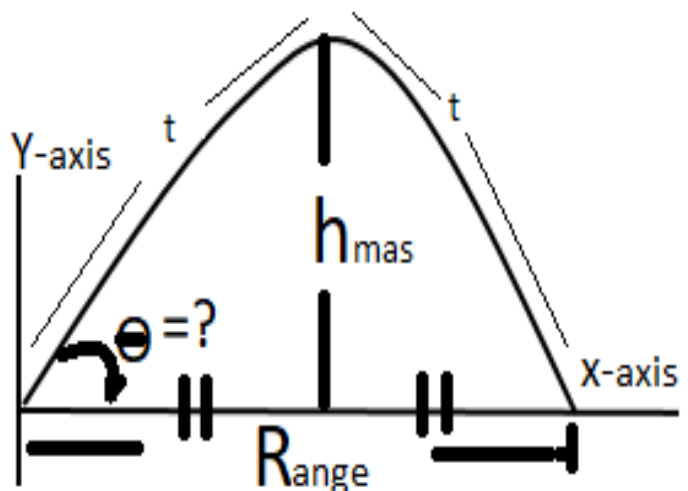


**Question # 04: [Marks: 4+2=6]**

A projectile is launched from ground level with an initial speed of  $V_0$  at an angle  $\phi$  of above the horizontal. It strikes a target in the air at  $t = \frac{V_0 \cdot \sin \phi}{g}$ . ( $g = 9.8 \text{ m/s}^2$ )

- a) Derive the mathematical equation for **horizontal range** as shown in figure below.  
b) What values of  $\phi$  as mentioned below in figure at which range of oblique projectile motion is maximum and minimum. **Where:**

- ❖  $V_{0x}$  is initial horizontal velocity
- ❖  $V_{0y}$  is initial vertical velocity.
- ❖  $V_0$  is initial velocity.
- ❖  $V$  is final velocity.
- ❖ Neglect air friction along x-axis.



*The End*

**GOOD LUCK @**