National University of Computer and Emerging Sciences

Lahore Campus

Applied Physics (NS1001) — **Sessional-I Exam**

Date: 23rd September, 2024 — **Total Time (Hr):** 1

Course Moderator: — **Total Marks:** 25

Prof. Dr. Saman Shahid — **Total Questions:** 2

Roll No

Do not write below this line

- Attempt all the questions.
- Properly mention question number and statement on the answer sheet.
- Write answers of each question in sequence on the answer sheet.

Question 1 [Total Marks: 10]

Q1(a): Carolyn drives her car north at 30 km/h for 1 hour, east at 60 km/h for 2 hours, then north at 50 km/h for 1 hour. Sketch the vector diagram showing this motion. Give magnitude and direction for the resultant displacement vector. [5 marks]

Q1(b): Prove with the help of an Illustration (with vector representation/diagram) that the vector addition follows the associative property in case of three vectors: $\boldsymbol{a}$, $\boldsymbol{b}$ and $\boldsymbol{c}$. [5 marks]

Question 2 [Total Marks: 15]

Q2(a): Prove that trajectory of a projectile particle follows equation of parabolic. [5 marks]

Q2(b): Two bodies of masses 15 and 16.5 kilograms were attached to the opposite ends of a light inextensible string that passed over a smooth pulley fixed to the edge of a smooth horizontal table. The body of larger mass was placed on the smooth table while the smaller one was hanging vertically below the pulley. Determine the tension (connecting a mass on a table to a vertically hanging mass through a pulley) in the string, given that the acceleration due to gravity g=9.8 m/s^2. [10 marks]