Roll No. _____

NATIONAL UNIVERSITY OF MODERN LANGUAGES ISLAMABAD
DEPARTMENT OF SOFTWARE ENGINEERING
Mid Term Examination – Spring 2021 – BSSE-1 (Afternoon)

Subject: Applied Physics | **Instructor: Dr. Sajid Saleem**
Time Allowed: 2 Hours | **Total Marks: 30**

Instructions: -

- Attempt all questions
- CLOs are clearly mention against each Question
- Overwriting / unnecessary details will be considered as incorrect answer.

Q1 **CLO1**

a. Briefly explain Scalar (Dot) and Vector Products. Support your answer with suitable examples — 5

b. Find the magnitude and the direction of the resultant vector — 5

$$\vec{\boldsymbol{R}} = \vec{A} - \vec{B} + \vec{C}$$

where

$$\vec{\boldsymbol{A}} = 2\hat{\imath} + 3\hat{\jmath}$$
$$\vec{\boldsymbol{B}} = 5\hat{\imath} - 6\hat{\jmath}$$
$$\vec{\boldsymbol{C}} = -3\hat{\imath} + 2\hat{\jmath}$$

Q2 **CLO1**

a. Briefly explain Gauss's Law with suitable examples — 5

b. A point charge $q_1 = 10nC$ is located on the x-axis at $x = 4m$, a second point charge $q_2 = -12nC$ is located on the y-axis at $y = 2m$ and the third point charge $q_3 = -5nC$ at $x = 4m, y = 2m$. What is the total electric flux due to these point charges through a spherical surface centered at the origin and with radius (a) 2.50 m (b) 5.50 m? — 5

Q3 **CLO2**

a. Explain an ideal source of Electromotive Force (EMF) — 5

b. What is internal resistance of an EMF source? How does it effect the terminal voltage V_{ab} and current I in the following circuit. Support your answer with concrete reasoning by first considering the internal resistance (r) equal to Zero than any Non-zero value — 5