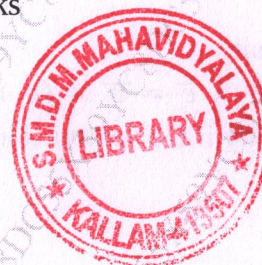


SUBJECT CODE NO: - BNP-2730**FACULTY OF SCIENCE AND TECHNOLOGY****B.Sc. (NEP) (P-2024) S.Y Sem III****Examination November / December 2025****Mathematics (Vector Algebra)****[Time: 1:00 Hours]****[Max. Marks:30]**

Please check whether you have got the right question paper.

N. B

- 1) Question no.1 is Compulsory
- 2) Attempt any four questions from question no.2 to 7.
- 3) Figures to the right indicate full marks

Part-A**Q1 Choose the correct alternative.****10**

- i) Direction of zero vector
 - a) does not exist
 - b) toward origin
 - c) indeterminate
 - d) none of these
- ii) Two vectors are said to be equal if they have
 - a) same length
 - b) same support
 - c) same sense
 - d) all of these
- iii) If $3\mathbf{i} + 2\mathbf{j} + 8\mathbf{k}$ and $2\mathbf{i} + x\mathbf{j} + \mathbf{k}$ is at right angles, find value of x
 - a) 7
 - b) -7
 - c) 5
 - d) -4
- iv) The distance between points whose position vectors are $4\mathbf{i} + 3\mathbf{j} - 6\mathbf{k}$ and $-2\mathbf{i} + \mathbf{j} - \mathbf{k}$ is:
 - a) 65
 - b) $\sqrt{65}$
 - c) 60
 - d) 5
- v) The vector product of two parallel vectors is
 - a) unit vector
 - b) zero vector
 - c) always negative
 - d) none of these

PART – B

- Q2** Prove that in any triangle ABC, $c^2 = b^2 + a^2 - 2ab \cos C$ in the usual notation of plane trigonometry. **05**
- Q3** If $\vec{a} = i + j - k$ and $\vec{b} = i - j + k$, then find the unit vector perpendicular to the vector $\vec{a}$ and coplanar with $\vec{a}$ and $\vec{b}$. **05**
- Q4** Find the angle between lines AB, AC where A, B, C are the three points with rectangular Cartesian coordinates (1,2, -1), (2,0,3), (3, -1,2) respectively. **05**
- Q5** Prove that $\vec{a} \times (\vec{b} + \vec{c}) = \vec{a} \times \vec{b} + \vec{a} \times \vec{c}$. **05**
- Q6** Show that vectors $\vec{a} - 2\vec{b} + 3\vec{c}$, $-2\vec{a} + 3\vec{b} - 4\vec{c}$ and $\vec{a} - 3\vec{b} + 5\vec{c}$ are coplanar. **05**
- Q7** Show that $(\vec{a} \times \vec{b}) \times \vec{c} = \vec{a} \times (\vec{b} \times \vec{c})$ if and only if the vectors $\vec{a}$ and $\vec{c}$ are collinear. **05**