TILAK MAHARASHTRA VIDYAPEETH, PUNE
BACHELOR OF SCIENCE (B.Sc.) – GAME ART AND DESIGN
EXAMINATION: DECEMBER- 2023
THIRD SEMESTER
Sub.: Mathematics (BSGD21-306)

Date: 21/12/2023	Total Marks: 40	Time: 2.00 pm to 4.00 pm

Instructions: All questions are compulsory.

Q. 1. **Solve the following (Any 2)** **(10)**

1. What is the final value of $(\text{cosec}^2\ 30°)(\cot 45°)^{10}(1 – \cos^2 30°)$

2. Proof that $\text{Sec}^2\ Ø / ((\tan^2 Ø)(\text{cosec}^2 Ø)) = 1$

3. What will be the direction of a Null Vector.

Q. 2. **Solve the following (Any 2)** **(10)**

1. What is the value of $(\sec^2 45° + \text{cosec}^2 45°)^{0.5}$

2. What is the value of $\frac{1+\tan^2 63°}{1+\cot^2 63°}\cot^2 63°$

3. What are Zero Vectors and Unit Vectors?

4. Find the unit vector in the direction of the vector $\vec{a} = \hat{\imath} + 4\hat{\jmath} + 8\hat{k}$

Q. 3. **Solve the following (Any 2)** **(20)**

1. Find $A^2 - 9A + 3I, if\ A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$

2. Find inverse of the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 3 & 2 \\ 1 & 1 & 1 \end{bmatrix}$ using elementary transformations.

3. A tower stands vertically on the ground. From a point on the ground, which is 19 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°. Find the height of the tower. Assume the value of $3^{1/2} = 1.7$

4. If $A = \begin{bmatrix} 3 & 2 & -2 \\ 5 & 1 & 2 \\ 1 & -1 & 1 \end{bmatrix}, B = \begin{bmatrix} 3 & -4 & 2 \\ 4 & 2 & 7 \\ 2 & 0 & 3 \end{bmatrix}, C = \begin{bmatrix} 4 & 1 & 3 \\ 0 & 3 & 1 \\ 1 & -2 & 3 \end{bmatrix}$, then compute (A+B) and (B - C). Also, verify that A+ (B - C) = (A+B) – C.