Roll No…….. **Total No. of Printed Pages: 2**
Total No. of Questions: [09]

B.Sc. (Food Tech)/B.F.S.T) (Semester – 1st)
MATHEMATICS
Subject Code: BFOTS1103
Paper ID: [21131703]

Time: 03 Hours **Maximum Marks: 60**
Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) Find the area of the circle with radius $r = 10cm$.
b) If the length of a rectangle is 8 cm and its width is 5 cm, what is its perimeter?
c) An equilateral triangle has a side length of 6 cm. What is its perimeter?
d) A parallelogram has a base of 12 cm and a height of 5 cm. What is its area?
e) Find the area of a triangle with a base of 10 cm and a height of 8 cm?
f) If the diagonals of a rhombus measure 6 cm and 8 cm, what is the area of the rhombus?
g) Solve the quadratic equation $x^2 - 5x + 6 = 0$ using the quadratic formula.
h) Find the determinant of the matrix $A = [2\ 5\ 7\ 9\ ]$.
i) Express the following: nC_r, nP_r.
j) Define singular matrix with an example.

Section – B **(5 marks each)**

Q2. A triangular prism has a triangular base with a base length of 6 cm and a height of 4 cm. If the length of the prism is 10 cm, what is its volume?

Q3. Find the inverse of given matrix $A = [5\ 6\ \ -\ 1\ 3\ ]$.

Q4. Solve the equation $2x^4 + 3x^2 - 2 = 0$ by reducing it to a quadratic equation.

Q5. Find the number of permutations of the letters of the word **ALLAHABAD.**

Q6. Find the following:

a) A rhombus having diagonals of length 10 cm and 16 cm, respectively. Find its area.
b) If a cube has its side-length equal to 5cm. Find its volume?

Section – C **(10 marks each)**

Q7. Let $A = [1\ 0\ 0\ 1\ ]$ and $B = [1\ 3\ 5\ 7\ ]$. Then show that $(AB)' = B'A'$,where A', B' denotes the transpose of a matrix A and B, respectively.

Q8. A sequence of numbers is given as follows: 2, 5, 8, 11, …

a) Determine whether the sequence is an arithmetic progression (AP), a geometric progression (GP), or neither.

b) Find the 10th term of the sequence.

Q9. A circular field has a radius of 50 meters. A path of uniform width of 5 meters is to be constructed around the field. If the cost of fencing the field is $10 per meter and the cost of fencing the path is $5 per meter, calculate:

a) The total cost of fencing just the field.

b) The total cost of fencing both the field and the path.