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Total No. of Printed Pages: 2

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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 $r = 10\text{cm}$.
- 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, ...
- Determine whether the sequence is an arithmetic progression (AP), a geometric progression (GP), or neither.
 - 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:
- The total cost of fencing just the field.
 - The total cost of fencing both the field and the path.