**Roll No.** | | | | | | | | | | | | | **Total No. of Pages : 02**

**Total No. of Questions : 09**

**B.Voc. (Building Construction and Technology) (Sem.–1)**

# APPLIED MATHEMATICS

**Subject Code : BVBCT-102-20**

**M.Code : 79022**

**Date of Examination : 17-01-23**

**Time : 3 Hrs.** **Max. Marks : 60**

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

## SECTION-A

**1. Write briefly :**

a) Solve the inequality : $2x - 1 < x + 3$.

b) Find the term independent of $x$ in $\left(x + \frac{1}{x}\right)^{10}$.

c) Write an equation for the line through the point (2, 3) with slope – 3/2.

d) Evaluate $\lim_{s \to 0} \frac{\sin(s/2)}{s/3}$.

e) Discuss the continuity of $\frac{x^4 + 20}{5x(x-2)}$ at $x = 0$.

f) Find the values of $\partial f / \partial x$ and $\partial f / \partial y$ at the point (4, –5) if $f(x, y) = x^2 + 3xy + y - 1$.

g) Find the local extreme values of $f(x, y) = x^2 + y^2$.

h) Evaluate $\int_0^3 \int_0^2 (4 - y^2)\, dy\, dx$.

i) Find the general solution of the partial differential equation : $2yzp + zxp = 3xy$.

j) Evaluate $(2 + 3i)(6 - 2i)$.

## SECTION-B

2. Find the nullity of linear transformation T $(x, y, z) = (x + 2y, z)$.

3. Find two positive numbers whose sum is 20 and whose product is as large as possible.

4. Evaluate $\int \frac{1}{x^2} \cos^2\left(\frac{1}{x^2}\right) dx$.

5. Find the general solution of the partial differential equation : $[D^2 + DD' - 2(D')^2]\, z = 5e^{x+2y}$.

6. From a pack of well stuffled cards, one card is drawn. Find the probability that this card is either king or an ace.

## SECTION-C

7. a) Find the center and radius of the circle $x^2 + y^2 + xy + 3 = 0$.

   b) Find the lines joining the origin to the points of intersection of $3x^2 + 4xy - 4x + 1 = 0$ and $2x + y - 1 = 0$.

8. Solve the following systems of equations :

$$2x + y + z = 2$$

$$x - y + z = 7$$

$$2x + 2y + z = 4$$

9. Find the area bounded by the curves $x^2 = y^3$ and $x = y$.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student**.