

Saraswat Vidyalaya's  
Sridora Caculo College of Commerce and Management Studies  
BCA Semester I End Examination, November 2022

CAC 103 Basic Mathematics

Duration: 2 hours

Total marks: 60

Total No of Pages : 3

**Instructions:**

1. All questions are **compulsory**.
2. Figures to the right indicate **full marks**.
3. Use of calculator is **not permitted**.
4. You may answer randomly but every main question attempted should be answered serially.

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**Q 1 A)** Attempt the following

(5x1=05)

- i) Find  $d(AB)$  if  $A = (-2, 4)$  and  $B = (6, -8)$
- ii) If  $f(x) = x^2 + 2x - 5$ , find  $f(x + 1)$
- iii) Find the equation of a line passing through the points  $A = (6, 7)$  and  $B = (2, 1)$ .
- iv) Find  $\int \left( \frac{2x^2 + 4x + 5}{x} \right) dx$ .
- v) If  $a, b$  and  $c$  are in G.P. where  $a = 9, c = 4$  find  $b$ .

**Q1 B)** Attempt the following

(5x1=05)

- i) Find  $M$  if  $A = (6, 7), B = (2, -4)$  and  $m : n = 2 : 3$
- ii) If  $f(x) = x^2 - 6x + 9$ , find  $f(k + 1)$
- iii) If a line having slope  $\frac{-1}{2}$  make an  $y$  intercept 4, find its equation.
- iv) Find  $\frac{dy}{dx}$  if  $y = (3x^2 + 4x - 1)^2$
- v) If  $\begin{vmatrix} 2 & 4 \\ 4 & x \end{vmatrix} = 0$  find  $x$

**Q 2 A)** Evaluate  $\lim_{x \rightarrow 2} \left[ \frac{1}{x^2+x-6} + \frac{1}{x^2-9x+14} \right]$  (02)

**B)** The demand function  $p$  in terms of quantity demanded ( $D$ ) is given by  $p = 16 + D - D^2$ , find the average revenue and marginal revenue when demand is 4 units. (03)

**C)** If  $A = \begin{bmatrix} 2 & 4 & 4 \\ 4 & 2 & 4 \\ 4 & 4 & 2 \end{bmatrix}$  show that  $A^2 - 8A$  is a scalar matrix. (05)

**Q 3A)** Find the volume of a cylinder which has a height of 14m and base of radius 3m. Also find the curved surface area of the Cylinder. (02)

**B)** Simplify  $\frac{3+2i}{3-2i} + \frac{1-i}{1+i}$  (03)

**C)** Find the sum of all natural numbers between 100 and 500 which are exactly divisible by 11. (05)

**Q 4 A)** Find the co-ordinates of  $M$  dividing  $AB$  internally in the ratio 5: 2 where  $A = (0, -5), B = (7, 9)$ . (02)

**B)** Find the values of  $x, y$  and  $z$  if  $\begin{bmatrix} x + 2y & y + 3z \\ x - y & y - 2z \end{bmatrix} = \begin{bmatrix} 4 & 7 \\ 1 & -3 \end{bmatrix}$  (03)

**C)** Solve the following system of equation using matrix method. (05)

$$2x + 8y + 5z = 5$$

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

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

Q 5 A) If  $A = \begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix}$ ,  $B = \begin{bmatrix} -3 & -1 \\ 6 & 4 \end{bmatrix}$ , find  $(4B - 3A)$  (02)

B) Find the centre and the radius of the circle given by (03)  
 $x^2 + y^2 - 4x - 6y + 22 = 0$

C) If  $\vec{a} = 2\hat{i} + 3\hat{j} - 5\hat{k}$  and  $\vec{b} = -3\hat{i} + \hat{j} + 2\hat{k}$ , (05)  
 find the value of  $\vec{a} \cdot \vec{b}$  and  $\vec{a} \times \vec{b}$

Q 6 A) Find  $y$  given that  $(5, y)$  is equidistant from  $(4, 3)$  and  $(1, -2)$  (02)

B) The demand and supply laws are  $p = x^2 - 12$  and  $p = 6 + \frac{x^2}{2}$  (03)  
 respectively. Determine the producer's Surplus under pure competition.

C) Find the equation of tangent and normal to the curve (05)  
 $y = x^2 + 4x + 1$ , at point whose abscissa is 3