

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.

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 unites. (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 $\begin{bmatrix} x+2y & y+3z \\ x-y & y-2x \end{bmatrix} = \begin{bmatrix} 4 & 7 \\ 1 & -3 \end{bmatrix}$ (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