

G.V.M.'s G.G.P.R. College of Commerce and Economics

Farmagudi, Ponda – Goa.

B.C.A. CBCS Semester-I End Examination, November 2022

CORE COURSE

CAC-103 BASIC MATHEMATICS

Duration – 2 hours

Marks-60

Instructions: 1) Question 1-6 are compulsory.

2) Figures to the right indicate full marks.

Q1] A) Fill in the blanks.

(5x1=5)

- 1) If 'A' is square matrix and $|A| = 0$, then 'A' is called _____.
- 2) The scalar or dot product of the two vectors $\vec{a} = a_1 \hat{i} + a_2 \hat{j} + a_3 \hat{k}$ and $\vec{b} = b_1 \hat{i} + b_2 \hat{j} + b_3 \hat{k}$ is defined as _____.
- 3) If a, b, c are in G.P. then geometric mean b = _____.
- 4) Two non zero vectors \vec{a}_1 and \vec{a}_2 are perpendicular to each other if and only if _____.
- 5) The radian measure corresponding to the degree measure 180° is _____.

B) Answer the following questions.

(5x1=5)

- 1) Find GCD of 54 and 90.
- 2) If 5, 7, 9, 11, 13, 15,..... is an A.P. Find the value of 'a' and 'd'.
- 3) If $f(x) = \frac{x+2}{x-1}$, find $f(2x)$.
- 4) If $A = \begin{bmatrix} -4 & 2 \\ 1 & 3 \end{bmatrix}$, find $|A|$.
- 5) If $x^{2q+5} = x^{25}$, find q.

Q2) Answer the following questions.

(10)

A) Solve the following equation and also state the nature of the roots. (02)

$$2x^2 + 5x + 2 = 0$$

B) Find 'y' if the distance between $A = (8, 5)$ and $B = (4, y)$ is 5 units.

(03)

C) Prove that $\frac{1}{\log_a(abc)} + \frac{1}{\log_b(abc)} + \frac{1}{\log_c(abc)} = 1.$ (05)

Q3) Answer the following questions. (10)

A) If $f(x) = x^2 - 2x + k$ and $f(1) = 3$. Find 'k' and $f(3)$. (02)

B) Using trigonometry prove the following identity.

$$\tan(x + y) = \frac{\tan x + \tan y}{1 - (\tan x \tan y)} \quad (03)$$

C) Use De Moivre's theorem to prove that

$$\sin 2\theta = 2 \sin \theta \cos \theta. \quad (05)$$

Q4) Answer the following questions. (10)

A) If $Z_1 = 6 + 2i$ and $Z_2 = 2 - i$. Find $Z_1 - Z_2$. (02)

B) Find volume of sphere whose surface area is 616 cm^2 . ($\pi = \frac{22}{7}$) (03)

C) Solve the following system of equations using cramer's rule.

$$2x - y = 5 \quad \text{and} \quad x + y = 4 \quad (05)$$

Q5) Answer the following questions. (10)

A) If $A = (3,4,5)$ and $B = (4,3,2)$. Find \overline{AB} . (02)

B) Find area of parallelogram whose adjacent sides are given by vectors

$$\vec{a} = 2\hat{i} + 3\hat{j} + \hat{k} \quad \text{and} \quad \vec{b} = -2\hat{i} + \hat{j} + 2\hat{k}. \quad (03)$$

C) Evaluate $\lim_{x \rightarrow 3} \frac{\sqrt{x+6}-3}{x^2-9}$. (05)

Q6) Answer the following questions. (10)

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

B) For an A.P. 9, 13, 17, 21, 25,.... Calculate a_{20} and S_{10} . (03)

C) Show that A= (2,1), B= (6,5) and C= (4,7) are vertices of right angled triangle. (05)

***** All the best *****