

Vidya Vikas Mandal's
Shree Damodar College of Commerce & Economics, Margao Goa
F.Y.B.C.A, Semester I, Supplementary Examination, May/June 2019
BASIC MATHEMATICS

Duration: 2 Hours

Total Marks: 50

Instructions:

- 1) Figures to the right indicate maximum marks
- 2) Start each answer on a fresh page.
- 3) Non scientific, non programmable calculator allowed.

1. Attempt the following.

A. Answer the following questions:

[1x5=5 Marks]

- i. Find the cofactor matrix of $A = \begin{bmatrix} 1 & 2 \\ 3 & -4 \end{bmatrix}$
- ii. Find the equation of circle with centre (4,1) and radius 3.
- iii. If $a=3$ and $d=-5$. Find T_9
- iv. Find $\gcd(37,249)$
- v. Find the lcm of 340 and 225.

B. Match the following:

[1x5=5 Marks]

- | | |
|---------------------------------|-----------------------------|
| i. Volume of a cylinder | a. $\pi r l$ |
| ii. Curved surface area of cone | b. $\frac{\sqrt{3}}{2} a^2$ |
| iii. Area of regular hexagon | c. $\frac{\sqrt{3}}{4} a^2$ |
| iv. Volume of sphere | d. $\pi r^2 h$ |
| v. Area of equilateral triangle | e. $\frac{4}{3} \pi r^3$ |

2. Answer any two of the following questions:

[2x5=10 Marks]

A. Find A^{-1} if $A = \begin{bmatrix} 5 & 3 & 1 \\ 2 & 1 & 3 \\ 1 & 2 & 4 \end{bmatrix}$

B. Find the sum $5+55+555+\dots$ upto n terms

C. Prove that :

i. $\sin^2 \phi + \cos^2 \phi = 1$

ii. $1 + \tan^2 \phi = \sec^2 \phi$

3. Answer any two of the following questions:

[2x5=10 Marks]

A. Write down the equation of the line

- Passing through (2,8) and (1,3)
- Having slope 5 and y-intercept 3

B. Evaluate the following limits:

- $\lim_{x \rightarrow 0} \frac{5^x - 2^x}{x}$
- $\lim_{x \rightarrow 5} \frac{x^3 - 125}{x - 5}$

C. Solve the following system of linear equations using Cramer's Rule

$$x + 2y - z = 3, \quad 3x - y + 2z = 1, \quad 2x - 2y + 3z = 2$$

4. Answer any two of the following questions:

[2x5=10 Marks]

A. Find the derivative of the following

- $Y = X^4 + 3X^2 - 8X + 5\log x + e^x - 2$
- $y = \frac{5x-2}{2x+3}$

B. Discuss the continuity of the following function at $x=3$.

$$f(x) = \begin{cases} x^2 - 2x + 5 & 0 \leq x < 3 \\ 8 & x = 3 \\ 3x + 2 & 3 < x \leq 6 \end{cases}$$

C. If $\vec{a} = 2\hat{i} + 3\hat{j} - 5\hat{k}$ and $\vec{b} = -3\hat{i} + \hat{j} + 2\hat{k}$ find $\vec{a} \times \vec{b}$ and $\vec{a} \cdot \vec{b}$

5. Answer any two of the following questions

[2x5=10 Marks]

A. Integrate the following

- $\int (4x^3 + 5e^x - \frac{1}{x} + 7) dx$
- $\int_1^2 \left(\frac{2x^2 + 4x + 5}{x} \right) dx$

B. Simplify the following

- $\log_3 243 - \log_2 64 + \log_3 81$
- $\frac{(256)^{\frac{1}{4}}(64)^{\frac{1}{2}}(27)^{\frac{1}{3}}}{(81)^{\frac{1}{5}}(16)^{\frac{1}{2}}}$

C. Solve the following quadratic equation

$$\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$$
