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Shree Damodar College of Commerce & Economics, Margao Goa
FY BCA, Semester I, Semester End Examination, October 2019
SUBJECT: BASIC MATHEMATICS (CAC-103)

Timing: 2 Hours   Marks: 60

Q1. Attempt the following:

A) Answer the following: [6X1=6 Marks]

i) Find the LCM of 24 and 36.

ii) Find the roots of quadratic equation, $4x^2 - 4x + 1 = 0$

iii) Find the area of trapezium whose parallel sides are 6cms and 10cms long distance between them is 4cms.

iv) If $A = \begin{bmatrix} 2 & -1 \\ 12 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -5 & 0 \\ -7 & 4 \end{bmatrix}$, find $A+B$.

v) Find S_{10} of an A.P. with first term 3 and common difference 1/3.

vi) If $Z = 5 - 3i$, find $\bar{z}$

B) Answer the following: [6X1=6 Marks]

i) Convert $\frac{2\pi}{3} radians$ to degrees.

ii) Find the slope of a line joining (1,2) and (3,4).

iii) Find the determinant of the matrix $\begin{bmatrix} 7 & 4 \\ -1 & 0 \end{bmatrix}$

iv) Find $\vec{a}.\vec{b}$, if $\vec{a} = \hat{\imath} + 2\hat{\jmath} + \hat{k}$ and $\vec{b} = \hat{\imath} + \hat{\jmath} + 3\hat{k}$.

v) Find $\lim_{x \to 0} \dfrac{\tan 3x}{x}$

vi) Simplify $(81)^{3/4}$.

Q2. Answer any three of the following questions: [4x3=12 Marks]

A) Solve for x, $\log_5(2x + 4) = 2$.

B) Find the volume of largest right circular cone that can be cut out of a cube of edge 22cms.

C) Express $(2\sqrt{3} + 2i) \times (\sqrt{3} - 3\sqrt{-1})$ in the form a + ib.

D) Find transpose of $(A \times B)$, If $A = \begin{bmatrix} 1 & 0 \\ 9 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 \\ 1 & 0 \end{bmatrix}$

Q3. Answer any three of the following questions: [4x3=12 Marks]

  A) Find three numbers in G.P. such that their sum is 21 and their product is 216.

  B) Show that (1,-2,3) (-2,3,2) (-8,13,0) are collinear using vectors.

  C) Find the domain of the function:

   $f(x) = \dfrac{1}{x^2 - 5x - 14}$

  D) Show that $\sqrt{\dfrac{(\sec\theta - 1)}{(\sec\theta + 1)}} = cosec\theta - \cot\theta$.

Q4. Answer any three of the following questions: [4x3=12 Marks]

  A) Find equation of circle with centre at (4,-2) and radius 6.

  B) If $\dfrac{5\sqrt{5} \times 5^3}{5^{3/2}} = 5^{a+2}$, find a.

  C) Circumference of two circles are 12m and 9m. Find the difference between the areas of the larger and smaller circle.

  D) Find cube roots of unity of 2+2i.

Q5. Answer any three of the following questions: [4x3=12 Marks]

  A) Examine if the following function is continuous or not, at x=2. In case the function is discontinuous state whether the discontinuity is of removable, and if removable redefine the function suitably to make it continuous.

$$f(x) = \begin{cases} 2x & if\ x < 2 \\ 2 & if\ x = 2 \\ x^2 & if\ x > 2 \end{cases}$$

  B) Find f○g and g○f for the following functions:
   i) f(x) = 4x-5, g(x) = x.
   ii) f(x) = x², g(x) = 1-2x

  C) Solve the following system of equations using Cramer's rule:
   5x-2y=11 and 6x-5y=8

  D) Find the angle between the vectors $\vec{p} = 2\hat{\imath} + 3\hat{\jmath} + 6\hat{k}$ and $\vec{q} = 3\hat{\imath} - 6\hat{\jmath} + 2\hat{k}$.

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