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B.C.A. CBCS (SEMESTER-I) EXAMINATION, OCTOBER 2019

BCA 104 BASIC MATHEMATICS

Duration :2 hours Marks: 60

Instructions: i) Questions 1-6 are compulsory.
ii) Figures to right indicate full marks.

Q1. A] Fill in the blanks: (5x1=5)

a) LCM of 80 & 64 is _____.
b) If A= $\begin{bmatrix} 2 & -1 \\ 4 & -2 \end{bmatrix}$, then |A| = _____.
c) The scalar product of the two vectors $\bar{a} = a_1\hat{\imath} + a_2\hat{\jmath}$ & $\bar{b} = b_1\hat{\imath} + b_2\hat{\jmath}$ is defined as _____.
d) For a G.P 1, 3, 9, 27… the value of a and r is ____ & _____.
e) The circumference of a circle with radius 2cm is _____.

B. Fill in the blanks: (5x1=5)

a) Common difference of the sequence 7, 10, 13, 16, …. is _____.
b) If the edge of a cube is 3cm then the surface area of cube is _____.
c) If $\tan\theta = \frac{5}{12}$ then $\operatorname{cosec}\theta$ = _____.
d) The distance between the point A(0,6) from origin is _____.
e) Area of triangle with $\bar{a}$ & $\bar{b}$ as the sides is _____.

Q2] Answer the following questions:

A. What is fourth proportional to 5, 8, 15? (2)
B. A solid sphere of radius 5cm is mounted on a cube of side 9cm. Find the total volume of the structure. (3)
C. If A= $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ find A^2 - 5A – 2I where I = $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$. (5)

OR

D. Solve the following equations using Cramer's rule (5)

$$x + 2y + z = 4$$
$$2x - y + z = -1$$
$$x + y - z = 4$$

Q3] Answer the following questions

A. Find x, if $\begin{vmatrix} x & 2 & 1 \\ 3 & 0 & 1 \\ 4 & -5 & 2 \end{vmatrix} = 0$. (2)

B. For an A.P 2, 5, 8, 11, 14,….Calculate T_{10} and S_{10} (3)

C. Use De moivre's theorem to prove the following
$\sin 3\theta = 3\cos^2\theta\sin\theta - \sin^3\theta$ (5)

OR

P.T.O.

D. Find the fifth root of 2+2$\sqrt{3}$i. (5)

Q4] Answer the following questions:

A. If$Z_1 = 1 + i$ & $Z_2 = 1 - i$, find $\frac{Z_1}{Z_2}$. (2)

B. The diameter of cone is 14mts and its slant height is 9mts. Find the area of curved curved surface. (3)

C. Evaluate$\lim_{x\to 3}(\frac{1}{x-3} - \frac{3}{x^2-3x})$. (5)

OR

D. Discuss the continuity of the following functions at x=1 (5)

$$f(x) = \begin{cases} x^2 + 1, & 0 \le x < 1 \\ 3x + 1, & 1 \le x < 2 \end{cases}$$

Q5] Answer the following questions:

A. If $f(x) = x^2 - 2x + 5,\ 0 \le x < 5$. Find f(2), f(3), f(-4), f(5) if they exist. (2)

B. Using trigonometry , prove the following identity. (3)

$$\frac{tan^2\theta \ + \ 1}{sec^2\theta - 1} = cosec^2\theta$$

C. Show that $\frac{3(2^{n+1})+2^n}{2^{n+2}-\ 2^{n-1}}$ = 2 (5)

OR

D. Solve the following equation. (5)

$Log_{10}x + log_{10}(x-21) = 2$

Q6] Answer the following questions:

A. Solve the following equation and also state the nature of the roots. $x^2 - 4x - 8 = 0$. (2)

B. Find the area of triangle with $\bar{a}$=$\hat{\imath}$ -2$\hat{\jmath}$ + 3k and $\bar{b}$ = 3$\hat{\imath}$ - 2$\hat{\jmath}$ +k. (3)

C. Find the equation of the line through the point of intersection of $x + 2y\ - 4\ =\ 0, x - 3y + 1 = 0$ and also through the midpoint of the segment joining (2,5) &(4,3). (5)

OR

D. Show that (2, -1), (0, 1), (6, 5) and (8, 3) are the vertices of a parallelogram. (5)

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