Vidya Vikas Mandal's
Shree Damodar College of Commerce & Economics, Margao-Goa
FY BCA Semester-I, Semester End Examination, November 2022
Basic Mathematics (CAC-103)

Duration: 2 Hours   Max Marks: 60

Instructions: 1) Figures to the right indicate Full Marks.
2) All Questions are compulsory.
3) Use of non programmeable calculator is allowed.

Q.1A. State whether the following statements are true or false.   (5x1= 05 marks)

 a) All natural numbers are whole numbers.
 b) Characteristic of 0.00543 is -3.
 c) Conjugate of 2+ i is $2 - i$.
 d) If $\sin x = \frac{2}{3}$ then $cosec\ x = \frac{3}{2}$.
 e) $\hat{k}$ is a unit vector in the direction of z - axis.

Q.1B. Answer the following questions.   (5x1= 05 marks)

 a) Convert $\frac{\pi}{4}$ radians to degrees.
 b) Calculate lcm (51, 70).
 c) Simplify $\log_5 7 \times \log_7 25$.
 d) Find the modulus of complex number $-3 - 4i$.
 e) Find the co-ordinates of the mid-point of the segment from (1, 0) and (5,0).

Q.2. Answer the following: 10 marks

 a) Solve the quadratic equation $x^2 - 8x + 15$.   (2)
 b) Solve for x in the expression $\log_{10}(x + 3)^2 + \log_{10} x^2 = 2$.   (3)
 c) Find the radius of a circle whose area is equal to the sum of the areas of two circles
    whose diameters are 10m and 24m and hence find its circumference.   (5)

Q.3. Answer the following   10 marks

 a) Find the 12th term of the A.P 2, 8, 14, 20...   (2)
 b) The ratio of income of two workers A and B are 3: 4. The ratio of expenditure of A
    and B is 2: 3 and each saves Rs 200. Find the income of A and B.   (3)
 c) Consider the matrix A = $\begin{bmatrix} -3 & 1 \\ 5 & -2 \end{bmatrix}$.
    Find inverse of A and hence calculate the product $A\ A^{-1}$.   (5)

Q.4. Answer the following   **10 marks**

a) Find the cross product of the vectors $\vec{a} = -\hat{j} + 3\hat{k}$ and $\vec{b} = 5\hat{i} + 2\hat{j} - 2\hat{k}$ (2)

b) Compute Z^2 where Z= 4 − 6i .   (3)

c) Find the equation of the line through point of intersection of the lines
x + 2y − 4 = 0 , x − 3 y +1 = 0 and also through the mid point of the line segment
joining the points (2 , 5) and (4 , 3)   (5)

Q.5. Answer the following   **10 marks**

a) Find $|\overrightarrow{AB}|$ where A=(3, -4, 2) and B= (3, 4, 5).   (2)

b) Express the complex number $Z = 6\sqrt{3} + 6 i$ in polar form.   (3)

c) Give an example of a 3 x 3 upper triangular matrix. Find the values of x and y which

satisfy the relation $\begin{bmatrix} 2 & -3 \\ -1 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 \\ -5 \end{bmatrix}$ (5)

Q.6. Answer the following   **10 marks**

a) Show that $\dfrac{Cos\ A}{1+Sin\ A} + \dfrac{1+Sin\ A}{Cos\ A} = 2\ Sec\ A$ (2)

b) The 3rd and the 8th term of a G. P. are 4 and 128 respectively. Find G.P. and hence write

the first 5 terms of of G.P.   (3)

d) Discuss the continuity of the following function at the points x =2 and x = 4 .
$$
\begin{aligned}
F(x) \quad &= \quad x^2 - 4 \qquad && \text{if} \quad 0 \le x \le 2 \\
&= \quad 3x + 2 \qquad && \text{if} \quad 2 < x \le 4 \\
&= \quad x^2 - 1 \qquad && \text{if} \quad 4 < x \le 6
\end{aligned}
$$
If g(x) = 6x   and h(x) = x +2   find h(g(x)).   (5)