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Shree Damodar College of Commerce and Economics, Margao-Goa  
FY BCA, Semester-I, Supplementary Examination August 2022  
CC 103 – Basic Mathematics

Max Marks: 60

Duration: 2hrs

- Instructions: i. All questions are compulsory  
ii. Figures to the right indicate full marks  
iii. Non-scientific, non-programmable calculators are allowed

**Q I A. Attempt the following:**

[1x5=5 Marks]

- i. Write down the proper divisors of 20.
- ii. Find a Geometric Progression with first term 100 and common ratio  $\frac{1}{2}$ . Write at least 4 terms.
- iii. Convert 150 degrees to radian measure.
- iv. Is 31 a prime number? Justify
- v. Find the slope and x intercept of the line  $5x+2y+8=0$ .

**Q I B. Attempt the following:**

[1x5=5 Marks]

- i. What is the lcm of 414 and 662.
- ii. Write down the commutative law for multiplication and addition of integers.
- iii. 1 is a composite number. Justify.
- iv. Write down the period of  $\sin x$  and  $\tan x$
- v. If  $A = \begin{bmatrix} 1 & 0 \\ 2 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} -1 & 2 \\ 3 & 8 \end{bmatrix}$ . Find AB.

**QII. A.** Check whether the line through (-2,3) (4,12) is parallel to the line through (2,-1) and (6,5). [2Marks]

**B.** Simplify  $\frac{\log x}{\log 9} = \frac{\log 64}{\log 8}$  [3 Marks]

**C.** The diameter of a right circular cone is 14m and its slant height is 10m. Find curved surface area, Total surface area and Volume. [5 Marks]

**Q III.A** Prove that:  $\frac{\cot \theta - \cos \theta}{\cot \theta + \cos \theta} = \frac{\operatorname{cosec} \theta - 1}{\operatorname{cosec} \theta + 1}$  [2 Marks]

**B.** Find the roots of the quadratic equation  $100x^2 - 20x + 1 = 0$ . [3 Marks]

**C.** Evaluate i.  $\lim_{x \rightarrow 2} \left[ \frac{1}{x-2} - \frac{2}{x(x^2-3x+2)} \right]$  [5 Marks]

ii.  $\lim_{x \rightarrow 0} \frac{\sin x \cos x}{3x}$

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

[2 Marks]

B. Write the polar form of: i.  $Z=1+i$

[3 Marks]

ii.  $Z=1+i\sqrt{3}$

C. If the sum of first 14 terms of an AP is 1050 and its first term is 10, find the 20th term.

[5 Marks]

QV. A. If  $x^{2p+8} = x^{20-p}$ , find  $p$ .

[2 Marks]

B. If  $\vec{a} = 2\hat{i} + 3\hat{j} - 5\hat{k}$  and  $\vec{b} = -3\hat{i} + \hat{j} + 2\hat{k}$ , find the value of  $a \cdot b$  and  $a \times b$ .

[3 Marks]

C. Solve the following system of equation by using matrix inversion method:

$$3x+7y=4, \quad x+2y=1.$$

[5 Marks]

Q VI. A Find the coordinates of P dividing MN in the ratio 2:3 where  $M = (5, -1)$  and  $N = (0, -2)$ .

[2 Marks]

B. If  $A = \begin{bmatrix} 2 & 1 \\ 0 & 3 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 2 \\ 3 & -2 \end{bmatrix}$ , verify whether  $|AB| = |A| \cdot |B|$

[3 Marks]

C. If  $a^2+b^2=7ab$ , prove that  $\log \frac{1}{3}(a+b) = \frac{1}{2}(\log a + \log b)$

[5 Marks]