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Shree Damodar College of Commerce & Economics, Margao – Goa  
FYBCA, Semester I, May/June Supplementary Examination 2018  
BASIC MATHEMATICS (BCA1014)

Duration: 2 Hours

Max. Marks: 50

**Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate maximum marks.
3. Start each question on fresh page.

**Q.1 Attempt the following**

A. Match the following

Marks (1X5)

A

- |                                  |                  |
|----------------------------------|------------------|
| i. Volume of a cube              | a) $\sec^2 x$    |
| ii. Derivative of $\tan x$       | b) $6l^2$        |
| iii. Integral of $\sec x \tan x$ | c) $l^2$         |
| iv. Total surface area of cube   | d) $l^3$         |
| v. Volume of a cuboid            | e) $\frac{1}{x}$ |
|                                  | f) $lbh$         |
|                                  | g) $\sec x$      |

B. Answer the following

Marks (1X5)

- a. If  $z = 3 + 7i$  then find  $|z|$  and  $\bar{z}$
- b. Find two numbers in the ratio 5:3 such that their difference is 8
- c. Find greatest common divisor of 27 and 125
- d. Solve  $3x^2 - 7x + 4 = 0$  for  $x$
- e. Determinant of the matrix  $\begin{bmatrix} -4 & 0 \\ 8 & -2 \end{bmatrix} = \dots\dots\dots$

**Q.2 Answer the following questions (any two)**

Marks (5X2)

A. Evaluate the following integrals

- i.  $\int (3x^5 + 7e^x + 5^x + 19) dx$
- ii.  $\int ((2x + 5)^6 + (5x - 15)^{-1} + 7^{5x-4} + e^{-x}) dx$

B. If  $2^x = 3^y = 6^{-z}$  then prove that  $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$

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

**Q.3 Answer the following (any two)****Marks (5X2)**

A. Prove that

i.  $\cos 2\theta = \frac{1 - \tan^2 \theta}{1 + \tan^2 \theta}$

ii.  $\sin 2\theta = \frac{2 \tan \theta}{1 + \tan^2 \theta}$

B. Find cofactor, adjoint, determinant and inverse of  $\begin{bmatrix} 2 & 5 \\ 3 & -1 \end{bmatrix}$ C. Find the product  $\begin{bmatrix} 2 & -4 & 5 \\ 0 & 3 & 4 \\ 0 & 2 & 4 \end{bmatrix} \begin{bmatrix} 3 & 2 & -1 \\ 3 & 1 & -2 \\ 2 & 3 & 2 \end{bmatrix}$ **Q.4 Answer the following (any two)****Marks (5X2)**

A. Evaluate the following limits

i.  $\lim_{x \rightarrow a} \frac{x^n - a^n}{x^m - a^m}$

ii.  $\lim_{x \rightarrow 2} \left[ \frac{1}{x^2 + x - 6} + \frac{1}{x^2 - 9x + 14} \right]$

B. Write  $(3 + 7i)(4 - 3i)$  in the form  $z = x + iy$ , write the real and imaginary parts and hence find the modulus of  $z$ C. Discuss the continuity of the following function at  $x = 2$ 

$$f(x) = \begin{cases} \frac{x^2 - 9}{x - 3} & x \neq 3 \\ 6 & x = 3 \end{cases}$$

**Q.5 Answer the following (any two)****Marks (5X2)**A. Differentiate the following with respect to  $x$  using definition

i.  $f(x) = x^2$

ii.  $f(x) = x^3$

B. Find the sum  $6 + 66 + 666 + 6666 + \dots$  up to  $n$ th termC. If  $\vec{a} = a_1\hat{i} + a_2\hat{j} + a_3\hat{k}$  and  $\vec{b} = b_1\hat{i} + b_2\hat{j} + b_3\hat{k}$  verify that  $\vec{a} \times \vec{b} = -\vec{b} \times \vec{a}$ **XXXXXXXXXXXXXXXXX ALL THE BEST XXXXXXXXXXXXXXXXXXXX**