

**Unit-III**

6. (a) Differentiate  $y = \frac{1 - \sqrt{x}}{1 + \sqrt{x}}$  w. r. t x

(b) Differentiate  $\frac{\sin x + x^2}{\cot 2x}$  w. r. t x

7. (a) Differentiate  $\tan^{-1} \left( \frac{\sqrt{1+x^2}-1}{x} \right)$  w. r. t x

(b) Differentiate  $\left( \sin^{-1} x \right)^x$  w. r. t x

**Unit-IV**

8. (a) Evaluate  $\int x\sqrt{2x+3} dx$

(b) Evaluate  $\int \frac{\sin(x+a)}{\sin(x-a)} dx$

9. (a) Evaluate  $\int e^{ax} \sin(bx+c) dx$

(b) Evaluate  $\int \sqrt{3+8x-3x^2} dx$

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Roll No. ....

**97663**

**B.C.A. 1st Semester (New)**

**Examination- November, 2016**

**Mathematics**

**Paper-BCA-103**

**Time : 3 hours**

**Max. Marks : 80**

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after the examination.

**Note :** Attempt five questions in all, selecting one question from each unit. Q. No. 1 is compulsory.

**Section-A**

1. (a) Find x and y, if  $(2x, x+y) = (6, 2)$

(b) If  $\begin{vmatrix} 2 & 4 \\ 5 & 1 \end{vmatrix} = \begin{vmatrix} 2x & 4 \\ 6 & x \end{vmatrix}$ ; find the value of x.

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- (c) Show that the relation R in the set  $\{1, 2, 3\}$  given by  $R = \{(1, 1), (2, 2), (3, 3), (1, 2), (2, 3)\}$  is reflexive but not symmetric.

(d)  $\lim_{\theta \rightarrow 0} \frac{\sin a\theta}{\sin b\theta}$

(e) Differentiate  $\sqrt{1+x^2}$  w.r.t x

(f) Differentiate  $\sin^2 x$  w.r.t x

(g) Evaluate  $\int \sec^2(7-4x) dx$

(h) Evaluate  $\int \frac{x dx}{1+x^4}$

## Section-B

### Unit-I

2. (a) Prove that  $(A \cap B)' = A' \cup B'$

(b) If  $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$  and  $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ , then find

K so that  $A^2 = 8A + KI$

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3. (a) Prove that

$$\begin{vmatrix} 1 & x & x^3 \\ 1 & y & y^3 \\ 1 & z & z^3 \end{vmatrix} = (x-y)(y-z)(z-x)(x+y+z)$$

(b) If  $A = \begin{bmatrix} 2 & 1 & 3 \\ 3 & 1 & 2 \\ 1 & 2 & 3 \end{bmatrix}$ , verify that  $A(\text{adj } A) =$

$|A| I_3$

### Unit-II

4. (a) In the set of integers, let relation R be defined as a R b if and only if a - b is even. Prove that R is an equivalence relation.

(b) Write the Range of  $y = \sqrt{(x-3)(5-x)}$

5. (a) Evaluate  $\lim_{x \rightarrow 0} \frac{\tan x - \sin x}{\sin^3 x}$

(b) If  $f(x) = \begin{cases} 4 & , \text{ if } x \leq -1 \\ ax^2 + b & , \text{ if } -1 < x < 0, \\ \cos x & , \text{ if } x \geq 0 \end{cases}$

then find the values of a and b so that the given function is continuous.

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