

Roll No.

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 $(\sin^{-1} x)^x$ 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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**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 $A = \begin{vmatrix} 2 & 1 & 3 \\ 3 & 1 & 2 \\ 1 & 2 & 3 \end{vmatrix}$, verify that A (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 $\lim_{x \rightarrow 0} \frac{\tan x - \sin x}{\sin^3 x}$

4, if $x \leq -1$

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

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

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