[Total No. of Questions: 3] *[Total No. of Printed Pages : 3]*

Roll No……..

BCA-14

BCA 1st year

Examination – June 2019

Discrete Mathematics

Time: Three Hours

Maximum Marks : 50

Note: i) Attempt all questions.(Ques.no.1 is Compulsory)

Section–A

Q.1 Objective Type Question. (1 x 5 = 5)

(i) $a + (a.b) =$

(a) a (b) b (c) $(a.b)$ (d) $a + b$

(ii) $A - (B \cap C) =$

(a). $(A - B) \cup (A - C)$ (b). $(A - B) \cap (A - C)$

(c). A (d). $(B \cap C)$ (d)

(iii) $\lim_{x \to 0} \frac{sinx}{x} =$

(a). 0 (b). 1 (c). x (d). $none$

(iv) $\int \frac{1}{1+x^2}\, dx =$

(a). $tan^{-1}x + c$ (b). $cot^{-1}x + c$

(c). $sin^{-1}x + c$ (d). $none$

(v)In Partial differentiation number of independent variables are

(a). 0 (b). 1 (c). 2 (d). 2 $or\ more\ than$ 2

Section – B

Short answer type question attempt any three question (5 x 3 = 15)

Q2.(i) Show that $a + a = a$ and $a.a = a$

Or

Define with Example

(a). Multigraph (b) Tree

(ii) Show that $A \times (B \cap C) = (A \times B) \cap (A \times C)$

Or

Define with example

(a) Binary Relation (b) Function

(iii) Evaluate $\lim_{x \to 1/2} \frac{4x^2-1}{2x-1}$

Or

Evaluate $\lim_{x \to 2} \frac{4}{x^2-4} + \frac{1}{2-x}$

(iv) Evaluate $\int (2-x)(x+1)dx$

Or

Evaluate $\int \frac{dx}{1+\cos x}$

(v) $If\ z = \frac{x-y}{x+y}\ , Find\ \frac{\partial z}{\partial x}\ and\ \frac{\partial z}{\partial y}$

Or

$If\ z = x^2y + xy^2\ , Find\ \frac{\partial^2 z}{\partial x}\ and\ \frac{\partial^2 z}{\partial y}$

Section – C

Long answer type question (attempt any five) (5 x 6 =30)

Q3. Show that $(a \vee b)' = a' \wedge b'$ and $(a \wedge b)' = a' \vee b'$

Or

Explain Boolean Variables and Boolean Functions.

(ii) Show that the binary relation defined by

$R = \{(a, b) = 2\ divides(a - b)\}$ is an Equivalence relation

Or

Explain Different type of mappings

(iii) Show that the function f defined by $f(x) = \begin{cases} x\ sin\frac{1}{x}\ , & x \neq 0 \\ 0, & x = 0 \end{cases}$

is continuous at $x = 0$.

Or

Evaluate $\frac{dy}{dx}, if\ x^2 + 2xy + y^3 = 40$

(iv) Evaluate $\int \frac{cotx}{\log(sinx)} dx$

Or

Evaluate $\int \frac{1+sin\,2x}{x+sin^2 x} dx$

(v) $If\ z = f(x, y)$ is homogenous function of degree n, then show That

$$x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} = nz$$

Or

$If\ u = log\frac{x^4+y^4}{x+y}$,then prove that

$$x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 3u$$