S.D.E.

B.C.A. (2004 Course Sem- I : SUMMER - 2019

SUBJECT : MATHEMATICAL FOUNDATIONS

Day : Wednesday
Date : 08/05/2019

S-2019-4958

Time : 02.00 PM TO 05.00 PM
Max. Marks : 80

N.B.:

1) Attempt **ANY FIVE** questions from Section – I and attempt **ANY TWO** questions from Section – II.
2) Answers to both the sections should be written in : SAME answer books.
3) Use of logarithmic table and pocket **CALCULATOR** is allowed.
4) Figures to the right indicate **FULL** marks.

SECTION – I

Q.1 **a)** A bag contains 3 black and 4 white balls. A second bag contains 2 black and 3 white balls. A bag is selected at random and a ball is drawn from the bag. Find the probability that the ball drawn is white. **[05]**

b) Construct truth table for $(p \wedge q) \rightarrow r$. **[05]**

Q.2 Discuss various types of functions with suitable example of each type. **[10]**

Q.3 **a)** Find : **i)** ${}^{12}C_4 \cdot {}^{5}C_2$ **ii)** ${}^{16}P_3 + {}^{16}P_2$. **[05]**

b) By using Mathematical Induction, prove that **[05]**

$$1+2+3+.....+n=\frac{n(n+1)}{2}$$

Q.4 **a)** Explain the 'Inclusion – Exclusion' principle with suitable example. **[05]**

b) Write properties of integers for inequalities and order. **[05]**

Q.5 Write short notes on **ANY TWO** of the following: **[10]**

a) Cardinality
b) Complexity of Algorithm
c) Euclidean Algorithm

Q.6 Find inverse of the matrix. If $|A| = -6$ and $A=\begin{bmatrix} -3 & 0 & 6 \\ x & 2 & 3 \\ 1 & 4 & 6 \end{bmatrix}$. **[10]**

Q.7 **a)** Define 'set' and illustrate various types of sets. **[05]**

b) Write algorithm to compute GCD (Greatest Common Divisor). **[05]**

P.T.O.

SECTION – II

Q.8 **a)** If U = {a, b, c, d.....z} **[10]**

A = {a, e, i, o, u}

B = {b, c, d, f, g, j, k}

C = {j, k, l, m, n, p, q}

Then find: **i)** $A \cup (B \cup C)$ **ii)** $A \cap (B \cup C)'$

iii) $(A \cap B \cap C)'$ **iv)** $A' \cap (B \cup C)$

v) $(A \cup B \cup C)'$

b) Elaborate concept of Binomial distribution. **[05]**

Q.9 **a)** Prove that $\sim (p \wedge q) \equiv (\sim p) \vee (\sim q)$. **[07]**

b) Solve the following linear system by using Matrix method: **[08]**

$-x + y - z = 4$

$5x + y + 2z = 10$

$2x + y - z = 8$

Q.10 **a)** Let A = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}. In how many ways, can a four digit number be generated using the digits said in set A? If **[07]**

i) Repetition of digits is allowed.

ii) Repetition of digits is not allowed.

b) Draw Venn diagram for: **[08]**

i) $A \cap B' \cap C$ **ii)** $A' \cap B' \cap C'$.

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