S.D.E.

B.C.A. (2004 COURSE SEM- I : SUMMER - 2018

SUBJECT : MATHEMATICAL FOUNDATIONS

Day : **Friday** | **S-2018-4343** | Time : **02.00 PM TO 05.00 PM**
Date : **08/06/2018** | Max. Marks : 80

N.B.:

1) Attempt **ANY FIVE** questions from Section – I and **ANY TWO** questions from Section – II.
2) Answers to both the sections should be written in **SEPARATE** answer books.
3) Figures to the right indicate **FULL** marks.

SECTION – I

Q.1 If A = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}, B = {3, 5, 7, 9, 11}, C = {1, 2, 4, 7, 9} and U = {x | x ∈ N, x < 15} then find **[10]**

a) n (A ∪ B ∪ C) **b)** n (A′ ∩ B′∩C′)

Q.2 If $f(x) = x^2 + 3$, $g(x) = 2x + 1$ then find: **[10]**

a) gof **b)** fog **c)** fof **d)** gog

Q.3 Draw truth table for the following statements and state whether the statement pattern is a tautology, contradiction or neither: **[10]**

a) $\sim (p \rightarrow q) \vee (q \rightarrow r)$ **b)** $(\sim p \wedge \sim q) \rightarrow (\sim q \wedge \sim r)$

Q.4 If $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 3 & 2 \\ 6 & 2 & 1 \end{bmatrix}$, find A^{-1} if exists by using elementary transformation. **[10]**

Q.5 Three cards are drawn from a well shuffled pack of 52 playing cards. Find the probability that: **[10]**

a) all cards are of the same suit.
b) there are two red cards and one black ace card.

Q.6 Prove that : $1+2+3...+n=\frac{n(n+1)}{2}$ by using mathematical induction method. **[10]**

Q.7 Write short notes on **ANY TWO** of the following: **[10]**

a) Inclusion- Exclusion principle
b) Binomial distribution
c) Complexity of algorithms

SECTION – II

Q.8 **a)** Draw Venn diagram for the following sets: **[08]**

i) (A ∩ B ∩ C) ∪ (B′ ∩ C′) **ii)** (A′ ∪ B′) ∩ (C′ ∪ A′)

b) Find the number of ways of forming words from the word 'MAHARASHTRA' when: **[07]**

i) repetition of letter is not allowed.
ii) repetition of letter is allowed.

Q.9 Solve the following equations by using matrix method: **[15]**
3x + 4y + 5z = 26, 2x – y + z = 3, 5x + 4y – z = 10

Q.10 Explain Euclidean algorithm. Find G.C.D of the following by using Euclidean algorithm: **[15]**

a) 540, 168 **b)** 37, 249.

* * * *