

B.C.A. (2010 Course Sem- I : SUMMER - 2019)
SUBJECT : MATHEMATICS – I (LOGIC, SETS & FUNCTIONS)

Day : Saturday
Date : 27/04/2019

S-2019-2087

Time : 02.00 PM TO 05.00 PM
Max. Marks : 70

N.B.:

- 1) Q.1 is **COMPULSORY**.
- 2) Attempt **ANY FOUR** questions from Q.2 to Q.7.
- 3) Figures to the right indicate **FULL** marks.

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- Q.1** If $f = \{(2, 4), (3, 6), (4, 8), (5, 10), (6, 12)\}$ and $g = \{(4, 13), (6, 19), (8, 25), (10, 31), (12, 37)\}$. Then find gof , fog . **[14]**
- Q.2** How many permutations can be made with the letters of the word **CONSTITUTION**? **[14]**
- a) In how many ways vowels occur together?
 - b) In how many ways consonants and vowels occur alternatively?
 - c) How many of these will have the letter N both at the beginning and at the end?
- Q.3** a) Prove by mathematical induction $P(n) : 1 + 3 + 5 + \dots + (2n - 1) = n^2$. **[07]**
- b) Compute the inverse of the matrix: $\begin{pmatrix} 1 & 0 & -4 \\ -2 & 2 & 5 \\ 3 & -1 & 2 \end{pmatrix}$ **[07]**
- Q.4** a) In a group of 200 people, each of whom is at least accountant or management consultant or sales management. It was found that 80 are accountants, 110 are management consultants and 130 are sales managers, 25 are accountants as well as sales managers. 70 are management consultants as well as sales managers. 10 are accountants, management consultants as well as sales managers. Find the number of those people who are accountants as well as management consultants but not sales managers. **[07]**
- b) Using Euclidean algorithm find the gcd of:
i) 45, 34 ii) 77, 128 iii) 258, 60. **[07]**
- Q.5** a) Find gcd of 25 and 118 using division algorithm and express it in the form $26x + 118y$. **[07]**
- b) Find the coefficient of:
i) x^5y^2 in the expansion of $(x + y)^7$.
ii) x^9y^3 in $(x + y)^{12}$. **[07]**
- Q.6** a) A problem in Statistics is given to five students A, B, C, D and E. Their chances of solving it are $1/2$, $1/3$, $1/4$, $1/5$ and $1/6$ respectively. What is the probability that the problem will be solved? **[07]**
- b) Explain the term sample space and events in brief. **[07]**
- Q.7** Write short notes on **ANY TWO** of the following: **[14]**
- a) Types of matrices
 - b) Division algorithm
 - c) Basic counting principles

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