

B.C.A. SEM-I (CBCS 2018 Course) : SUMMER - 2019

SUBJECT: BUSINESS MATHEMATICS

Day: Saturday
Date: 27/04/2019

S-2019-2052

Time: 02.00 PM TO 05.00 PM
Max. Marks: 60

N.B.:

- 1) Q.4 from Section-I is COMPULSORY.
- 2) Answer ANY TWO questions from Q. 1, 2, 3 in Section-I.
- 3) Answer ANY TWO questions from Q. 5, 6, 7 in Section-II.
- 4) All question CARRY EQUAL marks.
- 5) Answers to Both the sections to be written in SAME answer books.
- 6) Draw a labeled diagram WHEREVER necessary.

SECTION - I

Q.1) Answer the following: (6 Marks X 2 = 12)

- a) Show that $A = \{2, 3, 4, 5\}$ is not a subset of $B = \{x / x \in \mathbb{N}, x \text{ is even}\}$
- b) Let $f: \mathbb{R} \rightarrow \mathbb{R}$ and $g: \mathbb{R} \rightarrow \mathbb{R}$ be given by $f(x) = x^3$ and $g(x) = x^2 - 1$.
Find (i) $f \circ f$ (ii) $g \circ g$

Q.2) Answer the following: (6 Marks X 2 = 12)

- a) Prepare the truth table for $(p \leftrightarrow q) \vee (q \leftrightarrow p)$
- b) Using cofactor method find the inverse of the matrix $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$

Q.3) Explain the following: (6 Marks X 2 = 12)

- a) There are 10 questions in an exam. In how many ways can a person attempt at least one question?
- b) The probability that Sam parks in a no-parking zone and gets a parking ticket is 0.06. The probability that Sam has to park in a no-parking zone (he cannot find a legal parking space) is 0.20. Today, Sam arrives at school and has to park in a no-parking zone. What is the probability that he will get a parking ticket?

Q.4) Write short notes on the following: Attempt ANY THREE (4 Marks X 3 = 12)

- a) Probabilistic partitions
- b) Representation of Relations
- c) Matrix Algebra
- d) Contradiction Pattern of Logic
- e) Bayes Theorem

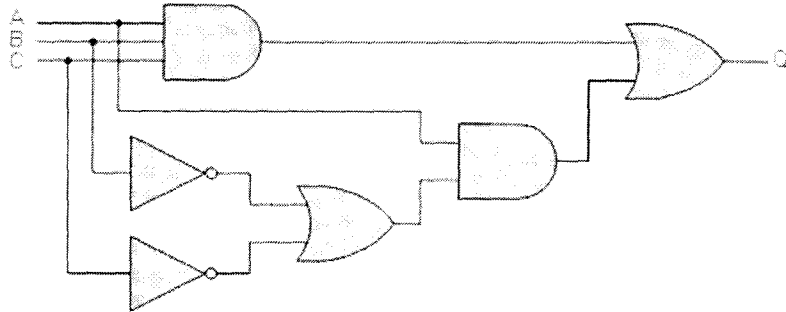
SECTION - II

Q.5) Answer the following: (6 Marks X 2 = 12)

- a) If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ is the universal set and
 $A = \{1, 2, 3, 4\}$, $B = \{2, 4, 6, 8\}$, $C = \{3, 4, 5, 6\}$, Verify the following
(a) $A \cup (B \cap C) = (A \cup B) \cap C$
(b) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
- b) Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be given by $f(x) = 7x - 5$, for all $x \in \mathbb{R}$. Find f^{-1} , $f \circ f^{-1}$, $f^{-1} \circ f$

Q.6) Answer the following: (6 Marks X 2 = 12)

a) Find the Boolean algebra expression for the following system.



b) Find the matrix X, such that $2X + 3A - 4B = 0$, where $A = \begin{bmatrix} 2 & -2 \\ 2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix}$

Q.7) Explain the following: (6 Marks X 2 = 12)

- a) In how many different ways can the letters of the word 'RUMOUR' be arranged?
- b) In a survey of the usage of three toothpastes A, B and C. It is found that 60 people like A, 55 like B, 40 like C, 20 like A and B, 35 like B and C, 15 like A and C and 10 like all the three toothpastes. Find the following:
 - i) Number of persons included in the survey.
 - ii) Number of persons who like A and B but not C
