

BACHELOR OF COMPUTER APPLICATIONS (CBCS - 2018 COURSE)
B.C.A. Sem-I :SUMMER- 2022
SUBJECT : BUSINESS MATHEMATICS

Day : Wednesday
Date : 15-06-2022

S-18755-2022

Time : 02:00 PM-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 book.
- 6) Draw a labeled diagram WHEREVER necessary.

SECTION - I

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

- a) If $A = \{1, 2, 3\}$ then write down all possible subsets of A.
- b) If $f: \mathbb{R} \rightarrow \mathbb{R}$ given by $f(x) = 3x - 4$, show that f is an onto function.

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

- a) Prepare the truth table for $(p \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim p)$
- b) Using Adjoint method find the inverse of the matrix $A = \begin{bmatrix} 3 & 2 & 4 \\ 1 & 4 & 1 \\ 2 & 6 & 3 \end{bmatrix}$

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 A can solve a problem is 0.7 and the probability that B can solve that problem is 0.6. Considering that these two events are independent, find the probability that the problem gets solved by either of them.

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

- a) Subset and Proper Subset
- b) Composite Function
- c) Inverse of a Matrix
- d) Product rule Principle
- e) Bayes Theorem

SECTION - II

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

- a) Of the total of 200 students appearing in an examination, 140 passed in mathematics and 100 passed in statistics. If 40 of them failed in both Mathematics and statistics. Find the percentage of students who passed in both by using Venn diagram.
- b) Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be given by $f(x) = 7x - 5$, for all $x \in \mathbb{R}$. Find $f^{-1} \circ f \circ f^{-1}, f^{-1} \circ f$

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

a) Show that the following statement is a Tautology or a Contradiction

$$(p \leftrightarrow q) \wedge (p \rightarrow \sim q)$$

b) Find $A^{-1}B$ and BA^{-1} (if exist), where $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & -1 & 2 \\ 0 & 7 & 6 \end{bmatrix}$

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

a) In how many different ways can the letters of the word 'OPTICAL' be arranged so that the vowels always come together?

b) In an electronics laboratory, there are identically looking capacitors of three makes A_1, A_2 and A_3 in the ratio 2:3:4. It is known that 1% of A_1 , 1.5% of A_2 and 2% of A_3 are defective. What percentage of capacitors in the laboratory are defective? If a capacitor picked at defective is found to be defective, what is the probability it is of make A_3 ?
