B.C.A. (2010 COURSE SEM- I : WINTER - 2017

SUBJECT : MATHEMATICS – I (LOGIC, SETS AND FUNCTIONS)

Day : **Saturday** Time : **02.00 PM TO 05.00 PM**

Date : **18/11/2017** **W-2017-1630** Max. Marks : 70

N. B. :

1) **Q. No. 1** is **COMPULSORY**.
2) Attempt **ANY FOUR** question from **Q. No. 2** is **Q. No. 7**.
3) Figures to the right indicate **FULL** marks.
4) Use of non-programmable calculator is **ALLOWED**.

Q. 1 **a)** State and prove De-Morgan's law for set Theory. **(07)**

b) $Let\ A = \{a, b, c, d, e\}\ \ B = \{a, b, d, f, g\}$ **(07)**

$C = \{b, c, e, j, h\}\ \ D = \{d, e, f, g, h\}$

Find : **i)** $A \cap (B \cup D)$ **ii)** $C \cup (B \cap D)$

Q. 2 **a)** Construct truth table for statement given below and put comment after last column of truth table $(p \wedge q) \wedge \sim q$. **(07)**

b) From a pack of well shuffled playing cards, 3 cards are drawn at random. Find the probability that three cards drawn contains two kings and one ace. **(07)**

Q. 3 **a)** Write formula for combination of n objects out of r taken and then determine how many committees of three, can be formed from eight people? **(07)**

b) Compute : ${}^{8}P_{3}$ and ${}^{52}C_{2}$ **(07)**

Q. 4 **a)** Use principle of Mathematical Induction to prove for all $n \in N$. **(07)**

$1 + 3 + 5 + \cdots + (2n - 1) = n^2$.

b) Discuss term "Set Theory" and their types in brief with suitable example. **(07)**

Q. 5 Define "matrix" and write note on various types of matrices with suitable example of each type. **(14)**

Q. 6 **a)** $P(A) = 0.3,\ P(B) = 0.4,\ P(A/B) = 0.32$ **(07)**

Find $P(A \cup B)$.

b) Find value of "x" if $|A| = 0$. **(07)**

$$A = \begin{bmatrix} 1 & 3 & -3 \\ 2 & x & 3 \\ 0 & 0 & 1 \end{bmatrix}$$

Q. 7 Write short notes on **ANY TWO** of the following: **(14)**

a) Pigeonhole Principle
b) Logical Equivalences
c) Euclidean Algorithm

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