Code No. 7066 / E

FACULTY OF SCIENCE

B.Sc. III-Semester (CBCS) Examination, December 2017

Subject: Mathematics

Paper – III

Logic and Sets

Time: 1½ Hour Max.Marks: 40

PART – A (2x5 = 10 Marks)

[Short Answer Type]

Note: Answer all questions. Each question carries equal marks.

1 a) Show that the statement – $(p \to q) \to \neg q$ is a tautology.

OR

b) Show that statements $p \wedge (\neg q \vee r)$ and $p \vee (q \wedge \neg r)$ are logically not equivalent.

2 a) For any finite set A with $|A| = n \geq 0$ then prove that $|P(A)| = 2^n$.

OR

b) Express $\overline{A - B}$ in terms of U and –.

PART – B (2x15 = 30 Marks)

[Essay Answer Type]

Note: Answer all questions. All questions carry equal marks.

3 a) Let s and t be statements that contain no logical connective other than $\wedge$ and $\vee$. If $s \Leftrightarrow t$ then $s^d \Leftrightarrow t^d$.

OR

b) **Hypothesis**: If I join OU then I will get best education. If I get best education then I will get job in USA. If I get job in USA then I will become a millionaire. I joined OU.
Conclusion: I will become a millionaire. Give an argument using rules of inference to show that the conclusion follows from the hypothesis.

4 a) Let S be the sample space for an experiment E. For events $A, B, C \subseteq S$
$Pr(A \cup B \cup C) = Pr(A)+Pr(B)+Pr(C)-Pr(A \cap B) - Pr(A \cap C) - Pr(B \cap C) + Pr(A \cap B \cap C)$.

OR

b) A man alternatively tosses a coin and throws a die beginning with coin. Find the probability that he will get a head before he gets a 5 or 6 on the die.

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