



**CSE 230 : DISCRETE MATHEMATICS**  
**MID TERM EXAM : Summer 2017**  
**TIME:1 HOUR MARKS:50**

**Answer any 05 (five) of the following 06 (six) questions**  
**Mention the Faculty Initial At The Top-Right Corner of Your Script**  
**Complete all parts of a particular question sequentially not haphazardly here & there**  
**[N.B.: TO UNDERSTAND THE QUESTIONS IS A PART OF EXAMINATION]**

<b>Name:</b>	<b>ID:</b>	<b>SEC:</b>
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1. Express the followings in terms of propositions and logical connectives (state the necessary propositions first) [2.5x4=10]
- i) If David comes to the party then Bruno and Carlo come too.
  - ii) 4 is even because 4 is divisible by 2.
  - iii) Only one among Aldo, Bruno and Carlo passed the exam.
  - iv) Either Aldo is Italian and Bob is English, or neither Aldo is Italian nor Bob is English.

2. a) Without using truth table, check whether the following compound proposition is a tautology or contingency. [6]

$$[(p \wedge \neg (\neg p \vee q)) \vee (p \wedge q)] \rightarrow p$$

- b) Use truth tables to verify the following equivalences. [4]

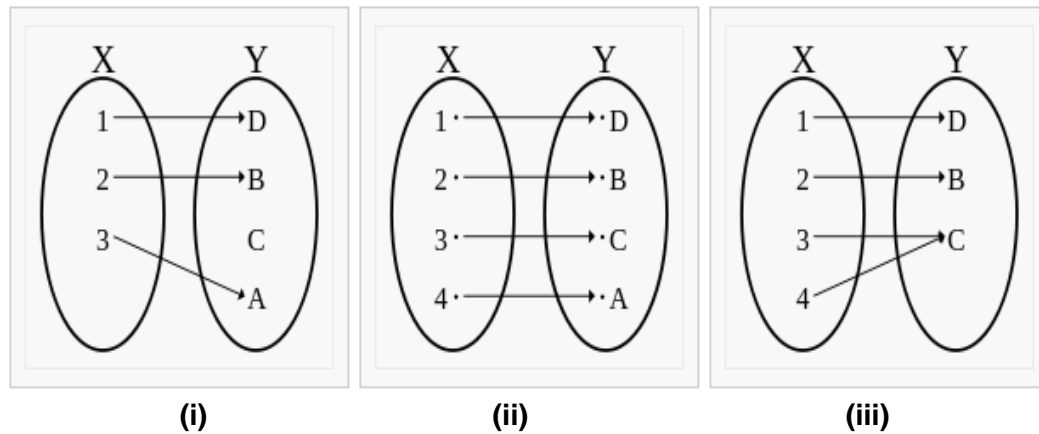
- i)  $p \wedge p \equiv p$
- ii)  $p \vee \mathbf{F} \equiv p$

3. a) Prove that, if  $n$  is an integer then  $2n^2+4n+5$  is odd. [7]  
b) Mention the names of three proof strategies. [3]

4. A travel agent surveyed 100 people to find out how many of them had visited the cities of Melbourne and Brisbane. 31 people had visited Melbourne, 26 people had been to Brisbane, and 12 people had visited both cities. Find out the number of people who had visited: [10]

- i) Melbourne or Brisbane
- ii) Brisbane but not Melbourne
- iii) Melbourne but not Brisbane
- iv) Only one of the two cities
- v) Neither city

5. (a) Determine from the following, which figures are “**One to One**” function? [4]



- (b) Express the followings in terms of **quantified propositional functions and logical connectives** (state the necessary propositional functions first). [6]

- i) Every student enrolled in CSE or EEE program must take a discrete mathematics course.  
[Assume that the domain contains all students]
- ii) Some of the integers that are divisible by 2 are also divisible by 4.  
[Assume that the domain contains all real numbers]

6. a) List all terms in each set:

- i) The set of all prime numbers divisible by 3. [3]
- ii) The set of all whole numbers greater than 5 and smaller than 35, and divisible by 5. [3]

- b) Determine whether the following sets are equal or not? Justify your answer. [4]

$A = \{x \mid x \text{ is positive integers and prime numbers less than } 10\}$

$B = \{y+2 \mid y \text{ is all odd positive integers less than } 7\}$