

CSE 230 : DISCRETE MATHEMATICS
FINAL EXAMINATION : SUMMER 2017
TIME: 2 HOURS MARKS: 80

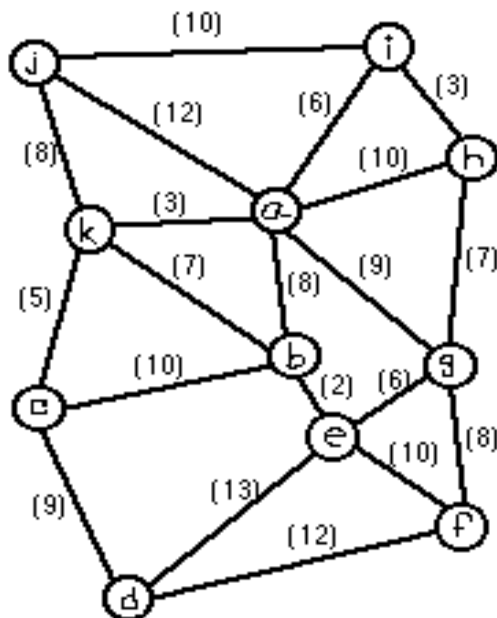
ANSWER EACH SECTION SEPARATELY

[N.B.: TO UNDERSTAND THE QUESTIONS IS A PART OF EXAMINATION]

NAME:	ID:	SEC: 3 / 4 / 5 / 6(√)
--------------	------------	------------------------------

Section A
ANSWER ALL

1. i. Determine whether (a) and (b) are logically equivalent or not without using truth table. [6]
 - (a) $[\neg p \wedge (p \vee q)] \rightarrow q$
 - (b) $[p \wedge (p \rightarrow q)] \rightarrow q$
- ii. How many ways are there to select five members from a team of 10 members to make a trip to another school. [4]
2. i. Draw a minimum cost spanning tree from the following graph. Also calculate the total cost of minimum spanning tree. [8]



- ii. "Every tree is graph but every graph is not tree." Explain why this statement is true or false? [2]

3. i. Write the following expression in

[3+3]

a) **Prefix notation**

$$((M * N) - X \uparrow Y \uparrow Z) * ((A + B) - (C/P * Q \uparrow R))/D$$

b) **Postfix notation**

$$(a \uparrow b) * (c - d) + e/f/(g + h)$$

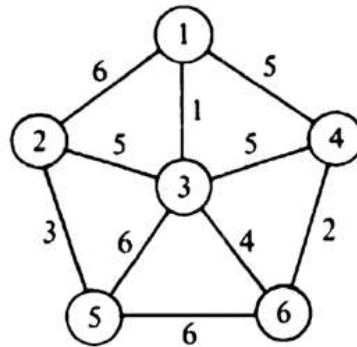
ii. What is the value of the following expression

[4]

$$342 \uparrow * 256/8 \uparrow * +$$

4. i. Draw 4 different spanning tree from the graph.

[4]



ii. Represent the following expressions using binary tree.

[6]

a)

$$- * + + ABC/EF/-GHI$$

b)

$$AD/C + XY \uparrow *$$

Section B

ANSWER ANY FOUR[04] OUT OF FIVE [05] QUESTIONS

5. i. How many five digits numbers can be formed using the digits 5, 6, 7, 8, 9, 0 if no digits can be repeated? [5]
- ii. A playoff between two teams consists of at most five games. The first team that wins two consecutive games wins the playoff. In how many different ways can the playoff occur? [5]
6. i. A bag contains 6 red chips numbered 1-6 respectively and 6 blue chips numbered 1-6 respectively. If two chips are to be picked sequentially from the bag without replacement, what is the probability of picking a red chip and then a blue chip with the same number? [5]
- ii. What is the probability that the sum of two dies will be greater than or equal to 8, given that the first die is 6? [5]
7. i. A baby has x total toys. If 9 of the toys are stuffed animals, 7 of the toys were given to the baby by it's grandmother, 5 of the toys are stuffed animals given to the baby by its grandmother, and 6 of the toys are neither stuffed animals nor given to the baby by its grandmother. What is the value of x? [5]
- ii. For the Venn's Diagram below [Fig. 7(ii)], verify whether the following equation is correct or not? [5]

$$|F \cup G \cup H| = |F| + |G| + |H| - |F \cap G| - |F \cap H| - |G \cap H| + |F \cap G \cap H|$$

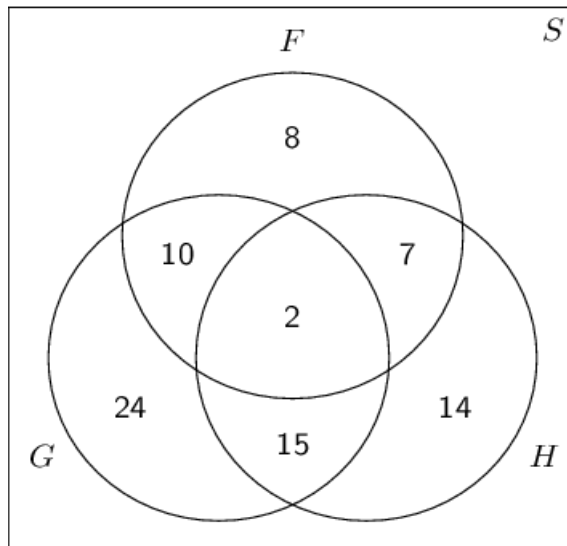


Fig. 7(ii)

8. i. Prove that, if n is an integer and $3n+10$ is even, then n is even. Mention the proof strategy you have used. [5]
- ii. Let, $f(x) = x^2 - 3x + 5$ be a function where, $f : A \rightarrow B$. Given that, $A = \{x : x \in \mathbb{N} \text{ and } x < 10\}$ and $B = \{y : y \in \mathbb{R} \text{ and } 0 < y < 60\}$.
- a) Check whether the function f is **onto** or not. [2.5]
- b) Check whether the function f is **invertible** or not. [2.5]
9. i. In a certain sequence, the first term is 9. Each of the term then, is found by adding 10 with it's previous term. Find the positive difference between 100^{th} term and 200^{th} term. [5]
- ii. Express the following statements using propositions and logical connectives.
- a) If Paola is happy and paints a picture then Renzo isn't happy. [2.5]
- b) Mercury is the smallest or largest planet of our solar system. [2.5]