Daffodil International University
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Final Exam Examination, Summer-2020 @ DIU Blended Learning Center
Course Code: CSE131 (Day), Course Title: Discrete Mathematics
Level: 1   Term: 3   Section: PC-B
Instructor: Tania Khatun (TK)   Modality: Open Book Exam
Date: Sunday 25 August, 2020   Time: 09:00-01:00pm
Four hours (4:00) to support online open/case study-based assessment   Marks: 40

Directions:
- **Students need to go through and answer all the questions in this exam paper.**
- **Analyze and answer specific section based on your own thinking and work.**
- **Do not share as this will be treated as plagiarism by Blended Learning Center.**

|		
1.	a) Consider the following relation. $R_1 = \{(1, 1), (1, 2), (1, 3), (1, 4), (2, 2), (2, 3), (2, 4), (3, 3), (3, 4), (4, 4)\}$ Considering the above scenario and draw the graph and find whether it is graph or tree. If it's a graph whether it is directed, undirected, weighted or un-weighted graph. If not then why it's not. Explain your answer by your own.	**2.5**
	b) Consider the above matrix and draw the graph and find whether it is graph or tree. If it's a graph whether it is directed, undirected, weighted or un-weighted graph. If not then why it's not. Explain your answer by your own.	**2.5**
2.	Mc-Sports One of the famous organization organize a charitable football match for collecting fund. The match is between two teams Red vs. Green. Red is playing in 3–3–3–1 formation and green is playing with 4–2–3–1 formation. The match start at 6:00 P.M evening.	**5**

After toss two players from team Red jersey no 8 and no 3 player come to the middle of the field for making center. No 3 (RED) passes the ball to no 8 (RED). No 8 (RED) move with the ball and pass to the number 11 (RED) he was playing in the left winger position, after moving into little bit ahead there he was trying to pass the ball to number 9 (RED) who is playing in center forward position but the player of green team from right back position with jersey no 4 (Green) tackle the ball and pass it to the number 6 (Green) who is in second center back position there he supposed to be attacked by Central Defensive Midfielder no 5 from red team so he back the ball to no 4 (Green) , No 4 (Green) was trying a shot to number 11 (Green) in left winger position but before number 11 (Green) receive the ball left stopper of red team number 6 (RED) head the ball towards number 5 (RED) center defensive position of his own team .No 5(RED) pass the ball to right winger position no 7 (RED). There he was defensed by number 3 (Green) left back position of green team, He passed the ball to no 2 (Green) first center back position but tackle the ball by no 11 (RED) left winger of the opponent team, Left winger passed the ball to no 9 (RED) center forward position, there he was supposed to defense by the no 5 (Green) Central Defensive Midfielder of green team. For tackling the defense center forward of red team pass back to left winger no 11 (RED) and left winger of red team directly shot to the goalpost which was saved by No 1 (Green) playing as goalkeeper position of green team. Goalkeeper was trying to take a big shot but somehow he missed and the ball was taken by the no 7 (RED) right winger of red team immediately he passed the ball to no 11 (RED) who is in left winger position but successfully tackle by no 4 (Green) in Right Back position of green team . Right back passed the ball to goalkeeper in the meanwhile referee blow the whistle for half time. Finally, the game was ended by [Red 2-Green 0] from team red left winger did 2 goals.

Considering the above scenario and draw the graph and find whether the graph is directed, undirected, weighted or un-weighted. Explain your answer by your own.
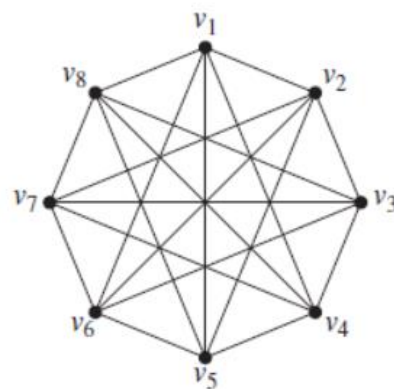
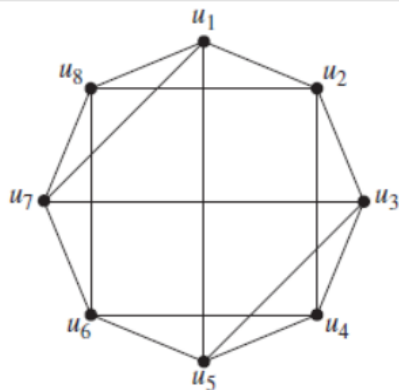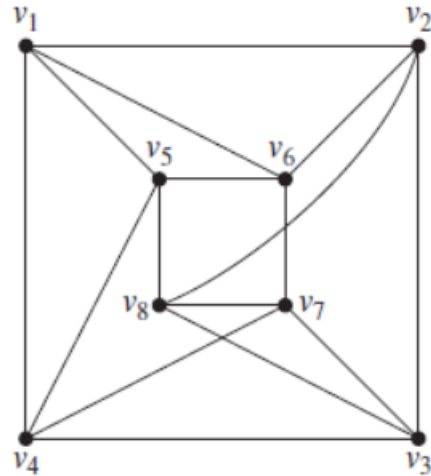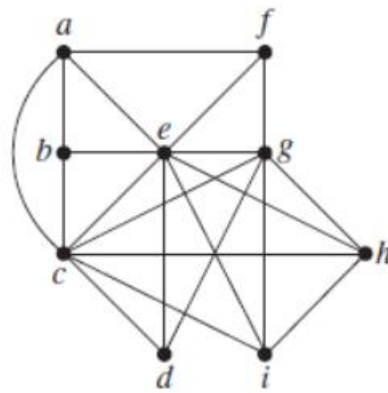| 3. | i) Find whether the following graph is bipartite or not. Explain your answer by your own. | 6+2 +2 |

a)
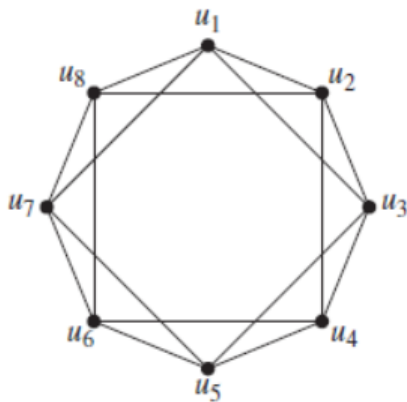
b)

c)

ii) Find whether the following graph is Euler Graph or not. If it's an Euler Graph then find out whether it is Euler Path or Circuit or not. Find the path and explain your answer by your own.
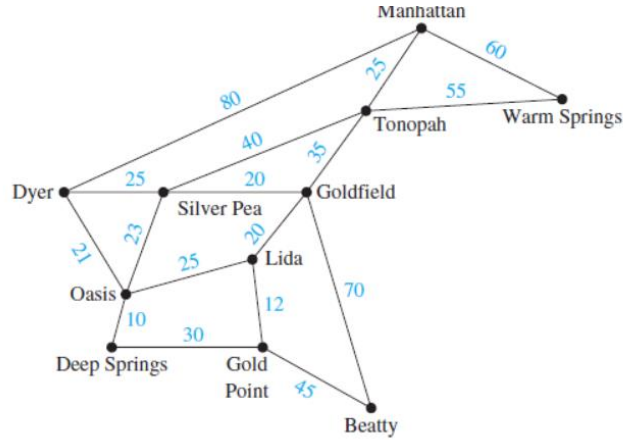

ii) Find whether the following graph is Hamilton Graph or not. If it's an Hamilton Graph then find out whether it is Hamilton Path or Circuit or not. Find the path and explain your answer by your own.

4.

i)Find whether the following graph is Euler Graph or not. If it's an Euler Graph then find out whether it is Euler Path or Circuit or not. Find the path and explain your answer by your own.
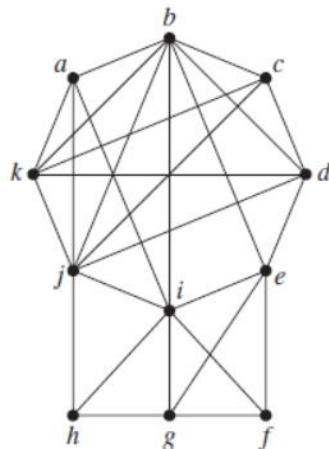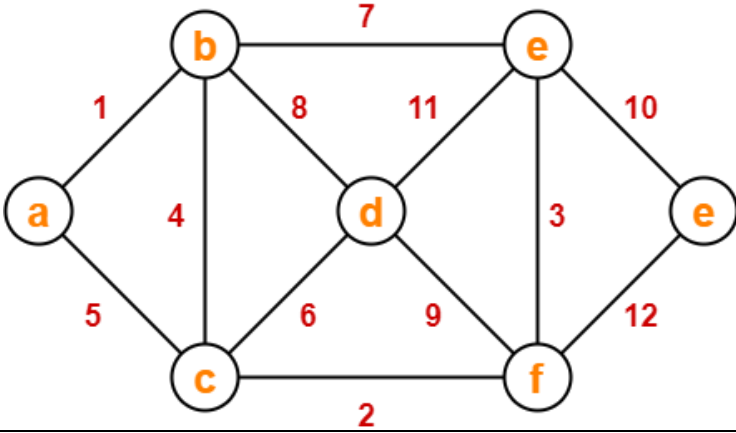
2.5 + 2.5

	ii) Suppose that are eight knights Alynore, Bedivere, Degore, Gareth, Kay, Lancelot, Perceval, and Tristan. Their lists of enemies are A (D, G, P), B (K, P, T), D (A, G, L), G (A, D, T), K (B, L, P), L (D, K, T), P (A, B, K), T (B, G, L), where we have represented each knight by the first letter of his name and shown the list of enemies of that knight following this first letter. Draw the graph representing these eight knight and their friends and find a seating arrangement where each knight sits next to two friends.	
5.	Find the shortest path from Deep Spring to Manhattan. Explain the step by step solution by your own. 	5
6.	Find the minimum spanning tree of the following graph using prim's and kruskal's algorithm. Explain the step by step solution by your own. 	5
7.	Find the minimum spanning tree of the following graph using prim's and kruskal's algorithm. Explain the step by step solution by your own. 	5