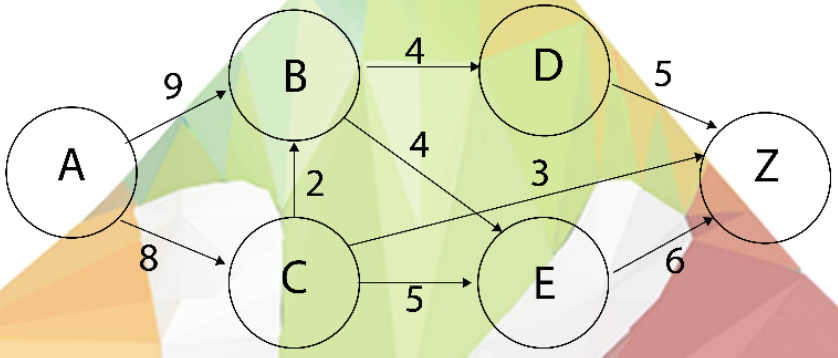
Operations Research – Final – Spring – 2022/2023 – with solution

اسم منسق المادة: د. حامد البدور

Answers are at the end of the test bank

In the transport network, find the following?



Q1: The flow of path (A, B, D, Z) is:

a. 4
b. 2
c. 1
d. 3

Q2: The flow of path (A, B, E, Z) is:

a. 4
b. 1
c. 2
d. 3

Q3: The flow of path (A, C, Z) is:

a. 1
b. 2
c. 3
d. 4

Q4: The flow of path (A, C, E, Z) is:

a. 4
b. 1
c. 2
d. 3

Q5: The maximum flow is:

a. 11
b. 14
c. 12
d. 13

Jobs are to be processed on 3 machines A, B, C. Processing time required for each job on each machine is given in the table below:

Job	1	2	3	4	5	6
A	12	8	7	11	10	5
B	3	8	2	5	2	4
C	7	10	9	6	11	4

Q6: The idle time for machine A, is:

a. 0
b. 5
c. 93
d. 9

Q7: The optimal job sequence is:

a. 3 → 5 → 6 → 4 → 1 → 2
b. 3 → 5 → 2 → 4 → 1 → 6
c. 3 → 5 → 2 → 4 → 1 → 6
d. 1 → 5 → 2 → 4 → 3 → 5

Q8: The idle time for machine C, is:

a. 12
b. 15
c. 14
d. 11

Q9: The idle time for machine B, is:

a. 31
b. 38
c. 32
d. 53

Q10: The total elapsed time:

a. 53
b. 60
c. 57
d. 62

In this game theory scenario, find the following:

		Player B			
Player A	3	-1	4	6	7
	-1	8	2	4	12
	16	8	6	14	13
	1	11	-4	2	13

Q11: The saddle point:

a. 4
b. 6
c. 14
d. 11

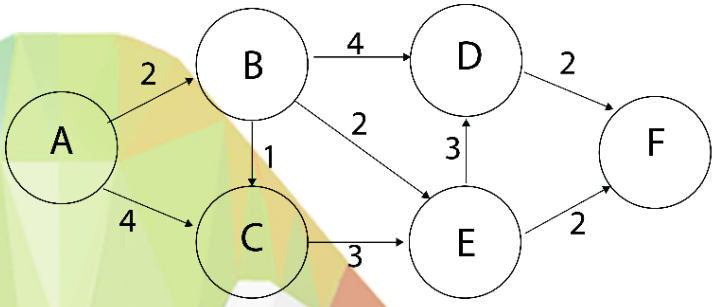
Q12: Strategies of player B:

a. [0, 0, 1, 0]
b. [0, 0, 1, 1, 0]
c. [0, 0, 0, 1]
d. [0, 0, 1, 0, 0]

Q13: Strategies of player A:

a. [0, 0, 1, 0]
b. [0, 0, 0, 1]
c. [0, 0, 1, 0, 0]
d. [0, 0, 1, 1, 0]

Using Dijkstra's algorithm find the following:



Q14: Shortest path from A to E:

a. 5
b. 6
c. 7
d. 4

Q15: Shortest path from A to D:

a. 10
b. 6
c. 9
d. 8

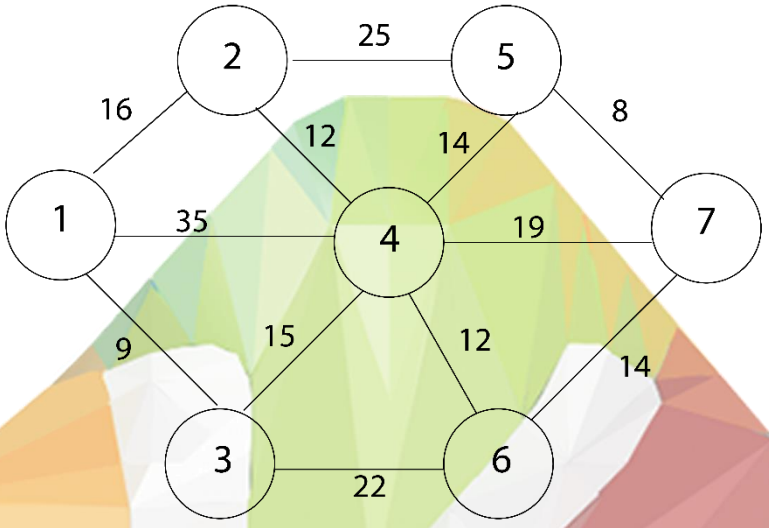
Q16: Shortest path from A to C:

a. 3
b. 4
c. 7
d. 5

Q17: Shortest path from A to F:

a. 10
b. 8
c. 9
d. 6

Using the following graph:



Q18: The minimum spanning tree is:

a. [1-3][3,4][4,2][4-5][5-7][4-6]
b. [1-3][3-6][6-4][4-7]
c. [1-2][2-4][4-2][4-6][6-7][7-5]
d. [1-2][2-5][5-7]

Q19: It is a way of finding the most economical way to connect a set of vertices:

a. Minimum spanning tree
b. Dijkstra's shortest path algorithm
c. The maximum flow problem
d. Undirected network

Match the term with the definition:

Q20:

_____: This includes what and how different external factors interact with a specific project or undertaking. This allows management to better understand what input variables may impact output variables.

Q21:

_____: Complex sensitivity analysis models educate users on different elements impacting a project; this in turn informs members on the project what to be alert for or what to plan in advance for.

Q22:

_____: The original assumptions for the baseline analysis may have had some uncaught errors. By performing different analytical iterations, management may catch mistakes in the original analysis.

Q23:

_____: Management may lay long-term strategic plans that must meet specific benchmarks. By performing sensitivity analysis, a company can better understand how a project may change and what conditions must be present for the team to meet its metric targets.

Q24:

_____: Upper management may already be defensive or inquisitive about an undertaking. Compiling analysis on different situations helps inform decision-makers of other outcomes they may be interested in knowing about.

Q25:

_____: Overly complex models may make it hard to analyze the inputs. By performing sensitivity analysis, users can better understand what factors don't actually matter and can be removed from the model due to its lack of materiality.

Answers

Question	1	2	3	4	5	6	7	8	9	10
Answer	A	A	C	C	D	D	B	B	B	D

11	12	13	14	15	16	17	18	19
B	D	A	D	B	A	D	A	A

20	Understanding influencing factors	21	Reducing uncertainty
22	Catching errors	23	Achieving goals
24	Communicating results	25	Simplifying the model