Activity	Description	Predecessor Activity
A	Open work order	------
B	Get material for X	A
C	Get material for Y	A
D	Turn X on lathe	B
E	Turn Y on lathe	B, C
F	Polish Y	E
G	Assemble X and Y	D, F
H	Pack	G

7. Discuss the inventory models (a) Continuous demand instantaneous replenishment model (b) Backordering or Shortages model. A dealer supplies you the following information with regard to a product that he deals in: Annual demand = Rs. 10,000 units/year, Ordering cost = Rs. 300/order, Carrying cost = Rs. 4/unit/year. Find the economic order quantity and total cost? 8+2 = 10

8. Solve the following problem with graphical method and write its duality.

   Maximize $Z = 5x_1 + 7x_2$, Subject to constraints, $x_1 + x_2 4$, $3x_1 + 8x_2 24$, $10x_1 + 7x_2 35$ and $x_1, x_2 0$ 7+3=10

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B. Tech Odd Semester Examination, February, 2023

Agricultural Engineering / Electronics & Communication Engineering

(5th Semester)

Course No.: ASH-502

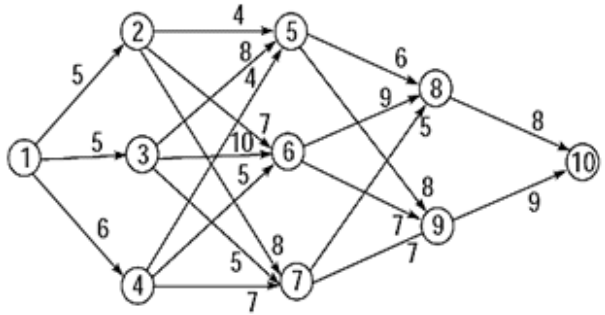
[Management-II (Operations Research and Industrial Management)]

Full Marks: 50
Pass Marks: 25

Time: 2 hours

Note:
1. Attempt any five questions.
2. Begin each answer in a new page.
3. Answer parts of a question at a place.
4. Assume reasonable data wherever required.
5. The figures in the right margin indicate full marks for the question.
6. All the mathematical symbols and abbreviations have their usual meanings.

1. A sale person wants to go from city 1 to 10. The various possibilities are shown as network in Fig. 1



Find the shortest route that sale person may covers for reaching city 1 to 10? 10

2. Customers arrive at a clinic at the rate of 8/hour and the doctor can serve at the rate of 9/hour.

   (a) What is the probability that a customer does not join the queue and walks into the doctor's room?

   (b) What is the probability that there is no queue?

   (c) What is the probability that there are 10 customers in the system?

   (d) What is the expected number in the system?

   (e) What is the expected waiting time in the queue? 2×5=10

3. Define simplex method. What are the three important variables that related to objective function in simplex method? Solve this linear programming problem by simplex method.

   Maximize $Z = 3x_1 + 9x_2$, Subject to constraints, $x_1 + 4x_2 \leq 8$, $x_1 + 2x_2 4$ and $x_1, x_2 0$ 1+3+6=10

4. Define Decision. What are the classifications of decision? Discuss decision theory?A marketing manager of an insurance company has kept complete records of the sales effort of the sales personnel. These records contain data regarding the number of insurance policies sold and net revenues received by the company as a function of four different sales strategies. The manager has constructed the conditional payoff matrix given below, based on his records. The number within the table represents utilities. Suppose you are a new salesperson and that you have access to the original records as well as the payoff matrix. Which strategy would you follow? 1+2+3+4=10

State of nature	N_1	N_2	N_3
Probability	0.2	0.5	0.3
Strategy	Utility	Utility	Utility
S_1	4	6	10
S_2	6	5	9
S_3	2	10	8
S_4	10	3	7

5. A computer centre has three expert programmers. The centre wants three application programmes to be developed. The head of the computer centre, after studying carefully the programmes to be developed, estimates the computer time in minutes required by the experts for the application programmes as follows.

	Programmers			
		A	B	C
Programmes	1	100	80	60
	2	80	70	90
	3	90	120	100

   Assign the programmers to the programmes in such a way that the total computer time is minimum. 10

6. Define project? Discuss the techniques used for managing the project. An assembly is to be made from two parts X and Y. Both parts must be turned on a lathe. Y must be polished whereas X need not be polished. The sequence of activities, together with predecessors is given below. 1+4+5=10