

Q M5 B1

(a) Consider the following data for activities in a given project.

Activity	A	B	C	D	E	F
Predecessor	-	A	-	B,C	C	D,E
Time(days)	5	4	7	3	4	2

Draw an arrow diagram for the project. Compute the earliest and latest event time. What is the minimum project completion time?. List the activities in the critical path.

OR

(b) A tourist car operator finds that during the past few months, the car’s use has varied so much that the cost of maintaining the car varied considerably. During the past 200 weeks the demand for the car fluctuated as shown below:

Trips/per week	0	1	2	3	4	5
Number of days (frequency)	16	24	30	60	40	30

Using random numbers simulate the demand for a 10 week period

[Use the random numbers : 85, 96, 18, 96, 10, 84, 56, 11, 52, 02]

Q M5 B2

a) A small project is composed of seven activities. The time estimates are listed in the table as follows:

	Activity	1-2	1-3	2-4	2-5	3-5	4-6	5-6
	Optimistic (to)	1	1	2	1	2	2	3
Time estimates (weeks)	Most likely (tm)	1	4	2	1	5	5	6
	Pessimistic (tp)	7	7	8	1	14	8	15

- 1) Draw the project network
- 2) Find the expected duration and variance of each activity
- 3) Find the critical path and project duration
- 4) What is the probability that the project will be completed 4 weeks earlier than expected

OR

(b): There are nine jobs, each of which must go through two machines P and Q in the order PQ, the processing times (in hours) are given below:

Machine	jobs								
	A	B	C	D	E	F	G	H	I
P	2	5	4	9	6	8	7	5	4
Q	6	8	7	4	3	9	3	8	11

Find the sequence that minimizes the total elapsed time T. Also calculate the total idle time for the machines in this period.

Q M5 B3

a)The following table gives the activities and duration of a construction project

Activity	A	B	C	D	E	F	G	H	I
predecessor	-	-	-	A	A	B,D	C	C	F,G
Time(days)	8	10	8	10	16	17	18	14	9

- 1) Construct the network diagram
- 2) Compute the earliest and latest event time
- 3) Determine the critical path and project duration

OR

(b) A tourist car operator finds that during the past 100 days the demand for the car had been varied as shown below:

Trips per day	0	1	2	3	4	5
Number of days	8	12	15	30	20	15

Using random numbers simulate the demand for a 10 days

[Use the random numbers : 10, 56, 42,01, 80, 06, 26, 57, 79, 55]

Q M5 B4

1. The first step in the process of creating a new product is to identify a market need. This involves conducting market research to understand the preferences and behaviors of potential customers. Once a need is identified, the next step is to develop a concept that addresses this need. This concept should be unique and offer a clear value proposition to the target market.

2. After developing a concept, the next step is to create a prototype. This allows the company to test the feasibility of the product and gather feedback from potential users. The prototype should be functional and represent the key features of the final product. Based on the feedback received, the company can make necessary adjustments to the design and functionality.

3. Once the prototype is refined, the next step is to conduct a small-scale pilot test. This involves producing a limited quantity of the product and distributing it to a select group of customers. The purpose of the pilot test is to evaluate the product's performance in a real-world setting and gather valuable insights from actual users. This feedback can be used to make further improvements to the product.

4. After the pilot test, the company can proceed to a full-scale launch. This involves producing a larger quantity of the product and distributing it to a wider market. The company should implement a marketing strategy to create awareness and generate interest in the new product. This may include advertising, public relations, and sales efforts. Monitoring the product's performance and customer feedback during the launch phase is crucial for identifying any issues and making necessary adjustments.

5. Finally, the company should continue to monitor the product's performance and customer feedback over time. This allows the company to identify any long-term issues or opportunities for improvement. Based on this feedback, the company can make necessary adjustments to the product or its marketing strategy to ensure its continued success in the market.

Q M5 B5

a) An automobile production line turns out about 100 cars a day but deviations occur owing to many causes. The production is more accurately described by the probability distribution given below.

Production	95	96	97	98	99	100	101	102	103	104
Per day	105									
Probability	0.03	0.05	0.07	0.10	0.15	0.20	0.15	0.10	0.07	0.05
	0.03									

The produced cars are sent by ferry. If the ferry has only space for 101 cars, what will be the average number of cars waiting to be transported and what will be the average number of empty space on the ship.

[Use the random numbers: **17, 46, 85, 09, 50, 58, 04, 77 ,69 ,74 ,73, 03, 96 ,71, 86**]

OR

(b) Ten jobs are required to be processed on two machines M1 and M2 in the order, M1 M2. Processing times are given below. Determine an optimal sequence and evaluate the total elapsed time.

Job	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10
M1	7	8	10	3	7	4	5	8	5	6
M2	4	2	6	6	5	7	2	6	7	6

