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

(a) Consider the following project. The time estimates are listed in the table as follows:

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 Per day	**95**	**96**	**97**	**98**	**99**	**100**	**101**	**102**	**103**	**104**	**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**