1. A confectioner sells confectionary items. Past data of demand per week (in hundred kilograms) with frequency is given below :

Demand /Week :	0	5	10	15	20	25
Frequency :	2	11	8	21	5	3

Using the following sequence of random numbers, generate the demand for next 10 weeks. Also find the average demand per week.

35, 52, 90, 13, 23, 73, 34, 57, 35, 83, 94, 56, 67, 66, 60.

2. A bakery keeps stock of a popular brand of cake Previous experience shows the daily demand pattern for the item with associated probabilities, as given below :

Daily demand :	0	10	20	30	40	50
Probability :	0·01	0·20	0·15	0·50	0·12	0·02

Use the following sequence of random numbers to simulate the demand for next 10 days :

Random numbers : 25, 39, 65, 76, 12, 05, 73, 89, 19, 49 .

Also estimate the daily average demand for the cakes on the basis of simulated data.

3. A company manufactures around 200 mopeds. Depending upon the availability of raw materials and other conditions, the daily production has been varying from 196 mopeds to 204 mopeds, whose probability distribution is as given below :

Production/day :	196	197	198	199	200	201	202	203	204
Probability :	0·05	0·09	0·12	0·14	0·20	0·15	0·11	0·08	0·06

The finished mopeds are transported in a specially designed three-storyed lorry than can accommodate only 200 mopeds. Using the following 15 random numbers 82, 89, 78, 24, 53, 61, 18, 45, 04, 23, 50, 77, 27, 54, 10, simulate the process to find out :

(*i*) What will be the average number of mopeds, waiting in the factory ?

(*ii*) What will be the average number of empty spaces on the lorry ?

4. The output of a production line is checked by an inspector for one or more of three different types of defects, called defects A, B and C. If defect A occurs, the item is scrapped. If defect B or C occurs, the item must be reworked. The time required to rework a B defect is 15 minutes and the time required to rework a C defect is 30 minutes. The probabilities of A, B and C defects are 0·10, 0·20 and 0·10 respectively. For ten items coming off the assembly line, determine the number of items without any defects, the number scrapped and the total minutes of rework time. Use the following random numbers :

RN for defect A :	48	55	91	40	93	01	83	63	47	52
RN for defect B :	47	36	57	04	79	55	10	13	57	09
RN for defect C :	82	95	18	96	20	84	56	11	52	03

5. Observations of past data show the following patterns in respect of inter arrival duration in a single channel queueing system. Using the random number table below, simulate the queue behaviour for a period of 60 minutes and estimate the probability of the service being idle and the mean time spend by a customer waiting for service.

Inter-arrival time		*Service time*	
Minutes	*Probability*	*Minutes*	*Probability*
2	0·15	1	0·10
4	0·23	3	0·22
6	0·35	5	0·35
8	0·17	7	0·23
10	0·10	9	

Random numbers (Start at NW corner and proceed along the row)

9,371	1,463	7.214	1,053	2,164
8,142	8,707	9,054	3,866	1,053
2,924	1,725	1,185	6,885	9,980
5,119	4,086	3,083	5,217	7,105

6. Ramu and Raju are workers on a two-station assembly line. The distribution of activity times at their stations are as given in the adjoining table.

Using the random numbers given below :

Operation 1 : 14, 01, 94, 44, 61, 82, 00, 03

Operation 2 : 36, 76, 55, 25, 97, 41, 16, 34

Time	*Time frequency for*	
(Sec..)	*Ramu (Sec..)*	*Raju (Sec..)*
10	4	4
20	6	5
30	10	6
40	20	7
50	40	10
60	11	8
70	5	6
80	4	4

(*i*) Simulate operation of the line for eight times,using the random numbers as given.

(*ii*) Assume that Raju must wait until Ramu completes the first item before starting work, will he have to wait to process any of the other remaining items?

7. Simulate the operation of a queuing system based on 10 customers (units), defined as follows :

(*i*) One server (*ii*) One unlimited queue, with first-come-first-served queue disciphne

(*iii*) The inter-arrival-time (IAT) distribution is :