1. *A population consist of the values: 2, 5, 8, 12, 15.A random sample of size 2 is drawn from it with replacement. Using EXCEL*

a) Draw all possible sample of size 2

b) Compute population mean & population variance

c) Compute means of all possible samples & construct a sampling distribution of sample means

d) Also compute expected value of sample mean

e) Prove that sample mean is an unbiased estimate of population mean

f) Draw a histogram of population distribution & sampling distribution of sample means

SOLUTON:

Population size(N)	5
Sample size (n)	2
Population	2, 5, 8, 12, 15
Total possible sample	25

2. Hotel's manager in Kathmandu wants to know the hotels average daily registration. The following table presents the numbers of guest registered each of 27 randomly selected days. Calculate the sample mean, standard errors of mean 95% & 98%, confidence limits of population mean.

61	57	53	60	64	57	54	58	63
61	50	59	50	60	57	58	62	63
60	54	54	61	51	53	62	57	60

3. Following are the weights in grams of two different brands of laptops. Is the mean weight of two different brands of laptops differs significantly? Test at 5% level of significance.

SOLUTION:

Dell (100 grams)	HP (100 grams)
13	12
18	15
17	13
21	18
20	20
32	28
35	39
40	33
19	32
23	27
28	28
26	29
31	33
	38

4. Surveys were conducted in Kathmandu and Pokhara to ascertain viewers' habits regarding Kantipur television. In Kathmandu, 1000 people were interviewed and 680 said they viewed kantipur television. In Pokhara 600 people were interviewed and 444said they viewed Kantipur television.

a) Is there a significant difference between viewing habits in Kathmandu and Pokhara? Support your answer at 5% significance level.

b) Is there a higher proportion of viewers in Kathmandu than in Pokhara ? Test at 5% level of significance.

c) Also calculate p value and take decision for both (a) and (b)

SOLn:

		Kathmandu		Pokhara	
Sample size		n1	1000	n2	600
Viewed kantipur tv		x1	680	X2	444
Proportion		p1	0.68	p1	0.74

P	0.7025
Q	0.2975

5. *The time in minutes spent by 25 randomly selected customers using internet in a cybercafé are as follows:*

30	**20**	**30**	**45**	**60**	**40**
65	40	25	50	61	65
62	35	25	28	44	90
64	72	55	53	43	40
50	52	56	48	82	78

Can you say an average time spent by customers is more than 45 minutes at 5% level of significance? From previous study it is known that customers in the population has mean spent time 15 min. Assuming that the population is normally distributed.

6) *Two groups of data managers, one group consisting of trained ones other group not trained have the following number of corrections required.*

	Let, trained=1
	Untrained=2

X	state	Rank
45	1	1
51	2	2
53	2	3
64	1	4
70	2	5
75	1	6
78	1	7
82	1	8
110	2	9

7) A random sample of 200 married men, all retired was classified according to education and number of children.

Education	Number of children		
	0 to 1	2 to 3	Over 3
Elementary	14	37	32
Secondary	19	42	17
College	12	17	10

Test the hypothesis at 0.05 level of significance, that the number of children is independent of the level of education attained by the father.

8)

following are the scores obtained by trainers in 3 different categories. Test whether 3 categories have performed equally. Use the kruskal Wallis H test at 5% level of significance.

Categories	scores									
A	68	65	92	82	62	64	68	92	86	64
B	93	86	73	87	76	85	67	79	75	75
C	95	72	85	70	80	80	78	85	72	90

9) From the following data all three partial correlation and multiple correlations.

Age	11	10	6	10	8	9	10	7	11	8
Height	60	67	53	56	64	57	71	58	67	57
Weight	57	55	49	52	57	48	59	50	62	51

10) The tensile strength of a certain synthetic fiber is thought to be related to the percentage of cotton in the fibre and the drying time of the fiber. A test of 10 pieces of fiber produced under different conditions yielded the following results.

Tensile strength	213	220	216	225	235	218	239
Percentage of cotton	13	15	14	18	19	20	22
Drying time	2.1	2.3	2.2	2.5	3.2	2.4	3.4

a) estimate a mean tensile strength of a synthetic fiber having 21 percent cotton whose drying time is 3.6.

b) Also calculate standard error of estimate and interpret it.

c) Calculate coefficient of determination and interpret it.

d) Test the significance of regression coefficients and overall fit oh the model at 5%.

11) *Fresh weight of plants in grams under different doses of fertilizers A,B and C are as follows. Test whether three different fertilizers are similar or not at 5% significance level.*

A 32	B 23	B 48	B 17	C 42
C 31	C 41	A 30	C 31	A 39
A31	A 32	B 29	C 19	B 34
A 46	B 17	C 27	A 41	C 41
B 47	A 33	A 43	B 37	B 25
C 33	B 39	C 32	C 27	A 32

Solution:

Treatment

A	32	30	39	32	32	46	41	33	43	32
B	23	48	17	29	34	17	47	37	25	39
c	42	31	41	31	19	27	41	33	32	27

12) Analyze the below result to test whether there is significant difference between yields of four varieties and five blocks.

Block				
I	II	III	IV	V
A 32	B 33	D 30	A 35	C 36
B 34	C 34	C 35	C 32	D 29
C 31	A34	B 36	B 37	B 37
D 29	D 26	A 33	D 28	A 35

13) *The mileage per liter of the different cars due to drivers and type of petrol (A,B,C,D) is given below. Construct the ANOVA table for the following and analyze it.*

DRIVERS	CARS			
	1	2	3	4
P	A 18	B 21	C 25	D 11
Q	B 22	C 12	D 15	A 19
R	C 15	D 20	A 23	B 24
S	D 22	A 21	B 10	C 17

14) For am M/M/1 queuing system with the average inter arrival time of 5 minutes and the average time of 3 minutes compute

a) The expected response times

b) The fraction of time when there are fewer than 2 jobs in the system

c) The fraction of customers who have to wait before their service starts.

15) *An offspring of a tall man is short with probability 0.4 and tall with probability 0.6 an offspring of short man is tall with the probability of 0.3 and short with probability 0.7.*

a) *Write transition probability matrix of the above.*

b) *What is the probability that grandchild of tall man is short?*