Total No. of Questions : 4] **SEAT No. :**

P853 **[Total No. of Pages : 4**

[5315]-452A
T.Y. B.Sc. (Semester IV)
STATISTICS : (Principal) (Paper - VI)
ST - 346 : Statistical Computing Using R Software
(Batch - II) (2013 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Each question is to be solved using R Software installed on your computer.***
4) ***Attach computer printout of your work to the answer book supplied to you.***

Q1) Attempt each of the following: **[1 each]**

a) Create a data frame using edit command of item name and its price for 5 items.

b) Find geometric mean of following observations:

63, 79, 70, 55, 42, 37, 67, 29, 36, 74, 36, 68, 58, 30, 60

c) An experiment of tossing a die 50 times gave following results:

Number appeared	1	2	3	4	5	6
Frequency	4	8	13	17	6	2

Draw spike plot.

d) Use Kolmogorov-Smirnov test to test whether the following observations comes from $U(0, 1)$ distribution:

0.25, 0.1, 0.3, 0.75, 0.85, 0.9, 0.39, 0.56.

e) Create a vector Y of following numbers using scan function:

37, 73, 55, 33, 40, 57, 50, 77, 61, 77

Using vector Y create vector T containing numbers of Y which are smaller than 55.

f) Using for loop obtain product of first 10 natural numbers.

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g) A car hire firm has 2 cars. The number of demands for a car on a day has Poisson distribution with mean 1.5. Find the probability that on a day

i) neither car is used

ii) some demand is not fulfilled.

h) From the following data find mean deviation about mean :

74, 55, 55, 46, 57, 75, 66, 37

i) Let $X \sim N\left(\mu = 3, \sigma^2 = 5\right)$. Find $P\left(-3 \leq x \leq 5\right)$.

j) Draw stem and leaf plot for the following data on weight (in kg) of 20 school boys:

41, 50, 47, 38, 45, 47, 31, 35, 41, 52, 57, 62, 49, 48, 45, 35, 37, 49, 39, 41.

Q2) Attempt **any two** of the following: **[5 each]**

a) Suppose $X_1, X_2, ..., X_n$ is a random sample from a Poisson distribution with mean 3.2. Verify whether sample mean is consistent for *m*. Write *R*. program script.

b) Calculate quartile deviation for the following data :

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	10	25	62	26	19	8

c) Frequency distribution of height (in cms) of number of students is given below:

Height	140-144	145-149	150-154	155-159	160-164	165-169
No. of students	4	13	22	45	16	9

Draw less than and more than cumulative frequency curves for the above data.

Q3) Attempt **any two** of the following: **[5 each]**

a) Fit a normal distribution to the following data:

Class	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
Frequency	3	18	45	62	51	34	9	2

b) Following table gives the mode of transport used by employees of a certain company

Mode of transport	Walk	Bicycle	Train	Bus	Two-wheeler	Four wheeler
No. of employees	45	60	105	200	380	70

Represent the above data by pie diagram.

c) The manufacturer of a certain make of electric tubes claims that the tubes have a minimum mean life of 50 months with a standard deviation of 8 months. A random sample of 8 such tubes gave the following life times (in months):

52, 59, 78, 41, 38, 67, 54, 50

Can we regarded the producers claim to be valid at 1% level of significance? Write R program script.

Q4) Attempt **any one** of the following:

a) i) Find AM, GM and HM of the observations given below:

47, 51, 35, 66, 35, 45, 55, 41, 60, 34.

Verify the relation between them. **[5]**

ii) Measurements of the fat content of brands of icecream A and B gave the following data:

A	13.5	14	13.6	12.9	13
B	12.1	15.5	12.4	13	16.9

Test whether the variation of fat contents in both brands is same by verifying the assumptions. Write R program script. **[5]**

b) i) The following data represent the number of hours that two different types of scientific pocket calculators operate before a recharge is required:

Calculator A	5.5	5.6	6.3	4.6	5.3	5	6.2	5.8	5.1
Calculator B	3.8	4.8	4.3	4.2	4	4.9	4.5	5.2	4.5

Use Mann-Whitney test with 1% level of significance to determine if calculator A operates longer than calculator B on a full battery charge. **[4]**

ii) A farmer applies three types of fertilizers on four separate plots. The figures of yield per acre are given below:

Fertilizer / Plots	A	B	C	D
Nitrogen	6	4	8	6
Potash	7	6	6	9
Phosphates	8	5	10	9

Carry out two way analysis of variance using above data. **[6]**