



MC-3537

**Second Year B. B. A. (Sem.-IV) (CBCS) Examination**  
**September / October - 2013**  
**Quantitative Methods : Paper - IV**

Time : 3 Hours]

[Total Marks : 70

**Instructions :**

(1)

नीचे दशांशके निशानीवाणी विगतो उत्तरवली पर अवश्य दपवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<b>Second Year B. B. A. (Sem.-4) (CBCS)</b>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<b>Quantitative Methods : Paper - 4</b>	<input type="text"/>
Subject Code No. <input type="text" value="3"/> <input type="text" value="5"/> <input type="text" value="3"/> <input type="text" value="7"/> -Section No. (1, 2,.....) :	<input type="text"/>
<input type="text" value="Nil"/>	Student's Signature

- (2) Figures to the right indicate marks of the respective question.
- (3) Use of simple calculator is allowed.
- (4) Graph papers and statistical tables will be provided on request.
- (5) Indicate your options clearly.

- 1 (1) 15 groups of 10 pendrives were randomly inspected 10  
in a factory on consecutive days. The number of  
defects found in each group were as follows. Find  
the appropriate control limits 34, 23, 13, 32, 48, 16,  
9, 12, 11, 28, 35, 22, 18, 14, 7.
- (2) 100 units of a population are divided into four strata  
of sizes 15, 20, 30 and 35. The stratum means are  
20, 25, 30 and 32 respectively. Find the population  
mean.

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[Contd...

- (3) The proportion of defective items in a sample of 36 is found to be 0.07. Test the hypothesis that the population proportion is  $P = 0.05$ .
- (4) If variance of the random sample of size 7 is 4 then test the hypothesis that the population variance is 7.
- (5) Test the significance of the correlation  $r = 0.5$  from a sample of size 18 against hypothesis correlation  $\rho = 0.7$ .

- 2 (a) 10 samples of 4 articles each selected randomly 6  
and following observations were recorded construct  $\bar{X}$  chart and state your conclusion. Also draw the graph :

Sample No.	1	2	3	4	5	6	7	8	9	10
$X_1$	20	18	24	23	24	20	18	23	20	19
$X_2$	22	23	25	21	25	22	23	20	22	22
$X_3$	25	20	22	26	24	23	22	25	26	24
$X_4$	24	26	20	24	21	25	26	25	24	23

- (b) 200 units are inspected from the every day's 6  
production, the number of defective units found are 8, 12, 2, 20, 10, 15, 6, 20, 13, 9, 16, 10, 13, 8 and 6. Draw P-chart and examine whether the production process is under control or not.

OR

- 2 (a) Draw the  $\bar{X}$ -chart and R-chart from the following 6  
data relating to 20 samples each of 4. Also comment on the state of the process :

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
$\bar{X}$	15	10	12.5	13	12.5	17.5	18.5	16.5	10	15	13	13.5	11.5	13.5	13	14.5	9.5	12	10.5	11.5
R	8	6	9	6	14	6	8	10	13	18	15	15	12	6	9	10	12	12	10	8

- (b) 20 samples each of size 100 of gift articles were inspected. The results of the inspection are given below. Find control limits for np-chart. Draw the graph and state your conclusion : 6

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
No. of defective articles	2	1	3	0	2	3	1	2	0	4	3	2	0	4	1	7	0	1	3	1

- 3 (a) (i) Sample surveys are always preferred over the census surveys - Explain the statements. 3
- (ii) Explain the term : Pay-off table. 3
- (b) From a population of 5 units having values 3, 7, 2, 10, 8 of a characteristic, a random sample of size 2 is to be drawn without replacement then prove the following results : 6

(i)  $E(\bar{y}) = \bar{Y}$

(ii)  $E(s^2) = S^2$

(iii)  $V(\bar{y}) = \frac{N-n}{N} \cdot \frac{S^2}{n}$

OR

- 3 (a) (i) Discuss simple random sampling method. 3
- (ii) Explain Decision Tree. 3
- (b) Find the population mean and variance of stratified sample mean from the following data of the population having three strata : 6

Strata	Size	$\bar{y}_i$	$S_i^2$	$n_i$
1	40	5	10	8
2	30	5	8	7
3	30	6	9	6



4 (a) A new variety of Potato grown in Gujarat for diabetic patients in 250 plots gave rise to a mean yield of 82.7 quintals per hectare with a s.d. of 14.6 quintals per hectare. It is reasonable to assert that the new variety is superior in yield to the standard variety with an established yield of 80.2 quintals per hectare ? 6

(b) You are given the following information relating to purchase of bulbs from two manufacturers A and B : 6

Manufacturer	No. of bulbs	Mean life	S.D.
A	50	1980 hours	80 hours
B	70	2010 hours	60 hours

Is the difference between the standard deviation significant ?

OR

4 (a) A college conducts both regular and evening batches intended to be identical. A sample of 100 regular students yields examination results as under  $\bar{x}_1 = 72.4$  and  $\sigma_1 = 14.8$ . A sample of 200 evening students yields examination results as under  $\bar{x}_2 = 73.9$  and  $\sigma_2 = 17.9$ . Are the two means statistically equal ? 6

(b) In a random sample of 400 persons from a large population 120 are females and it be said that males and females are in the ratio 5:3 in the population ? 6

- 5 (a) A salesman is expected to effect an average sales of Rs. 3500. A sample test revealed that a particular salesman had made the following sales : Rs. 3700, 3400, 2500, 5200, 3000 and 2000. Conclude whether his work is below standard or not. 6
- (b) The time taken by workers in performing a job by method -I and method-II is given below : 6

Method I:	20	16	26	27	22		
Method II:	27	33	42	35	32	34	38

Do the data show that the variances of time distribution in a population from which these samples are drawn do not differ significantly ?

OR

- 5 (a) The following data present the yield in quintals of corn on ten subdivisions of equal area of two agricultural plots : 6

Plot 1	6.2	5.7	6.5	6.0	6.3	5.8	5.7	6.0	6.0	5.8
Plot 2	5.6	5.9	5.6	5.7	5.8	5.7	6.0	5.5	5.7	5.5

Find out whether the difference between the mean yield of two plots is significant ?

- (b) Memory capacity of a students was tested before and after training. State whether the training was effective or not from the following scores : 6

Students	1	2	3	4	5	6	7	8	9
Before	10	15	9	3	7	12	16	17	4
After	12	17	8	5	6	11	18	20	3

- 6 (a) An automobile company gives you the following information about age groups and the liking for particular model of car which it plans to introduce on the basis of this data can it be concluded that the model appeal is independent of the age group : 6

Person who	Below 20	20-39	40-59	60 and above	Total
Liked the car	140	80	40	20	280
Disliked the car	60	50	30	80	220
Total	200	130	70	100	500

- (b) The three samples below have been obtained from normal population with equal variances. Test the hypothesis that the population means are equal : 6

Sample I	8	10	7	14	11
Sample II	7	5	10	9	9
Sample III	12	9	13	12	14

OR

- 6 (a) In the accounting department of a bank 100 accounts are selected at random and examined for errors. Suppose the following results have been obtained : 6

No. of errors	0	1	2	3	4	5	6
No. of accounts	35	40	19	2	0	2	2

On the basis of this information can it be concluded that the errors are distributed according to the Poisson probability law ?



- (b) A farmer applied three types of fertilizers on 4 separate plots. The figure on yield per acre are tabulated below :

Fertilizers plots	Yield				Total
	A	B	C	D	
Nitrogen	6	4	8	6	24
Potash	7	6	6	9	28
Phosphates	8	5	10	9	32
Total	21	15	24	24	84

Find out if the plots are materially different in fertility, as also, if the three fertilizers make any material difference in yields.