SUBJECT CODE : 11MT/PE/RS34

M. Sc. DEGREE EXAMINATION, NOVEMBER 2014
BRANCH I - MATHEMATICS
THIRD SEMESTER

COURSE   :   ELECTIVE
PAPER   :   RESEARCH IN STATISTICS
TIME   :   3 HOURS   MAX. MARKS : 100

SECTION – A   (5 X 2 = 10)
ANSWER ALL THE QUESTIONS

1. What is a case study?

2. What are the essential characteristics of a good Questionnaire?

3. Define null hypotheses and alternative hypotheses.

4. Write a note on processing and analysis of data.

5. What is a Chi-square test?

SECTION – B   (5 X 6 = 30)
ANSWER ANY FIVE QUESTIONS

6. What is primary and secondary data? Distinguish between them.

7. Represent the following data on investment for the First and Second Five-Year Plan by a percentage bar diagram:

Investments in the Public sector

Items	First Five Year Plan	Second Five Year Plan
Agriculture	357	768
Irrigation	492	990
Industry	261	909
Transport	654	1485
Social Service	306	945
Miscellaneous	90	300

8. Draw a Histogram and frequency polygon for the data given below:

Weekly wages	20-24	25-29	30-34	35-39	40-44	45-49
No. of workers	4	5	12	23	31	10

9. Explain the different types of sampling designs.

10. Calculate the range and semi-inter quartile range of wages:

Wages(Rs.)	30-32	32-34	34-36	36-38	38-40	40-42	42-44
Labourers	12	18	16	14	12	8	6

Also calculate the quartile coefficient of dispersion.

11. Sample of sales in similar shops in two towns are taken for a new product with the following results:

Town	Mean sales	variance	Size of sample
A	57	5.3	5
B	61	4.8	7

Is there any evidence of difference in sales in the two towns? Use 5% level of significance for testing this difference between the means of two samples.

12. A random sample of size 100 articles taken from a batch of 2000 articles showed that the average diameter of the article is 0.354 with standard deviation 0.048. Find 95% confidence interval for the average diameter of this batch of 2000article.

SECTION – C   (3 X 20 = 60)
ANSWER ANY THREE QUESTIONS

13. (a) Two researcher workers classified some people in income groups on the basis of sampling studies . Their results are as follows:

Investigators	Income groups			Total
	Poor	Middle	Rich	
A	160	30	10	200
B	140	120	40	300
Total	300	150	50	500

Show that the sampling technique of at least one research worker is defective.
(Tabulated chi-square is 5.991 at 2 degree of freedom).

(b) State the properties of a normal distribution.

14. Find the mean , median, and mode for the following:

Class	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Freq	3	7	13	17	12	10	8	8	6	6

15. (a) A random sample of 10 boys has the following I.Q. 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Do these data support the assumption of a population mean I.Q. of 100?

(b) The weekly wages of 100 workers in a factory are:

Weekly wages	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65
No. of workers	4	5	12	23	31	10	8	5	2

Draw both less than and greater than ogives and write the answer of the median.

16. (a) Explain classification and tabulation of data in detail.

(b) Represent the following data by a pie diagram.

Items	Expenditure In Rs.
Food	87
Clothing	24
Recreation	11
Education	13
Rent	25
Miscellaneous	20

17. (a) Two random samples drawn from two normal populations are:

Sample 1	20	16	26	27	23	22	18	24	25	19		
Sample 2	27	33	42	35	32	34	38	28	41	43	30	37

Test using variance ratio test at 5% and 1% level of significance whether the two populations have the same ratio.(Table value 3.11 at 5% level of sig and 5.2 at 1% level of sig).

(b) Give a diagrammatic representation for the below data and obtain the mode of the distribution from the figure.

Age in years	10-20	20-30	30-40	40-50	50-60	60-70
No. of Patients	5	19	26	35	15	3

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