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2013

**RESEARCH METHODOLOGY AND
BIOSTATISTICS**

Full Marks : 80

Time : Three hours

*The figures in the margin indicate full marks
for the questions.*

1. Answer the following questions : *(any two)*
2×10=20
 - (i) "Research design in exploratory studies must be flexible but in descriptive studies it must minimise bias and maximise reliability". — Discuss.

Or

What is Chi-square Test ? The table given below shows the data obtained during outbreak of smallpox :

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GROUPS	RESULTS		TOTAL
	Attacked	Not Attacked	
Vaccinated	31	469	500
Not Vaccinated	185	1315	1500
Total	216	1784	2000

Test the effectiveness of vaccination in preventing the attack from small pox. Test your result with the help of χ^2 at 5 per cent level of significance.

(ii) The procedure of testing hypothesis requires a researcher to adopt several steps. Describe in brief all such steps.

Or

Long performance indicators studied among smokers and non-smokers are as given below. Assess the difference between mean values and provide the level of significance

Details	Sample size	Mean	SD
Smokers	16	17.54	4.4713
Non-smokers	9	12.43	4.8493

(iii) State the reasons why sampling is used in the context of research studies. Explain the meaning of Sampling Frame and Sampling Error.

Or

What are basic assumptions underlying Analysis of Covariance? The following are paired observations for three experimental groups concerning an experiment involving three methods of teaching performed on a single class

Method A to Group I		Method B to Group II		Method C to Group III	
X	Y	X	Y	X	Y
33	20	35	31	15	15
40	32	50	45	10	20
40	22	10	5	5	10
32	24	50	33	35	15

X represents initial measurement of achievement in a subject and Y the final measurement after subject has been taught. 12 pupils were assigned at random to 3 groups of 4 pupils each, one group from one method as shown in the table.

Apply the technique of analysis of covariance for analyzing the experimental results and then

state whether the teaching methods differ significantly at 5% level. Also calculate the adjusted means on Y.

2. Answer the following questions : *(any eight)*
8×5=40

- (i) What are the criteria for good research ?
- (ii) What is Central Tendency of Scores ? What are the guidelines for the use of its various measures ?
- (iii) Discuss in brief the steps in sampling design.
- (iv) Write a short note on "Computers and Researchers".
- (v) What is Histogram ? Draw a histogram for the following table of distribution. (Use graph paper)

Class-Intervals	Frequency
90 - 94	2
85 - 89	2
80 - 84	4
75 - 79	8

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70 - 74	6
65 - 69	11
60 - 64	9
55 - 59	7
50 - 54	5
45 - 49	2

N = 56

- (vi) How would you differentiate between rating scales and ranking scales ?
 - (vii) Given a normal distribution of 500 scores with $M = 40$ and $SD = 8$, what percentage of cases lie between 36 and 48 ?
 - (viii) Discuss questionnaire as a technique of data collection.
 - (ix) Describe the various measures of relationships often used in context of research studies.
 - (x) Write short notes on : "Sampling Distribution".
3. Answers in short : 10×2=20
- (i) What is Inferential statistics ?

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- (ii) What is the necessity of defining a research problem ?
- (iii) What is Ordinal scale ?
- (iv) What is Schedule ?
- (v) What is 'Coding' in processing operations ?
- (vi) What is z-test ?
- (vii) What is Standard Error ?
- (viii) What are Estimator and Estimate ?
- (ix) Mention *any two* characteristics of good sample design.
- (x) What is Skewness ?