

**INDIAN INSTITUTE OF MATERIALS MANAGEMENT****Post Graduate Diploma in Materials Management****Dec 2012****Graduate Diploma in Materials Management****PAPER No. 13****Research Methodology**

Date : 16.12.2012
Time : 10.00 a.m to 1.00 pm

Max. Marks :100
Duration : 3 Hrs.

Instructions :

1. Part A: Four Questions (Q 1 to Q 4). All questions are compulsory. Each Question carries 8 marks. **(Total marks 32).**
2. Part B: From Part B answer any three out of 5 questions. Each question carries 16 marks. **(Total marks 48).**
3. Part C: (Compulsory). Case study. **(Total marks 20)**

PART A**(1 x 8 = 8 marks)****1. Select correct answers from the following :**

(a) At 5 % level of significance, Null hypothesis is rejected if p-value is :

- (i) less than 0.05
- (ii) equal to 0.05
- (iii) greater than 0.05

(b) t - test is used when :

- (i) sample size $n < 30$
- (ii) sample size $n > 30$
- (iii) $n < 30$ and population Standard deviation is not given.

(c). Median of the data : 13, 7, 18, 6, 12, 9, 10, 19 is :

- (i). 10
- (ii). 12
- (iii). 11

(d). If mean is 16 and standard deviation is 1.5, then coefficient of variation is

- (i) 8.5
- (ii) 9.38
- (iii) 10.50

(e). ANOVA stands for :

- (i). Analysis of varieties
- (ii). Analysis of variance
- (iii). Analysis of variation

(f). A measure of dispersion is :

- (i). Median
- (ii). Mode
- (iii) Range

(g). A measure is reliable if repeated measurements :

- (i) maintain the same distance between them
- (ii) are consistent
- (iii) are almost similar

(h). Z- test is based on :

- (i). Poisson distribution
- (ii). Normal distribution
- (ii). F- distribution

2. Match the following :

(1 x 8 = 8 marks)

	Column A		Column B
A	Cumulative Frequency Curve	1.	Central Value
B	Median	2.	Consistency
C	Coding	3.	Probability Sampling
D	Normal Distribution	4.	Categorization
E	Systematic sampling	5.	Lottery method
F	Coefficient of variation	6.	Z-curve
G	Data Processing	7.	Ogive
H	Random sampling	8	Editing

3. Fill in the blanks (selecting from the choices given)**1 x 8 marks**

- (i) Dichotomous Questions are _____ ended (open/closed)
- (ii) In simple random sampling every element of the population has _____ chance of being selected. (a known/an equal)
- (iii) Under stratified sampling design the population is divided into _____ groups (homogeneous/heterogeneous)
- (iv) In simple positive correlation the two variables move in _____ direction (same/opposite)
- (v) The main purpose of factor analysis is to _____ a large number of variables into fewer factors (reduce/ classify)
- (vi) Greater the dispersion in the population _____ size sample should be taken for better estimation (greater/smaller)
- (vii) In the use of disguised questionnaire the respondent is _____ aware of the purpose of study (much/ not)
- (viii) Binomial distribution is applicable to trials which have two mutually _____ outcomes (Exclusive/inclusive)

Q.4 Find the true or false of the following :

- (a) The induction method of logic in good research is a process of reasoning from part to the whole.
- (b) Validity is the ability of a measuring instrument to measure what it is supposed to.
- (c) In exploratory study it is always possible to develop a hypothesis.
- (d) In a structured questionnaire, there are usually options for answers to questions.
- (e) A less than give for any frequency distribution is a falling curve.
- (f) Chi-square test is a parametric test
- (g) Degree of freedom is the number of values that we can choose freely.
- (h) In cluster analysis, the individual clusters are similar to each other.

PART B

(Answer any three out of five. Each question carries 16 marks)

Q.5. A television company collected the following sample data on the average sales during the last year of its LED televisions of three different sizes from its dealers (controlling as far as possible the blocking variables) :

Size/dealers	D1	D2	D3	D4
Small	20	14	22	12
Medium	25	22	26	11
Large	10	2	10	6

Test the hypothesis that there was no difference in the sale of different sizes at 5% Level of significance. (Table Value of Statistic F = 4.26)

Q.6. Distinguish briefly between the following. (Mention only two critical differences) :

Answer all the four sub questions.

- (a) Factor analysis and conjoint analysis
- (b) Research Methods and Research Methodology
- (c) Technical report and Business report
- (d) Z-test and t-test

Q.7. Write Brief notes (about 100 words) on each of the following :

- (a) Data Processing
- (b) Normal probability distribution
- (c) Cluster sampling
- (d) Testing of hypotheses

Q.8. (a) The daily profits (in rupees) of 100 shops are distributed as follows :

Profit classes	0-100	100-200	200-300	300-400	400-500	500-600
Frequency	14	20	29	22	19	28

Construct a frequency polygon of the above distribution.

(b). In a town on an average 10 accidents occur in a span of 25 days. Assuming that the number of accidents per day follow Poisson distribution, find the probability that there will be not more than two accidents in a day.

Q.9. A firm manufactures elevators. It requires cables of average strength between 1200 Kg wt to 1250 Kg wt. It obtained samples of 10 cables from each of two suppliers S_1 and S_2 . The company tested these in its R & D wing. The table below gives the test results (of their strengths) in kilogram weights :

	Supplier S_1	Supplier S_2
Mean strength	1250	1260
Standard deviation	60	75

From which supplier the elevator company should purchase the cables and why ?

Case Study (Compulsory)

20 marks

Q. 10

A car manufacturing company MARKO introduced a new model of a passenger car last year. The sale of this model had not been very encouraging and the company could not reach the minimum sales target of Rs. 2500 crores during the previous year, in spite of its excellent brand image in the car market and an elaborate and effective network of dealers. The company decides to find out the reasons. MARKO had the record of contact numbers (mobile/land line), the residential addresses and e-mail addresses of the customers who bought this model. The investigation project was assigned to the R & D wing to do research and find out the causes.

A team of senior researchers from R & D and Marketing departments was selected to probe the matter. The team decided first to know from its customers, who bought this model during the previous year, of their experience about the car, particularly about its :

1. Price
2. Design and look
3. Performance
4. Service/maintenance

Also it aimed to determine other reasons. As a researcher :

- Q.1 What different methods of data collection about the experience of its customers will you use and how ?
- Q. 2 Prepare a brief structured questionnaire (containing about 10 Questions).
- Q. 3 Can an exploratory research design be advocated in the above situation ?
- Q. 4 Would it be advisable to conduct a descriptive research study here ?
