

**MASTER OF SCIENCE (DIETETICS AND
FOOD SERVICE MANAGEMENT)**

Term-End Examination

December, 2007

**MFN-009 : RESEARCH METHODS AND
BIostatISTICS**

Time : 3 hours

Maximum Marks : 100

Note : Question No. 1 is **compulsory**. Answer **five** questions in all. All questions carry equal marks.

1. (a) Define or explain the following in 2 – 3 sentences : 10
- (i) Nutritional epidemiology
 - (ii) Stochastic variable
 - (iii) Type II error
 - (iv) Quasi experimental design
 - (v) Scatter graph

(b) Fill in the blanks :

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- (i) If the mean of a group of test scores is 75 and the SD is 10, a person who receives a score of 85 is _____ SD above the mean.
- (ii) _____ studies are concerned with describing the distribution of disease or the health condition by person, place or time.
- (iii) If the scheme is such that each unit of the population has the same chance of being included in the sample, it is called _____ sampling.
- (iv) A sample that is not representative is known as _____ sample.
- (v) The totality of all subjects or units from which a sample is selected is called _____ .
- (vi) Recruiting volunteers for a study is an example of _____ sample.
- (vii) The characteristics which can be exactly measured in terms of quantity are said to be measured on _____ scale.
- (viii) _____ interview is one where the interviewer does not follow a list of predetermined questions.
- (ix) The distribution is called _____ when the division of the subjects is presented by categories of one variable only.
- (x) _____ is the measure of the likelihood of an outcome in a large number of cases.

2. Overweight and obesity among urban children in India has become a public health problem. As a researcher you would like to investigate the prevalence and determinants of overweight/obesity among school children in your region. Plan a suitable study covering the following aspects :

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- (i) Statement of problem
- (ii) Objectives
- (iii) Sample and sampling procedure
- (iv) Sample size determination
- (v) Data collection
- (vi) Data analysis
- (vii) Interpretation of data

3. A sample of 25 cans of a certain carbonated beverage were used in an industrial experiment that examined the beverage's shelf life, measured in days. The shelf life data collected is as under :

262, 188, 234, 203, 212, 212, 301, 225, 241,
211, 231, 227, 217, 252, 206, 281, 251, 219,
268, 231, 279, 243, 241, 290, 249

- (a) Prepare a frequency table and histogram for the data. 5
- (b) Is the distribution symmetric or skewed ? Give reasons for your answer. 3
- (c) Calculate the three measures of central tendency for this set of data. 6
- (d) Calculate the variance and standard deviation. 6

4. Identify the study design for each of the following and enumerate the advantages and limitations for each of the study designs : 5+5+5+5

(a) A researcher plans to study the relationship between dietary components and coronary heart disease.

(b) In a national survey, researchers recruited 5000 men and women between the age 20 – 40 years and undertook extensive physical examination and lifestyle interview and the data so collected was analyzed for common patterns related to chronic degenerative diseases.

(c) In a study on lung cancer, a researcher selected subjects who already had the disease and other conditions and looked back to see if there are characteristics of these subjects that differ from those who do not have the disease.

(d) In a community based study to assess the impact of iron supplementation, the researcher selected two groups of subjects. One was provided the supplement and the other received no supplement.

5. (a) As a researcher you have developed a research tool. Discuss the characteristics of a good research tool which your tool should also possess. 8

(b) What indicators would you use to assess the accuracy of your research tool ? Explain, giving examples. 7

- (c) In a study to assess the energy intake of children ($n = 242$), the mean energy intake (Kcal) recorded was 694 and the standard deviation was 268. Calculate the standard error of mean.

5

6. (a) Differentiate between parametric and non-parametric tests.

4

- (b) What is meant by the two-tailed and one-tailed test of significance? Illustrate graphically.

6

- (c) A researcher is interested to find out "Does pre-pregnancy weight of mothers affect infant birth-weight. He/she has collected data on 10 subjects for analysis." The data is as follows :

Case No.	Mother's Weight (kg)	Infant's Birth-weight (g)
1	49.0	3515
2	63.0	3742
3	68.0	3629
4	52.0	2680
5	54.0	3006
6	70.0	4068
7	50.0	3373
8	73.0	4124
9	65.0	3572
10	54.0	3359

Do a suitable analysis to help the researcher.

10

7. (a) Define cumulative frequency distribution and explain how to calculate it, with the help of an example. 6
- (b) What do you understand by the terms "Descriptive Statistics" and "Inferential Statistics"? Comment what they are used for. 6
- (c) An investigator has undertaken a study to examine the relationship between personality type and heart disease. The observed frequencies are as under :

Personality	No Heart Disease	Heart Disease
Type A	32	18
Type B	128	22

Is there a relationship between personality type and heart disease? Test at 0.05 level of significance. 8

8. Write short notes on any **four** of the following : 5+5+5+5
- (a) Normal probability distribution
- (b) Concept of confidence interval and degree of freedom
- (c) Types of questionnaires and questionnaire pretesting
- (d) Documents — A data collection tool
- (e) Probability sampling techniques