

Paper 8: Elements of Statistics and Research Methodology -
End-Sem Exam

MS LIS First Year

May 06, 2017

Instructions: There are 6 questions altogether. Marks corresponding to each question is indicated in bold. Answer as many as you can. Maximum score : 60 marks. Maximum time : 3 hrs.

(1) For each of the following questions write the final answer (you need not show the calculations):

- (a) Provide examples of nominal and ordinal features (one each).
- (b) Suppose the median of the following data which is arranged in ascending order is 63:
50, x , $x + 2$, 72, 79
then find x and the mean of the data.
- (c) What are the mean and variance of X where $X \sim Uniform(-1, 1)$?
- (d) Suppose $X \sim N(0, 1)$, Compute $Cov(X, X^2)$

[4 × 2 = 8]

(2) Indicate *True* or *False* for each of the following statements and provide reasons supporting your answers. You will have to prove the statement if you indicate *True* and provide a counter example if you indicate *False*. Correct answer carries 1 mark each and a valid reasoning carries 3 marks each.

- (a) Number of accidents on Mysore road on a certain day is an example of a discrete random variable.
- (b) If a stick of unit length is broken at random into two pieces (i.e. choosing the breaking point between 0 and 1 from the distribution $Uniform(0, 1)$), then the expected value of the length of the longer piece is given by $\frac{2}{5}$?
- (c) Suppose $a > 0$, $b > 0$ are constants and X is a discrete random variable that takes finitely many values then the variance of the random variable $aX + b$ depends on a but not on b .
- (d) Suppose X and Y are random variables such that $Cov(X, Y) = 0$ then X and Y are independent.
- (e) Suppose $X \sim Bernoulli(p)$ and $Y \sim Bernoulli(1 - p)$ are independent random variables, then the distribution of XY is given by $Bernoulli(p - p^2)$?
- (f) Suppose X is a discrete random variable with $Var(X) = 0$, then there is a unique x such that $P(X = x) > 0$.
- (g) If $X \sim N(0, 1)$ then $P(X > 0) = \frac{1}{2}$ and $P(X = 0) = 0$.

Hint: You may provide counter examples for some incorrect statements by modifying examples in the other questions.

[7 × (1+3) = 28]

- (3) (a) What is questionnaire method of data collection?
- (b) Briefly discuss the steps involved in questionnaire construction.

(c) What are different types of questionnaires?

[2+4+4]

- (4) The following research is conducted in a laboratory: 'A treatment for hair loss in men is being tested. Men of the same age range are gathered. One group receives an application with the active ingredient ACDH, DTCC while another group receives an application that appears the same but does not have the active ingredient in it.' Based on the above experiment identify the following:
- (a) experimental group,
 - (b) control group,
 - (c) independent variable,
 - (d) dependent variable.

Justify your answer with appropriate explanation.

[4+6]

- (5) (a) Describe basic research, applied research and action research ?
(b) Explain any three approaches to research with examples.

[4+6]

- (6) (a) What is a research design? What is the purpose and function of research design?
(b) Define unstructured interview with examples.
(c) Name any two online questionnaire construction tools.
(d) Write the following bibliographic information in both APA(6th) and MLA (7th) reference style format:

Towards Semantometrics: A New Semantic Similarity Based Measure for Assessing a Research Publication's Contribution.

Journal name- D-Lib Magazine
Volume No. - 20
Issue- 11/12
Page number- 110 to 120
Author: Petr Knoth and Drahomira Herrmannova
doi- 10.1045/november2014-knoth

[5+2+2+5]