



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Business & Social Studies

DEPARTMENT OF BUSINESS STUDIES

UNIVERSITY EXAMINATIONS FOR DEGREE IN
BACHELOR OF BUSINESS ADMINISTRATION

BMS 4302: ADVANCED STATISTICS

SUPPLEMENTARY/SPECIAL EXAMINATIONS

SERIES: JULY 2014

TIME: 2 HOURS

INSTRUCTIONS:

– Answer Question **ONE (Compulsory)** and any other **TWO** questions.

This paper consists of Three printed pages

QUESTION 1 (Compulsory)

- Discuss the distinctive features of the binomial and multinomial distribution. **(8 marks)**
- In a music store, a manager found that the probability that a person buys zero, one or two or more CDs are 0.3, 0.6, and 0.1, respectively. If six customers enter the store, find the probability that one won't buy any CDs, three will buy one CD, and two will buy two or more CDs. **(4 marks)**
- To qualify for a police academy, candidates must score in the top 10% on a general ability test. The test has a mean of 200 and a standard deviation of 20. Find the lowest possible score to qualify. Assume the test scores are normally distributed. **(5 marks)**
- What is an interval estimate? **(2 marks)**

- e) The president of a large university wishes to estimate the average age of the students presently enrolled. From past studies, the standard deviation is known to be 2 years. A sample of 50 students selected, and mean is found to be 23.2 years. Find the 95% confidence interval of the population mean. **(5 marks)**
- f) For each of the following research situations identify which statistical technique could be used (choose one of these: independent samples t-test, correlation, two-way ANOVA, multiple regression, chi-square test of independence, one-way ANOVA).
- i) Ann is interested in exploring the possibility of gender differences in levels of perceived stress.
 - ii) Ann would also like to explore the relationship between optimism and perceived stress. She suspects that higher levels of optimism would be associated with lower levels of perceived stress.
 - iii) John is interested in exploring the effect of both sex and age group on self-esteem scores. He is interested in the effect of each variable individually, and any interaction that may exist.
 - iv) Celia would like to know which is a better predictor of negative affect: optimism or self-esteem.
 - v) David is interested in the question: are younger people (18 – 29) more likely to be smokers than older people (30 – 44 yrs or 45 + yrs)?
 - vi) Ellie conducts a study to find out if there is a significant change in depression levels across three time periods (prior to an intervention, after the intervention and at a three month follow-up). **(6 marks)**

QUESTION 2

- a) Write short notes on quota sampling and convenience sampling. **(8 marks)**
- b) i) What is t-distribution? **(2 marks)**
 ii) Give **FOUR** properties of t-distribution. **(4 marks)**
 iii) Outline three ways in which t-distribution differs from normal distribution. **(6 marks)**

QUESTION 3

A professor is investigating the relationship between performance of his students and hours the students study in a week and their Intelligence Quotient (IQ). A sample of ten students is taken and the data is summarized in the table below:

STUDENT	HOURS STUDIED (x_1)	I.Q (x_2)	EXAM GRADE (y)
1	9	99	56
2	6	100	45
3	12	119	80
4	14	95	73
5	11	110	71
6	6	117	55
7	19	98	95
8	16	101	86
9	3	100	34
10	9	115	66

Calculate the regression line and hence otherwise, use the equation to predict the performance of a student who studies for 21 hours 35 minutes in a week and has an I.Q of 96.

(20 marks)

QUESTION 4

- a) What is the difference between:
- The null hypothesis and alternative hypothesis
 - Type I and Type II error
 - One tail and two-tailed.
 - Critical and non-critical region.
- b) A researcher reports that the average salary of assistant professors is more than \$42,000. A sample of 30 assistant professors has a mean salary of \$43,260. At $\alpha = 0.05$, test the claim that assistant professors earn more than \$42,000 a year. The standard deviation of the population is \$5230.

(8 marks)

(12 marks)

QUESTION 5

Discuss the following statistical charts for quality improvement.

- Time-ordered plot (run chart)
- Histogram (dot plot)
- Statistical control charts (variables and attribute charts)
- Scatter plot.

(20 marks)