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University Examinations 2022/2023

FIRST YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF MASTERS IN
BUSINESS ADMINISTRATION

SMB 5100: STATISTICS FOR BUSINESS

DATE: APRIL 2023

TIME: 3 HOURS

INSTRUCTIONS: *answer question one and any other two questions*

QUESTION ONE (30 MARKS)

- a) Explain the meaning of the following terms as used in biostatistics (3 marks)
- (i) Survey
 - (ii) Data
 - (iii) Measurement
- b) It is expected that 5% of writing pen bought from a shop are defective. Find the probability that in a sample of 20 pens chosen from the shop at random:
- i) None will be defective (2 marks)
 - ii) At least two will be defective (4 marks)
 - iii) At most one will be defective (3 marks)
- c) According to the 2009 current population survey conducted by the US Census Bureau, 40% of the U.S population 25 years old and above have completed bachelor's degree or more. Given a random sample of 50 people 25 years old and above, what is the expected number of people and the standard deviation of the number of people who have completed a bachelor's degree (15 marks)

Highlight the two broad branches of statistics and explain the significance of each in
 conduction of business research (4 marks)

d) The following table shows the summary statistics for the wages of two types of workers.

Worker's Type	Daily Wages	
	Mean	Standard deviation
I	\$100	\$20
II	\$150	\$24

Compare these two daily wages distributions (6 marks)

e) Highlight the three techniques of data collection (3 marks)

QUESTION TWO (20 MARKS)

a) Delvis ltd, a firm selling foodstuff product appoints 4 salesmen A, B, C and D and observes their sales performance into owns around Nairobi: Ruiru, Thika and Kiambu. Their dairy sales volumes in Ksh.000 are recorded as below

	A	B	C	D
Summer	65	66	67	64
Winter	69	66	67	65
Monsoon	63	64	65	63

Assuming the homogeneity of towns, analyze the variance for the performance of the 4 salesmen and discuss your results as a consultant to this company. (Use 5% level of significance (14 marks)

b) Explain three diagnostic checks necessary before deciding to carry out the parametric data analysis (6 marks)

QUESTION THREE (20 MARKS)

a) The data below relates to the dairy expenditure in Ksh. On use of mobile phone by 10 females and 8 male insurance firms agents

Female	420	450	520	370	510	680	440	360	530	390
Male	390	490	440	460	320	470	430	380		

Test the claim at 5% level of significance that male agents spend less than females. (11 marks)

- b) If 3% of pesticides manufactured by a firm are ineffective find the probability that in a sample of 300 pesticides
- At most 3 are effective (4 marks)
 - At least 4 are ineffective (2 marks)
- c) Highlight three advantages of sampling over census (3 marks)

QUESTION FOUR (20 MARKS)

- a) In a large manufacturing company an opinion survey was conducted regarding two types of bonus scheme. Total employees were divided into three categories; technical, Executive and not skilled. The results obtained by the opinion survey are presented in the form of contingency table as given below;

Employee category	Bonus scheme	
	Type I	Type II
Technical	19	5
Executive	30	6
Non Skilled	12	4

At 5% level of significance, test the opinion about bonus schemes is independent of types of employees (8 marks)

- b) Distinguish the following terms
- Parametric and non-parametric test (2 marks)
 - Type one and type two error (2 marks)
 - Point and interval estimation (2 marks)
- c) Highlight three probabilistic sampling techniques showing how they can be used in a business research (6 marks)

QUESTION FIVE (20 MARKS)

a) A pharmaceutical firm reported that on average a certain drug has a lifespan of 4 years with a standard deviation of 0.2 years. In a certain season 2.6% of drugs were destroyed for being in the shelf after the expiry time

(i) If the hospital buys drugs from the firm, determine the probability that its lifespan will be

- Less than 2.5 years (2 marks)

- Between 2 and 5 years (3 marks)

- More than 4 years (1 mark)

(ii) Determine the expiry period for the firm drugs (4 marks)

(iii) Determine the 95% confidence interval for the mean lifetime of the firm drug. (3 marks)

b) The sales volume of product (y_i) depends on marketing expenditure (x_1) and other firms selling the product (x_2). A marketing research study has provided the following regression model and relevant information

$$y_i = 7.64 + 0.93x_1 - 0.33x_2$$

SE (3.3), (0.41) (0.15)
 $r^2 = 0.77, n = 26$

(i) Comment on the goodness of fit of the model (1 mark)

(ii) Test the significance of the three regression coefficients (β_s) and comment on your results (6 marks)