



**University of Kelaniya – Sri Lanka**

***Centre for Distance and Continuing Education***

**Faculty of Commerce and Management Studies**

Bachelor of Business Management (General) Second Year Examination (External) – 2023

April – 2025

**BMGTE 2045 – Statistics for Management**

No. of Questions: Eight (08)

Time: 03 hours

Answer any five (05) Questions.

Non Programmable Calculators are allowed.

**Question No. 01**

a) ‘Statistics is a subject which can be applied by individuals as well as different types organizations making their decisions’ comment on this statement.  
(10 marks)

b) ‘Four types of measurement scales of data can be identified in quantitative and qualitative data analysis’ discuss with suitable examples.  
(10 marks)

**(Total 20 Marks)**

**Question No. 02**

A manufacturer of dog food was planning to survey households in Sri Lanka to determine the purchasing habits of dog owners. Among the questions to be included are those related to:

1. Where dog food is primarily purchased
2. Where dry or moist dog food is purchased
3. The number of dogs living in the household
4. Whether or not the dog is pedigreed

Base on above information you are required to answer the following questions

- a) Describe the population (03 marks)
- b) Define the sampling frame (03 marks)
- c) Indicate the type of sampling method that you would use and why you would select it. (04 marks)
- d) Develop five categorical questions for the survey (05 marks)
- e) Develop five numerical questions for the survey (05 marks)
- (Total 20 marks)**

**Question No. 03**

- a. i. Distinguish between skewness and kurtosis. (05 marks)
- ii. Using a clear labeled diagram show the position of mode, mean and median of a negatively skewed distribution. (05 marks)
- b. The following is the distribution of weight of 140 students entering the management degree of a university.

<b>Weight (Kg)</b>	<b>Frequency</b>
40 - 44	4
45 - 49	23
50 - 54	49
55 - 59	38
60 - 64	17
65 - 69	6
70 - 74	3

- i. Calculate median and mean weight and interpret your answer. (05 marks)

- ii. Calculate variance and standard deviation and interpret your answer

(05 marks)

**(Total 20 marks)**

**Question No. 04**

A school employs 75 teachers. The following table summaries their length of service at school, classified gender.

	Less than 3 years	3 years to 8 years	More than 8 years
Female	12	20	13
Male	8	15	7

- a. Find the probability that a randomly selected teacher;

i. is female

(02 marks)

ii. is female given that the teacher has more than 8 years service

(03 marks)

iii. is female, given that the teacher has less than 3 years service

(03 marks)

- b. State giving a reason, whether or not the event of selecting a female teacher is independent of the event of selecting a teacher with less than 3 years service.

(03 marks)

- c. State an event which is mutually exclusive to the event of selecting a female teacher.

(03 marks)

- d. Three teachers are selected at random without replacement. Find the probability that all three are,

i. Female with less than 3 years service

(03 marks)

ii. Of the same gender

(03 marks)

**(Total 20 marks)**

**Question No. 05**

- a. What are the four types of probability approaches? Explain.  
(05 marks)
  - b. What is the probability of drawing a red card from a standard deck of 52 cards?  
(03 marks)
  - c. If you roll a fair single six-sided die, what is the probability of getting a number greater than 4?  
(03 marks)
  - d. What is the sample space for flipping a coin twice?  
(03 marks)
  - e. If the probability of an event A happening is 0.7, what is the probability of event A not happening?  
(03 marks)
  - f. If you roll a fair single six-sided die, what is the probability of rolling either a 2 or a 5?  
(03 marks)
- (Total 20 marks)**

**Question No. 06**

- a. What are properties of the **binomial distribution**, **Poisson distribution**, and **normal distribution**.  
(05 marks)
- b. A factory produces light bulbs, and 95% of them pass the quality check. If a random sample of 10 bulbs is selected, what is the probability that exactly 8 bulbs will pass the quality check?  
(05 marks)
- c. A call center receives an average of 4 customer service calls per hour. What is the probability that more than 5 calls are received in an hour?  
(05 marks)

- d. The heights of adult women in a certain country follow a normal distribution with a mean of 64 inches and a standard deviation of 3 inches. What is the probability that a randomly selected woman will be taller than 67 inches?

(05 marks)

(Total 20 marks)

**Question No. 07**

Management of a soft-drink bottling company wished to develop a method for allocating delivery cost to customers. Although one cost clearly relates to travel time within a particular route, another variable cost reflects the time required to unload the cases of soft drink at the delivery point. Data were collected from a sample of 20 customers as follows;

Customer	Delivery Time (Minutes)	Number of Cases	Customer	Delivery Time (Minutes)	Number of Cases
1	32.1	52	11	43.0	161
2	34.8	64	12	49.4	184
3	36.2	73	13	57.2	202
4	37.8	85	14	56.8	218
5	37.8	95	15	60.6	243
6	39.7	103	16	61.2	254
7	38.5	116	17	58.2	267
8	41.9	121	18	63.1	275
9	44.2	143	19	65.6	287
10	47.1	157	20	67.3	298

You are provided with the following regression (Excel) output of regression model to predict delivery time based on the number of cases delivered. You are required to answer the questions based on this output.

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.3708256
R Square	0.1375116
Adjusted R Square	0.0895956
Standard Error	37.810362
Observations	20

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	4102.80175	4102.80	2.86984	0.10748577
Residual	18	25733.2237	1429.62		
Total	19	29836.0255			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	25.837371	20.0656077	1.28764	0.21418	-16.318906	67.9936
Number of cases	0.1814457	0.10710686	1.69406	0.10748	-0.0435774	0.40646

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- a. Identify the independent and dependent variables.
- b. State the regression equation
- c. What is the interpretation of the Y intercept in this problem
- d. What is the interpretation of the slope in the regression model in this problem
- e. Predict the delivery time for a customer who is receiving 150 cases of soft drink.
- f. Determine the coefficient of determination  $r^2$  and explain its meaning in this problem
- g. Determine the coefficient of correlation
- h. Determine the standard error of the estimation
- i. At the 0.05 level of significance, is there evidence of a linear relationship between delivery time and the number of cases.
- j. Perform a residual analysis

(02 marks for each)

**(Total 20 marks)**

**Question No. 08**

- a. The quality control manager at a lightbulb factory needs to determine whether the mean life of a large shipment of lightbulbs is equal to the specified value of 375 hours. The process standard deviation is known to be 100 hours. A random sample of 64 lightbulbs indicates a sample mean life of 350 hours. (assume significance level at 0.05)
  - i. State null and alternative hypotheses.
 

(02 marks)
  - ii. State appropriate test statistics. Show work by giving the correct formula with the correct values substituted in the formula.
 

(02 marks)
  - iii. Find the appropriate critical value and rejected region for this hypothesis testing. Draw an appropriate picture and show your work.
 

(03 marks)
  - iv. Write a conclusion for this test in the context of this situation.
 

(03 marks)

- b. A company claims that 80% of their customers are satisfied with their product. To test this claim, a survey is conducted with a random sample of 150 customers. Out of the 150 customers surveyed, 120 report that they are satisfied with the product.

Answer the following questions to test the company's claim at a 5% significance level.

- i. State null and alternative hypotheses.  
(02 marks)
- ii. State appropriate test statistics. Show work by giving the correct formula with the correct values substituted in the formula.  
(02 marks)
- iii. Find the appropriate critical value and rejected region for this hypothesis testing.  
Draw an appropriate picture and show your work.  
(03 marks)
- iv. Write a conclusion for this test in the context of this situation.  
(03 marks)

**(Total 20 marks)**