EASTERN UNIVERSITY, SRI LANKA
FACULTY OF COMMERCE AND MANAGEMENT
FIRST YEAR SECOND SEMESTER EXAMINATION IN
BACHELOR OF BUSINESS ADMINISTRATION HONOURS/ BACHELOR OF COMMERCE HONOURS - 2021/2022 (May 2024)
COM 1033 BUSINESS STATISTICS

Answer All Questions.
Calculators permitted.

Time: 03 Hours

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01. I) i) What is the level of measurement of the underlying variable in each of the following questions?

a) At what supermarket do you shop most often?

☐	☐	☐	☐	☐
Cargils	Arpico	Glomark	Keels	Other

b) How much do you spend per week on groceries?

☐	☐	☐	☐	☐
0 - 1000	1000 - 2000	2000 - 3000	3000 - 4000	Above 4000

ii) What method would you use to display the relationship between (a) and (b)?

(03 Marks)

II) A study was conducted to determine the proportion of all young job seekers aged 24 to 35 who preferred to "look for a job in a place where they would like to live" rather than "look for the best job they can find; the place where they live is secondary". Sixty-five percent of 1000 young job seekers aged 24 to 35 reported that they preferred to "look for a job in a place where they would like to live.

i) Describe the population of this study?

ii) Describe the sample of this study?

iii) Is the value 65% a parameter or a statistic? Explain.

(05 Marks)

III) The following frequency distribution shows the distances travelled by a sample of sales representatives of a firm during a certain week.

Distance (km)	80 - 100	100 - 120	120 - 140	140 - 160	160 - 180	180 - 200
No. of sales representatives	3	8	12	16	7	4

i) Construct a histogram for this distribution.

ii) Describe the shape of the histogram.

iii) Compute mean and standard deviation of distances travelled by the sales representative

iv) Briefly describe what each statistic calculated in (iii) tells you.

v) Calculate the coefficient of variation and interpret it in the context of data.

vi) Calculate the range of the distances travelled by the sales representatives.

(12Mark

(Total Marks 2

02. I) A sample of 500 respondents was selected in a large city to study consumer behaviour. T following table presents a summary of the responses to a question: "Do you enjoy shopping f clothing?".

Enjoys shopping for clothing	Gender	
	Male	Female
Yes	136	224
No	104	36

i) What is the probability that a respondent chosen at random

a) enjoys shopping for clothing?
b) is a female and enjoys shopping for clothing?
c) is a female or enjoys shopping for clothing?
d) is a female or male?

ii) Suppose the respondent chosen is a female. What is the probability that she does not en shopping for clothing?

iii) Are "enjoying shopping for clothing" and "gender of the individual" independe Explain.

(08 Mar

II) i) Consider the experiment of a worker assembling a product and a random variable t represents the time in minutes required to assemble the product.

04

a) What values may the random variable assume?
b) Is the random variable discrete or continuous? Explain.

ii) The manager of a large computer network has developed the following probabi distribution of the interruptions per day:

Interruptions (X)	0	1	2	3	4	5	6
Probability $[P(X)]$	0.32	0.35	0.18	0.08	0.04	0.02	0.0

a) What is the probability that the interruptions per day is more than 3?
b) Compute expected number of interruptions per day and interpret it.
c) Compute standard deviation of interruptions per day.

(12 Mar

(Total Marks

03. I) A manufacturer of window frames knows from long experience that 5% of the production will have some type of minor defect and will require an adjustment. Suppose a sample of 12 window frames has been selected.

i) What is the probability that in the sample of 12 window frames

a) none will need adjustment?
b) at least one will need adjustment?

ii) How many of these 12 window frames would you expect for adjustment?

(06 Marks)

II) The download time of a company homepage is normally distributed with a mean of 0.8 second and a standard deviation of 0.2 second.

i) What is the probability that a download time is

a) less than 1 second?
b) between 0.5 and 1.5 seconds?

ii) 95% of the download times lie what are the two values between which symmetrically distributed around the mean?

(10 Marks)

III) The diameter of a brand of Ping-Pong balls is approximately normally distributed with a mean of 1.30 cm and a standard deviation of 0.04 cm. If a random sample of 16 Ping-pong balls is selected,

i) what is the sampling distribution of the mean?

ii) what is the probability that the sample mean is more than 1.32 cm?

(04 Marks)
(Total Marks 20)

04. I) i) Distinguish between the terms point estimate and confidence interval estimate.

ii) A quality control expert wants to estimate the mean thickness of optical lenses produced by a firm. A sample of 120 lenses reveals a mean thickness of 0.52 mm. The population standard deviation is known to be 0.17 mm.

a) Construct a 95% confidence interval for the population mean thickness of optical lenses and interpret it.

b) How would the confidence interval calculated in part (a) change if the population standard deviation is unknown and the sample standard deviation is 0.17 mm? Calculate the interval.

c) How many lenses must the quality control expert sample to be 99% confident with a margin of error 0.10?

(10 Marks)

II) The director of marketing operations for a large retail chain, believes that 60% of the firm' customers are graduates. The director intends to establish an important policy decisio regarding pricing structure on this proportion. A sample of 800 customers reveals that 492 ha degrees. At 5% level of significance, test the hypothesis that the proportion of all custome who are graduates is different from 0.60.

(10 Mark

(Total Marks 2

05) I) In a manufacturing process the assembly line speed (cm per minute) was thought to affect t number of defective parts found during the inspection process. To test this, managers devised situation in which the same batch of parts was inspected visually at variety of line speeds. Th collected the following data.

Line Speed (X)	20	20	40	30	60	40
Number of defective Parts Found (Y)	21	19	15	16	14	17

i) Construct a scatter diagram for these data.

ii) What does the scatter diagram developed in part (i) indicate about the relations between line speed and number of defective parts found?

iii) Estimate the linear regression line by taking number of defective parts (Y) as dependent variable and line speed (X) as independent variable.

iv) Interpret the slope of the estimated linear regression line in part (iii) in the context of data.

v) Estimate the mean number of defective parts found when line speed is 50 cm per minute.

vi) Calculate the coefficient of determination and interpret it in the context of the data.

(12 Ma

II) i) What are the four components of a time series?

ii) Briefly explain the following terms in the context of time series:

a) Additive model;
b) Multiplicative model.

iii) A manufacturing company is interested in forecasting demand of its product quarter the year 2025 from the past data. The demands for each quarter from 2020 to 2024 used to estimate the linear trend equation. The estimated linear trend equation is by: $\hat{Y} = 12.45 + 1.045t$, where $t = 1$ indicates the first quarter of 2020. Estima demand of the product for the 4^{th} quarter of 2025.

(08 M

(Total Mark