UNIVERSITY OF RUHUNA

FACULTY OF MANAGEMENT AND FINANCE

No. of Pages : 04
No. of Questions: 05
Total Marks :70

BACHELOR OF BUSINESS ADMINISTRATION HONOURS DEGREE

1000 LEVEL FIRST SEMESTER END EXAMINATION- AUG/SEP 2025

Three Hours

BBA - 11023 BUSINESS MATHEMATICS AND STATISTICS (Old Syllabus)

Academic Year 2024/2025

Instructions

- Answer all the questions.
- The answer of a new question should be started in a new page.
- Non-programmable calculators are permitted.

Question One

i. Simplify this statement $3[2(x-1)+4(x^2-1)]+10$

(03 Marks)

ii. Find the factors $7x^2-63$

(02 Marks)

iii. Expand the expression, then factorize it. $(x+\frac{1}{x})(x+3)-\frac{3}{x}+1$

(03 Marks)

iv. Solve $\frac{x}{(x-1)}+\frac{2}{x}=\frac{1}{x^2-x}$

(03 Marks)

v. Find the values of x and y by solving the following equations:

$4x+3y=11$ and $2x-5y=25$

(03 Marks)

(Total Marks 14)

7×7 $7\overline{)63}$ 9, 63

mode $= Lm + \left(\frac{d_1}{d_1+d_2}\right)c$ variance $= \frac{\Sigma f(x-\bar{x})^2}{\Sigma f}$

median $= Lm + \left[\frac{\frac{n+1}{2} - F_1}{Fm}\right]c$ standar devi. $= \sqrt{\frac{\Sigma f(x-\bar{x})^2}{\Sigma f}}$

mean deviation $= \frac{\Sigma f(x-\bar{x})}{\Sigma f}$

x	$\bar{x}$	$x-\bar{x}$	$\lvert x-\bar{x}\rvert$	$(x-\bar{x})^2$
		-5	5	25
		-4	4	16
		-2	2	

coefficient variance $= \frac{S^2}{\bar{x}} \times 100$

Question Two

i. A student who borrows Rs.9000 at simple rate and repaid Rs.11 275 after the three years and settle the loan. Find the annual simple interest rate.

(03 Marks)

ii. A person deposited Rs. 10 000 a selected bank account, which pays a 4% compound interest rate compounding quarterly. What is the amount available in this account after 24 months?

(03 Marks)

iii. Mr. Peterson deposited Rs. 5 000 at the end of every month (ordinary annuity) in a bank account for 10 years. If the bank provided 9% of annual compounding in interest rate and compounded monthly. What will be the total amount of the annuity after the 10 years?

(04 Marks)

iv. A father wants to save Rs.100,000 to pay for his son's education in 10 years' time. An education fund requires the investors to deposit equal installments at the end of every 6 month. If the annual interest is 7.5% compounded semi-annually, how much does the father need to save each year in order to meet his target?

(04 Marks)

(Total Marks 14)

Question Three

i. Find the limit $\lim_{x->2} \frac{x^2-x-2}{x^2-2x}$

(03 Marks)

ii. Calculate the derivative of $f(x) = \sqrt{(3-2x)}$

(03 Marks)

iii. Find the derivative of $g(x) = x^2(1+3x^2)$ at $x = 2$.

(03 Marks)

iv. Find $\int (x^3 - 4x + 5)\, dx$

(02 Marks)

v. Show that $\int_0^1 (x-2)(x+2)dx$ is equal to $-\frac{11}{3}$

(03 Marks)

(Total Marks 14)

Question Four

i. Discuss the major steps of sampling process.

(03 Marks)

ii. Briefly explain Three (03) probability sampling techniques.

(03 Marks)

iii. The following table shows the number of hours employees spend on training and their corresponding performance ratings given by the supervisor.

Training Hours	Performance Rating
12	40
15	50
10	32
16	60
20	65
16	50
8	40
14	40
22	70
9	32

a) Compute the Spearman's Rank Correlation Coefficient for the given data.

(06 Marks)

b) What is the relationship between two variables of training hours and performance rating? Interpret the result.

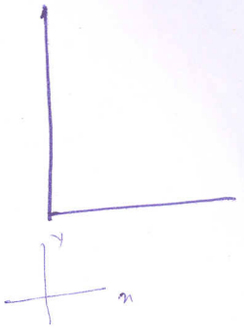
(02 Mark)

(Total Marks 14)

Question Five

The vice president of research and development of a large chemical and fiber manufacturing company believes that the firm's annual profits depend on the amount spent on Research and Development. The new chief executive officer does not agree and has asked for evidence. Here are data for 6 years.

Year	Millions spent on Research and Development-X	Annual Profit (Millions) -Y
2019	2	20
2020	3	25
2021	5	34
2022	4	30
2023	11	40
2024	5	31



i. Draw the scattered diagram for the given data.

(02 Marks)

ii. Draw the line of the best fit for the given data.

(01 Marks)

iii. Formulate the regression function for the given data.

(04 Marks)

iv. Estimate the expected annual profit, when the expenditure for Research and Development increases 15 million rupees.

(02 Marks)

v. Find coefficient of determination (R2) for regression.

(03 Marks)

vi. What is the accuracy level of predictions of your regression line? Explain.

(02 Marks)

(Total Marks 14)

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