CARMEL COLLEGE OF ARTS, SCIENCE AND COMMERCE FOR WOMEN, NUVEM-GOA

SEMESTER END EXAMINATION, JUNE, 2022

Semester: IV of BCOM

Course Title: Business Statistics II (GE 5) **Course Code: CAG102**

Total marks: 80 **Date:** **Duration: 2 Hrs** **Total No. of pages: 3**

Instructions: *1. All questions are compulsory. However internal choice is/are available.*

2. Figures to the right indicate maximum marks to each question.

3. Use of non-programmable calculator is allowed.

Q.1. Answer <u>any four</u> of the following: **(4×4 = 16 marks)**

a) Two Judges gave the following ranks to eight teams in a talent show. Calculate the coefficient of correlation between the ranks assigned by the two Judges.

Judge A	6	5	3	1	4	8	7	2
Judge B	7	3	1	2	5	8	6	4

b) Calculate the Karl Pearson's coefficient of correlation from the following data.

Price (Rs. /unit)	5	4	3	6	2
Demand (in thousands)	8	6	4	9	3

c) Draw a scatter diagram from the following data and interpret.

Capital employed (crores of Rs.)	2	3	5	6	8	9
Profits (Lakhs of Rs.)	6	5	7	8	12	11

d) Distinguish between positive and negative correlation. Give examples of each.

e) Find the probability of getting a sum of 9 or more in a single throw with two dice.

f) What is the probability that the four S's come consecutively in the word MISSISSIPPI?

Q.2. Answer <u>any four</u> of the following: **(4×4 = 16 marks)**

a) A bag contains 7 white, 5 black and 4 red balls. If two balls are drawn at random from a bag, find the probability that one is white and the other is red.

b) What is the chance that a non-leap year has 53 Sunday? Justify your answer.

c) In a binomial distribution with 6 independent trials the probability of 3 and 4 successes is found to be 0.2457 and 0.0819 respectively. Find the parameters p and q of the binomial distribution.

d) A random sample of 1000 units from a large consignment showed that 200 were damaged. Find (i) 95% and (ii) 99% confidence limits for the proportion of damaged units in the consignment.

e) Write a note on sampling and its uses.

f) Explain what is Null Hypothesis, Alternate Hypothesis, Type I error and Level of Significance with reference to testing of hypothesis.

Q.3. Answer <u>any one</u> of the following: **(6×2 = 12 marks)**

A. i. Given the following aptitude and I.Q. scores for a group of students.
Find the Spearman's rank correlation by making adjustment for the tied ranks.

Aptitude Score	57	58	59	59	60	61	60	64
I.Q. Score	97	108	95	106	120	126	113	110

ii. The data relating to the import price (y) and import quantity (x) in respect of a given commodity are as under:

Import Price (y)	7	6	5	4	3	2	1
Quantity imported (x)	18	16	14	12	10	6	8

Compute the Karl Pearson's correlation coefficient.

OR

B. i. Calculate the coefficient of correlation by Karl Pearson's method from the table, given that arithmetic means of X and Y series are 6 and 8 respectively.

X	6	2	10	4	8
Y	9	11	?	8	7

ii. The lines of regression of a bivariate population are
$4X - 5Y + 33 = 0$ and $20X - 9Y - 107 = 0$
The variance of X is 9. Find
(a) Correlation coefficient between X and Y
(b) Standard deviation of Y.

Q.4. Answer <u>any one</u> of the following: **(6×2 = 12 marks)**

A. i. State and prove the Addition theorem of Probability.
ii. Given below is the information relating to bivariate distribution
Regression equation of Y on X is $Y = 20 + 0.4X$, mean of $X = 30$
Correlation coefficient between X and Y is 0.8
Find the regression equation of X on Y.

OR

B. i. You are given the following data:

	x	y
Arithmetic mean	36	85
Standard deviation	11	8

And correlation coefficient between x and y = 0.66
a) Find the two regression equations
b) Estimate value of x when $y = 75$.

ii. From 4 professors and 6 students, a committee of 3 is to be formed. In how many ways, this can be done, if the committee contains:
a) exactly 1 professor,
b) at least 3 professors,
c) at most 2 professors.

Q.5. Answer <u>any one</u> of the following: **(6×2 = 12 marks)**

A. i. The probability that a student is a swimmer is $\frac{4}{5}$.

Out of 5 students considered, find the probability that

(a) exactly 3 are swimmers.

(b) at most 2 are swimmers.

ii. A bakery has the following probability distribution of daily demand for cakes. Find the expected number of cakes demanded per day.

Number of cakes demanded	100	200	300	400	500
Probability	0.09	0.21	0.40	0.28	0.02

OR

B. i. If 2% of the electric bulbs manufactured by a company are defective, use Poisson distribution to find the probability that in a sample of 200 bulbs.

a) None is defective.

b) Less than 2 bulbs are defective

c) More than 3 bulbs are defective (Given $e^{-4} = 0.0183, e^{-5} = 0.007$)

ii. In a city there were 1000 electric bulbs were used for street lighting. The average life of bulbs is 1000 hours with a standard deviation of 200 hours. Find the number of bulbs expected to have a life between 800 and 1200 hours.

(Given that for a standard normal variate the area between $z = 0$ and $z = 1$ is 0.3413 and 80% of the area lie between $z = \pm 1.25$)

Q.6. Answer <u>any one</u> of the following: **(6×2 = 12 marks)**

A. i. The probability of three independent companies opening new branch in a city are $\frac{1}{2}, \frac{1}{3}$ and $\frac{1}{5}$ respectively. What is the probability that

a. All three companies open a new branch in that city?

b. None of the three companies open a new branch in that city?

ii. Enumerate the various methods of sampling and describe two of them mentioning the situations where each one is too be used.

OR

B. i. Let A and B be two events such that $P(A) = 0.4, P(B) = 0.5, P(A \cup B) = 0.7,$

Obtain the probabilities (a) $P(A \cap B)$ (b) $P(A/B)$ (c) $P(\overline{A} \cap \overline{B})$.

ii. A D.T.P. operator claims that she can type a regular text at an average speed of 100 words per minute. To check her claim random 36 trials were done, her average speed was 95 words per minute with a standard deviation of 10 words. Test the claim at 1% level of significance.