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

B.SC. CBCS Semester I Examination, January, 2021

Semester: I OF B.SC **Course name & Code: Probability and Statistics (GE)**
Total marks: 30 **Date: 12-01-2021** **Duration: 2 Hrs** **Total No. of pages: 2**

Instructions:

1. All questions are compulsory, however internal choice is available.

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

*3. Student shall write down the answers and should **sign each and every page with date** and then upload the scanned copy/photograph of the answer sheet in PDF format. A student must upload their answer scripts by 1.00 pm.*

*4. PDF should be titled as : **Name of the student_Seat Number_paper name.***

Q.1. Attempt **any five** of the following: **[10]**

a) "Figures do not lie. Liars figure", Explain the distrust of Statistics on the basis of the Statement (write your answer in not more than 40 words)

b) The letters of the word 'ORANGE' are arranged at random, find the chance that the vowels are always together.

c) Define a Poisson distribution.
If X is a Poisson variate with parameter1, find $P(X = 5)$. [Given $e^{-1} = 0.36783$]

d) A town has two doctors X and Y operating independently. If the probability that Doctor X is available is 0.9 and that for Y is 0·8, what is the probability that at least one doctor is available when needed?

e) Given the regression line of x on y as $3x + 2y - 8 = 0$ and the regression line of y on x as $x + 2y = 5$, Calculate the mean of x and y.

f) Calculate Spearman's Rank correlation coefficient between advertisement cost and sales from the following data:

Advertisement cost('000 Rs)	39	65	62	90	82
Sales (lakhs Rs.)	47	53	58	86	62

g) A random variable X has the following probability distribution.

Values of X:	3	4	5	6	7	8
$p(X)$:	0.2	$2k$	0.1	k	0.3	k

Find the value of k. Also, find the expected value of random variable X.

h) What are non-parametric tests? How are parametric test different from non-parametric tests?

Q.2. Attempt **any four** of the following: **[20]**

a) The following data relates to the marks obtained by 10 students of a class in Statistics and Costing. Calculate the Karl Pearson's correlation coefficient.

Marks in Statistics	30	38	28	27	28	23
Marks in Costing	29	27	22	29	20	29

b) The following calculations have been made for closing prices of twelve stocks (X) on Bombay Stock Exchange on a certain day, along with the volume of sales (in thousands) of shares (Y). Form the calculations, find the regression equations. $\sum X = 370$, $\sum Y = 580$, $\sum XY = 11{,}494$, $\sum X^2 = 17{,}206$, $\sum Y^2 = 41{,}658$

c) What do you understand by Binomial distribution? What are its features?
The average percentage of failures in a certain examination is 40%. What is the probability that out of a group of 6 candidates, at least 4 passed in the examination?

d) There are five white and seven red balls in a bag. A ball is drawn and then replaced. What is the probability that the white and a red ball are drawn in that order?
What would be the probability if the balls drawn were not put back into the bag?

e) A manufacturer needs to buy acrylic sheets of 5 mm thickness. Thinner sheets would not be appropriate and thicker sheets would be too heavy. He took a random sample of 100 sheets from a supplier and found that their average thickness was 3.8 mm with a standard deviation of 1 mm. Should he buy the sheets from the suppliers if he wants to make a decision at 1% level of significance?

f) The eye-sight of 1000 randomly selected people from a town was tested.

	Poor Eye-sight	Good Eye-sight
Male	200	350
Female	200	250

Can we conclude at 5% level of significance that sex has no bearing on the quality of eye-sight? [*Given the chi-square values for 1, 2, 3 and 4 degrees of freedom are 3.84, 5.99, 7.81 and 9.49 respectively*].