

### Assignment VII: Unit IV

Note: Submission date 18<sup>th</sup> March 2023.

Q.1 State the properties of Chi-Square Distribution.

Q.2 In experiments on pea breeding the following frequencies of seeds were obtained:

Round and yellow	Wrinkled and yellow	Round and green	Wrinkled and green	Total
315	101	108	32	556

Theory predicate that the frequencies should be in proportions 9:3:3:1. Examine the correspondence between theory and experiment.

Q.3 Among 64 offspring's of a certain cross between guinea pigs, 34 were red, 10 were black and 20 were white. According to the genetic model, these numbers should be in the ratio 9:3:4, are the data consistent with the model at the 5% level?

Q.4 A set of five similar coins is tossed 320 times and the result is

No. of heads	0	1	2	3	4	5
Frequency	6	27	72	112	71	32

Test the hypothesis that the data follow a binomial distribution.

Q.5 Fit a Poisson distribution to the following data and test the goodness of fit.

x	0	1	2	3	4	5	6
f	275	72	30	7	5	2	1

Q.6 Fit a Poisson distribution to the following data and test for its goodness of fit at level of significance 0.05.

X	0	1	2	3	4
F	419	352	154	56	19

Q.7 A company director is concerned that his company's share may be unevenly distributed throughout the country, in a survey in which sample of 200 customers are selected from four zones and are tabulated as under:

	Zone	
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	I	II	III	IV	
Purchase the brand	80	110	90	100	380
Not purchase the brand	120	90	110	100	420
	200	200	200	200	800

At  $p = 0.05$ , use  $\chi^2$  to determine whether the company share is same across the four zones.

Q.8 From the following table showing the number of plants having certain characters, test the hypothesis that the flower colour is independent of flatness of leaf at the 0.1 level of significance.

	Flat leaves	Curled leaves	Total
White Flowers	99	36	135
Red Flowers	20	5	25
Total	119	41	160

Q.9 Use Yate's correction and test whether A and B are independent. Observed frequencies are as under:

	A	Not A	Total
B	45	55	100
Not B	60	40	100
Total	105	95	200

Q.10 The number of licensor companies classified by the proportion of foreign profits derived from license agreements were as follows:

Proportion of profits	Licensor type		Total
	Dominant product	Diversified	
Less than 5%	1	6	7
5% or more	7	6	13
Total	8	12	20

Q.11 In an experiment on immunization of human from COVID-19 the following results were obtained.

	Died	Unaffected
Inoculated	12	26
Not inoculated	16	6

Examine the effect of vaccine in controlling susceptibility to COVID-19.

Q.12 In a survey of 200 boys, of which 75 were intelligent, 40 had skilled fathers; while 85 of the unintelligent boys had unskilled fathers. Do these figures support the hypothesis that skilled fathers have intelligent boys? Use Chi-square test at 5% level of signification.