VIT
Vellore Institute of Technology

Final Assessment Test – Jan / Feb 2023

Course: MAT5007 - Applied Statistical Methods
Class NBR(s): 5820 / 5832 / 5854 Slot: D2
Time: Three Hours Max. Marks: 100

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS TREATED AS EXAM MALPRACTICE

General Instruction : Scientific calculator and Statistical tables are allowed

Answer any TEN Questions

(10 X 10 = 100 Marks)

1. Calculate the arithmetic mean and the median of the frequency distribution given below. Hence calculate the mode using the empirical relation between the three.

Class limits	130-134	135-139	140-144	145-149	150-154	155-159	160-164
Frequency	5	15	28	24	17	10	1

2. From the data given below, find the Standard deviation

Ages	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
No. of Persons	50	70	80	80	150	120	70	50

3. The following table gives the distribution of monthly income of 500 workers in a factory

Monthly income	Below Rs 100	100-150	150-200	200-250	250-300	300 and above
No. of Workers	10	25	145	220	70	30

Obtain Bowley's coefficient of skewness.

4. Calculation Pearson's coefficient of correlation from the following data: Take 65 and 70 as the assumed average of the variates X and Y respectively

X	45	55	56	58	60	65	68	70	75	80	85
Y	56	50	48	60	62	64	65	70	74	82	90

5. From the following data of the age of husband and the age of wife, from two regression lines and calculate the husband's age when the wife's age is 16.

Husband's age	36	23	27	28	28	29	30	31	33	35
Wife's age	29	18	20	22	27	21	29	27	29	28

6. The distribution of typing mistakes committed by a typist is given below. Assuming a Poisson model, find the expected frequencies.

Mistakes per page	0	1	2	3	4	5
No. of pages	142	156	69	27	5	1

7. The daily wages of 1000 workmen are normally distributed around a mean of Rs 70 and with a standard deviation of Rs 5. Estimate the number of workers whose daily wages will be

   i) Between Rs 70 and 72
   ii) Between Rs 69 and 72
   iii) more than Rs 75
   iv) Less than Rs 63
   v) more than Rs 80

8. A person buys 100 electric tubes of each of two well-known makes, taken at random from stock for testing purpose. He finds that make A has a mean life of 1300 hours with a standard deviation of 82 hours, and make B has a mean life of 1248 hours with a standard deviation of 93 hours. Discuss the significance of these results. Which make of electric tubes should the person buy?

9. The subject under investigation is the measure of dependence of Tamil on words of Sanskrit origin. One newspaper article reporting the proceedings of the constituent assembly contained 2025 words of which 729 words were declared by literary critic to be of Sanskrit origin. A second article by the same author describing atomic research contained 1600 words of which 640 words were declared by the same critic to be of Sanskrit origin. Assuming that simple sampling conditions hold, estimate the limits for the proportion of Sanskrit words in the writer's vocabulary and examine whether there is any significant difference in the dependence of this writer on words of Sanskrit origin in writing the two articles. Take $\alpha = 0.05$.

10. The following table gives for a sample of married women, the level of education and marriage adjustment score:

		marriage adjustment score			
		Very low	Low	High	Very high
Level of Education	College	24	97	62	58
	High school	22	28	30	41
	Middle school	32	10	11	20

Can you conclude from the above, the higher the level of education, the greater is the degree of adjustment in marriage?

11. The random samples were drawn from two normal populations and the following results were obtained.
Sample 1: 16,17,18,19,20,21,22,24,26,27
Sample 2: 19,22,23,25,26,28,29,30,31,32,35,36
Obtain the estimates of the means of populations and test whether two populations have the same means.

12. Four experimenters determine the moisture content of samples of a powder, each man taking a random sample from each of the six consignments. These assessments are given in the following table.

Observer	consignment					
	1	2	3	4	5	6
1	9	10	9	10	11	11
2	12	11	9	11	10	10
3	11	10	10	12	11	10
4	12	13	11	14	12	10

Perform an analysis of variance on these data and discuss whether there is any significant difference between consignments or between observers.
If there is significant difference between the level of any of the factors of variation, then determine the corresponding pairs of sample means which differ significantly.
Use $\alpha = 0.05$

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