(FOR THE CANDIDATES ADMITTED

| 22UAI4A1 |

DURING THE ACADEMIC YEAR 2022 ONLY)   **REG.NO. :**

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : MAY-2024

Bsc.Computer Science with AI and ML   **MAXIMUM MARKS: 50**

SEMESTER: IV   **TIME : 3 HOURS**

PART - III

22UAI4A1 -MATHEMATICS FOR MACHINE LEARNING

SECTION – A   **(10 X 1 = 10 MARKS)**

ANSWER THE FOLLOWING QUESTIONS.   **(K1)**

1. The foundations of statistical inference_____

   (a) the sampling distribution of mean

   (b) sampling distribution of proportion

   (c) the sampling distribution of correlation coefficient

   (d) all

2. χ^2 Distribution has ____ parameter

   (a) 0 (b) 1 (c) 2 (d) 3

3. If there are more than two populations, for testing the equality of their mean ,___method is applied

   (a) F-test   (b) t-test (c) χ^2 (d) Analysis of variance

4. A finite automaton is 5-tuple $M = (Q, \sum, \delta, q_0, F)$ where δ is called _____

   (a) finite set (b) input symbols (c) initial state (d) next state

5. If L_1 and L_2 are regular then _____ is regular

   (a) $L_1 \cap L_2$ (b) $L_1 U L_2$ (c) L_1' and L_2' (d)all

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES   **(K2)**

6. Define standard error mean.

7. Write any one property of t distribution.

8. List the types of analysis of variance

9. What is called accepting state?

10. Write the representation of context free grammar

| ETHICAL PAPER |

SECTION – B (5 X 3 = 15 MARKS)
ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) A college conducts both day and night classes intended to be identical . A sample of 100 day students yields examination results as
$\bar{x} = 72.4$, $\sigma = 14.8$ and a sample of 200 night students as $\bar{x} = 73.9$, $\sigma = 17.9$ Are the two means statistically equal at 10% level?

(OR)

b) A random sample of 200 tins of coconut oil gave an average weight of 4.95kgs with a standard deviation of 0.21 kg. Do we accept the hypothesis of net weight 5 kgs per tin at 1% level?

12. a) A sample of 10 house owners is drawn and the following values of their incomes are obtained . Mean Rs 6,000 standard deviation Rs 650. Test the hypothesis that the average income of house owners of the town is Rs 5500

(OR)

b) A company keeps records of accidents during a recent safety review. a random sample of 60 accidents was selected and classified by day of the week on which they occurred

Day	Mon	Tue	Wed	Thu	Fri
No of accidents	8	12	9	14	17

Test whether there is any evidence that accidents are more likely on some days that others.

13. a) Explain the analysis of covariance for two way classification table .

(OR)

b) Explain the classification relation problems in detail.

14. a) Explain language accepted by a finite automaton with an example .

(OR)

b) Explain deterministic finite automata with an example.

15. a) Explain context free grammar

(OR)

b) Explain the types of Phrase-Structure Grammars

SECTION – C (5 X 5 = 25 MARKS)
ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.(K4 (Or) K5)

16. a) In a sample of 600 parts manufactured by a factory, the number of defective parts was found to be 45. The company however claimed that only 5% of their product is defective .Is the claim tenable?

(OR)

b) A company has the head office at Calcutta and a branch at Bombay. The personal director wanted to know if the workers at two places would like the introduction of a new plan of work and a survey was conducted for this purpose. Out of a sample of 500 workers at Calcutta 62% favoured the new plan. At Bombay out of a sample of 400 workers 41% were against the plan. Is there any significant difference between the two groups in their attitude towards the new plan at 5% level.

17. a) A company is testing two machines . A random sample of 8 employees are selected and each employee uses each machine for one hour. The number of components produced is shown in the following table

Employee	1	2	3	4	5	6	7	8
I machine	96	107	84	9	102	87	93	101
II machine	99	112	90	97	108	97	94	98

Test whether there is evidence of difference between the machines in the mean number of components produced.

(OR)

b) A random sample of employees of a large company was selected and the employee were asked to complete a questionnaire. One question asked was whether the employees were in favour of the introduction of flexible working hours. The following table classifies the employees by their response and gender that is male or female

Response	Gender	
	Male	Female
In favour	57	83
Not in favour	33	27

Test whether there is evidence of a significant association between the response and gender.

18. a) Set up a ANOVA table from the following per hectare yield for these varieties of wheat each grown in four plots:

Per hectare yield (in Hundred kgs)

Plots	Variety of wheat		
	A_1	A_2	A_3
1	6	5	5
2	7	5	4
3	3	3	3
4	8	7	4

Also work out F-ratio and test whether there is significant difference among the average yields in the 3 varieties of wheat.

(OR)

b) Perform a Two-way ANOVA on the data given below

		Treatment I		
		I	II	III
Treatment II	I	30	26	38
	II	24	29	28
	III	33	24	35
	IV	36	31	30
	V	27	35	33

Use the coding method, subtracting 30 from the given numbers

19. a) Explain non-deterministic finite automata with an example.

(OR)

b) Briefly explain the procedure for finding an FA equivalent to a given NFA

20. a) Explain Chomsky Hierarchy of languages

(OR)

b) Explain context sensitive grammar, regular grammar, and languages generated by grammars.

****

ETHICAL PAPER