BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI

Work Integrated Learning Programmes Division

Cluster Programme - M. Tech in AI & ML

II Semester , 2023 – 24

Comprehensive Examination **(Makeup)**

Course No : AIMLC ZC418
Course Title : Introduction to Statistical Methods
Nature of Exam. : Open Book (Off Line)
Weightage : 40 Marks
Duration : 150 minutes
Date : 5th October ,2024_10 AM

Number of questions:4
Number of Pages: 2

Q. No	Question	Marks
Q.1.	A patient is asked to pass four different lab tests P, Q, R and S to get the confirmation regarding a disease. He estimates his chance of passing in P as 4/5, in Q as 3/4, in R as 5/6 and in S as 2/3. To get the confirmation from the doctor that there is no disease, he must pass in P and at least two other tests. What is the probability that he will get the confirmation that there is no disease?	**5M**
Q.1.b.	Foody an online food ordering and delivery company is aimed to reduce the delivery time to a minimum. A The mean delivery time for a random sample of 25 food orders is 13.15 minutes and standard deviation is 3.1 minutes. Perform a hypothesis test, with α =0.05 level of significance, to determine whether the service goal of 10 minutes or less is being achieved.	**5M**
Q.2.a.	Analyze the following data for testing the significant difference between the mileages of 3 branded 2-wheeler motor bikes. And answer the following with justification a) State the null hypothesis b) State the alternate hypothesis c) Which test can be used in the validation? d) Is it a parametric or non - parametric test? e) What is the critical region or criteria with 0.05 level of significance Bike Brand | Mileage (in Kms) per liter petrol Hero | 60, 65, 65, 63, 62 TVS | 70, 75,7 8, 56, 52 Bajaj | 85, 77, 65, 53, 82	**5M**
Q.2.b.	Following data is related to players' performance in one days series and IPL leagues.Using a suitable test, check whether there is any association between a player's performance in one day series and IPL league at 1% Level of significance.(Use and state assumptions if required) | | **Runs scored** | | | | **One day series** | **IPL Series** | | **Player A** | 1000 | 200 | | **Player B** | 800 | 700 | | **Player C** | 600 | 500 | | **Player D** | 900 | 400 | | **Player E** | 200 | 600 |	**5M**

Q.3.b. Consider the following time series data. **10M**

i) Fit an exponential smoothing model, if possible. If not ,state the reasons

ii) Fit a suitable moving average of your choice

iii) Compare the above models and conclude.

Year	**Sales(in crores)**
2014	12
2015	16
2016	20
2017	15
2018	16
2019	17
2020	21
2021	18
2022	19

Q.4. Consider the following data.(Y = f(X)) **10M**

X	12	10	13	10	9	14
Y	15	20	22	13	12	18

i) Check whether x and y are having any linear relation using a suitable statistical approach.

ii) Find a suitable linear relation using “Sum of Squared Errors” (SSE) as the loss / cost function.

iii) Use this relation to predict y when x is 20.

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