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**PRESIDENCY UNIVERSITY
BENGALURU
SCHOOL OF ENGINEERING**

MIDTERM EXAMINATION

SET A

Sem & AY: Winter Sem 2021-22

Date: 09/05/2022

Course Code: MAT1003

Time: 1.30 PM – 3.00 PM

Course Name: Applied Statistics

Max Marks: 50

Program & Sem: B. Tech and II Sem

Weightage: 25%

Instructions:

- (i) *Read the questions properly and answer accordingly.*
 - (ii) *Question paper consists of 3 parts.*
 - (iii) *Scientific and Non-programmable calculators are permitted.*
-

Part A [Memory Recall Questions]

Answer all the questions. Each question carries 1 mark. (10Q x 1M = 10M)

1. The arithmetic mean of first 7 natural numbers is _____. (C.O.No.1) [Knowledge]
2. The formula for computation of average by step-deviation method for grouped data is _____ . (C.O.No.1) [Knowledge]
3. Suppose a sample standard deviation was calculated to be 8. What would be the associated variance? (C.O.No.1) [Knowledge]
4. If the values of the two variables deviate in the opposite direction, then the correlation is said to be _____. (C.O.No.1) [Knowledge]
5. The formula for regression equation of y on x is _____. (C.O.No.1) [Knowledge]
6. Two dice are thrown at the same time. Find the total number of elements in the sample space. (C.O.No.2) [Knowledge]
7. If $P(E)$ denotes the probability of an event E , then the probability of the complement of the event E is _____. (C.O.No.2) [Knowledge]
8. The probability of a sure event is _____. (C.O.No.2) [Knowledge]
9. For two independent events A and B, $P(B|A) =$ _____. (C.O.No.2) [Knowledge]
10. The probability of scoring a six in a single throw of an unbiased die is _____. (C.O.No.2) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the questions. Each question carries 5 marks.

(4Q x 5M = 20M)

11. The following data denote the frequency distribution of the number of telephone calls received in 245 successive one-minute intervals at an exchange:

Number of calls	0	1	2	3	4	5	6	7
Frequency	14	21	25	43	51	40	39	12

Obtain the mean number of calls per minute using step deviation method.

(C.O. No.1) [Comprehension]

12. Determine the nature of correlation prevalent between X and Y from the following observations using a suitable measure:

(C.O.No.1) [Comprehension]

X	1	2	3	4
Y	1	4	9	16

13. Three unbiased coins are tossed simultaneously. What are the chances of getting (a) two tails (b) at least two heads
14. A card is drawn from a well shuffled deck of playing cards. What are the chances of getting either a queen or a spade?

(C.O.No.2) [Comprehension]

(C.O.No.2) [Comprehension]

Part C [Problem Solving Questions]

Answer all the questions. Each question carries 10 marks.

(2Q x 10M = 20M)

15. Construct suitable linear regression models for

- a) estimating marks in Statistics when marks in Accountancy is given
b) estimating marks in Accountancy when marks in Statistics is given.

Marks in Statistics	18	17	23	22	21	20	19	19	20	21
Marks in Accountancy	16	12	20	15	22	15	11	14	19	16

(C.O.No.1) [Comprehension]

16. The probability that a married man votes for a bond referendum is 0.21 and the probability that a married woman votes for the bond referendum is 0.28. The probability that a woman votes for the bond referendum, given that her husband does, is 0.7. Find the probability that (a) a married couple vote for a bond referendum (b) a husband votes for a bond referendum, given that his wife does (c) at least one member of a married couple will vote for a bond referendum.

(C.O.No.2) [Comprehension]



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MIDTERM EXAMINATION

SET B

Sem & AY: Winter Sem 2021-22

Date: 09/05/2022

Course Code: MAT1003

Time: 1.30 PM – 3.00 PM

Course Name: Applied Statistics

Max Marks: 50

Program & Sem: B.Tech and II Sem

Weightage: 25%

Instructions:

- (i) *Read the questions properly and answer accordingly.*
 - (ii) *Question paper consists of 3 parts.*
 - (iii) *Scientific and Non-programmable calculators are permitted.*
-

Part A [Memory Recall Questions]

Answer all the questions. Each question carries 1 mark. (10Q x 1M = 10M)

1. The average/arithmetic mean of first five odd numbers is _____.
(C.O.No.1) [Knowledge]
2. The formula for the computation of arithmetic mean by step-deviation method concerning ungrouped data is _____.
(C.O.No.1) [Knowledge]
3. The value of the standard deviation is _____ when the variance of the data is 9.
(C.O.No.1) [Knowledge]
4. Karl-Pearson's coefficient is used to measure _____.
(C.O.No.1) [Knowledge]
5. The regression equation of x on y is _____.
(C.O.No.1) [Knowledge]
6. The probability of getting 7 when we throw a die is _____.
(C.O.No.2) [Knowledge]
7. $P(E) + P(E') =$ _____, where E' is the complement of the event E .
(C.O.No.2) [Knowledge]
8. The probability of an impossible event is _____.
(C.O.No.2) [Knowledge]
9. For two independent events A and B, $P(A \cap B) =$ _____.
(C.O.No.2) [Knowledge]
10. The probability of getting all heads when three coins are tossed is _____.
(C.O.No.2) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the questions. Each question carries 5 marks.

(4Q x 5M = 20M)

11. Engineers in a design department are assessed by their leader. A '0' is 'Terrible' and a '5' is 'Outstanding'. The 29 members of the department are evaluated and their scores recorded as follows:

Scores	0	1	2	3	4	5
Number of staff	2	5	6	9	4	3

Obtain the mean score of the whole department using step deviation method.

(C.O.No.1) [Comprehension]

12. Determine the nature of correlation for the following observations using a suitable measure

Number of teachers	10	15	23	27
Number of students	46	47	53	61

(C.O.No.1) [Comprehension]

13. A uniform die is thrown at random. What are the chances that the number on it is
(a) greater than 4 (b) even number? (C.O.No.2) [Comprehension]

14. A card is drawn from a well shuffled pack of playing cards. What is the chance of getting either a diamond or a king? (C.O.No.2) [Comprehension]

Part C [Problem Solving Questions]

Answer all the questions. Each question carries 10 marks.

(2Q x 10M = 20M)

15. Construct suitable linear regression models for
a) estimating marks in statistics when marks in mathematics is given
b) estimating marks in mathematics when marks in statistics is given.

Marks in statistics	10	25	13	25	22	11	12	25	21	20
Marks in mathematics	12	22	16	15	18	18	17	23	24	17

(C.O.No.1) [Comprehension]

16. The probability that a man watches a certain sport is 0.45 and the probability that a married woman watches the same sport is 0.35. The probability that a man watches a certain sport, given that his wife does, is 0.87. Find the probability that (a) a married couple watch a certain sport (b) a woman watches a certain sport, given that her husband does (c) at least one member of a married couple will watch the sport.

(C.O.No.2) [Comprehension]



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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

END TERM EXAMINATION

Winter Semester: 2021-22

Course Code: MAT1003

Course Name: Applied Statistics

Program & Sem: B.Tech & II Sem

Date: 5th July 2022

Time: 01:00 PM – 04:00 PM

Max Marks: 100

Weightage:50%

Instructions:

- (iv) Read all the questions carefully and answer accordingly.
- (v) Question paper consists of 3 parts.
- (vi) Scientific and non-programmable calculators are permitted.

Part A [Memory Recall Questions]

**Answer all the questions. Each question carries TWO marks.
2M = 20M)**

(10Q x

1. Consider the ages of 10 children as follows: 4, 2, 6, 8, 3, 2, 2, 1, 5, 3. What is the mean age?
(C.O.No.1)
[Knowledge]
2. The coefficient of correlation is found to be – 0.47. What is the nature of correlation prevalent between the variables?
(C.O.No.1)
[Knowledge]
3. What is the probability of scoring a doublet of odd numbers while rolling 2 dice?
(C.O.No.2) [Knowledge]
4. For an experiment, the event space of an event P is {2, 3, 4} and that of Q is {5, 8}. If P and Q are mutually exclusive as well as exhaustive, what is the sample space?
(C.O.No.2)
[Knowledge]
5. What is the probability mass function of the binomial distribution? (C.O.No.3)
[Knowledge]
6. State any two properties of the standard normal distribution. (C.O.No.3)
[Knowledge]
7. What is the level of significance when the level of confidence is 95%?
(C.O.No.4)
[Knowledge]
8. What type of error occurs when one accepts the null hypothesis when it is actually not true?

(C.O.No.4)

[Knowledge]

9. Distinguish between statistics and parameters.

(C.O.No.4)

[Knowledge]

10. For the null hypothesis $H_0: \mu = 100$, construct a suitable alternative hypothesis.

(C.O.No.4) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the questions. Each question carries TEN marks.

(5Q x

10M = 50M)

11. The following data shows the number of residents in a certain old age home. Considering the assumed mean age as 72 years, calculate the actual mean age of the residents.

(C.O.No.1) [Comprehension]

Age	60-65	65-70	70-75	75-80	80-85	85-90
Number of residents	3	4	10	5	2	1

12. A consulting firm rents cars from 3 agencies A, B & C such that 20% of them are from agency A, 30% from agency B and 50% from agency C. It has been observed that 90% of the cars from A, 80% from B and 95% from C are in good condition. If a randomly selected car is in good condition, what is the probability that they have been rented from (i) Agency B (ii) Agency C.

(C.O.No.2) [Comprehension]

13. Following is the probability distribution of a discrete random variable X:

x	2	4	6	8	10	12	14
$f(x)$	K	3k	k	2k	4k	2k	3k

Find (a) the value of k (b) $P(X \geq 14)$ (c) $P(4 \leq X \leq 12)$ (d) $P(X < 10)$.

(C.O.No.3)

[Comprehension]

14. It has been observed that 10 drops of water trickle every 5 minutes from a leaking pipe. What is the probability that in 5 minutes (a) exactly 6 drops of water trickle (b) at most 2 drops of water trickle (c) at least 2 drops of water trickle.

(C.O.No. 3) [Comprehension]

15. The average lifetime of an electric motor is 5 years. If lifetime of electric motors is normally distributed with a standard deviation of 2 years, what is the probability that an electric motor survives for (a) at most 4 years (b) at least 6 years (c) between 3 to 7 years. (Given that $P(Z \leq 0.5) = 0.69146$, $P(Z \leq 1) = 0.84134$).

(C.O.No.3) [Comprehension]

Part C [Problem Solving Questions]

Answer both the questions. Each question carries FIFTEEN marks.

(2Q x

15M = 30M)

16. Consider the marks scored in 2 courses History and Sociology for 10 students on a scale of 0 - 10. (C.O.No.1)

[Comprehension]

Students	1	2	3	4	5	6	7	8	9	10
History	9	4	7	8	5	6	7	9	8	2
Sociology	8	5	7	7	6	2	3	5	6	2

Determine the nature of the correlation prevalent between the scores in the two courses.

17. It has been observed that, for a particular disease, 4 out of 5 times a patient responds to a treatment.

- Construct a suitable mathematical model, which represents the number of times the patient responds to the treatment.
- If 4 patients suffering from the mentioned disease are treated, what is the probability that all 4 respond to the treatment?
- If 4 patients suffering from the mentioned disease are treated, what is the probability that at least 2 respond to the treatment?
- If 30 patients are monitored, what is the expected mean number of patients who would respond to the treatment? (C.O.No. 3)

[Comprehension]



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MIDTERM EXAMINATION

SET B

Sem & AY: Winter Sem 2021-22

Date: 09/05/2022

Course Code: MAT1003

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-

Part A [Memory Recall Questions]

Answer all the questions. Each question carries 1 mark. (10Q x 1M = 10M)

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(C.O.No.1) [Knowledge]
2. The formula for the computation of arithmetic mean by step-deviation method concerning ungrouped data is _____.
(C.O.No.1) [Knowledge]
3. The value of the standard deviation is _____ when the variance of the data is 9.
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9. For two independent events A and B, $P(A \cap B) =$ _____.
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Part C [Problem Solving Questions]

Answer all the questions. Each question carries 10 marks.

(2Q x 10M = 20M)

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(C.O.No.1) [Comprehension]

16. The probability that a man watches a certain sport is 0.45 and the probability that a married woman watches the same sport is 0.35. The probability that a man watches a certain sport, given that his wife does, is 0.87. Find the probability that (a) a married couple watch a certain sport (b) a woman watches a certain sport, given that her husband does (c) at least one member of a married couple will watch the sport.

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MIDTERM EXAMINATION

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6. Two dice are thrown at the same time. Find the total number of elements in the sample space. (C.O.No.2) [Knowledge]
7. If $P(E)$ denotes the probability of an event E , then the probability of the complement of the event E is _____. (C.O.No.2) [Knowledge]
8. The probability of a sure event is _____. (C.O.No.2) [Knowledge]
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X	1	2	3	4
Y	1	4	9	16

13. Three unbiased coins are tossed simultaneously. What are the chances of getting (a) two tails (b) at least two heads
14. A card is drawn from a well shuffled deck of playing cards. What are the chances of getting either a queen or a spade?

(C.O.No.2) [Comprehension]

(C.O.No.2) [Comprehension]

Part C [Problem Solving Questions]

Answer all the questions. Each question carries 10 marks.

(2Q x 10M = 20M)

15. Construct suitable linear regression models for

a) estimating marks in Statistics when marks in Accountancy is given

b) estimating marks in Accountancy when marks in Statistics is given.

Marks in Statistics	18	17	23	22	21	20	19	19	20	21
Marks in Accountancy	16	12	20	15	22	15	11	14	19	16

(C.O.No.1) [Comprehension]

16. The probability that a married man votes for a bond referendum is 0.21 and the probability that a married woman votes for the bond referendum is 0.28. The probability that a woman votes for the bond referendum, given that her husband does, is 0.7. Find the probability that (a) a married couple vote for a bond referendum (b) a husband votes for a bond referendum, given that his wife does (c) at least one member of a married couple will vote for a bond referendum.

(C.O.No.2) [Comprehension]