

Invigilator's Signature :



- iv) The standard deviation is
- a) the square root of the variance
 - b) a measure of variability
 - c) an approximate indicator of how numbers vary from the mean
 - d) all of these.
- v) A graph that uses vertical bars to represent data is called
- a) line graph
 - b) bar graph
 - c) scatter plot
 - d) vertical graph.
- vi) The most frequently occurring number in a set of values is called the
- a) mean
 - b) median
 - c) mode
 - d) range.
- vii) The is the value you calculate when you want the arithmetic average.
- a) mean
 - b) median
 - c) mode
 - d) all of these.
- viii) Which of the following is the formula for range ?
- a) $H + L$
 - b) $L \times H$
 - c) $L - H$
 - d) $H - L$.
- ix) Which of the following is not a measure of variability ?
- a) Median
 - b) Variance
 - c) Standard deviation
 - d) Range.
- x) Which of the following is *not* a common measure of central tendency ?
- a) Mode
 - b) Range
 - c) Median
 - d) Mean.
- xi) What is the median of the set of numbers :
4, 6, 7, 9, 2000000 ?
- a) 7.5
 - b) 6
 - c) 7
 - d) 4.



- xii) What is the key question in the field of statistical estimation ?
- Based on my random sample, what is my estimate of the population parameter ?
 - Based on my random sample, what is my estimate of normal distribution ?
 - Is the value of my sample statistic unlikely enough for me to reject the null hypothesis.
 - There is no key question in statistical estimation.
- xiii) If the standard deviation of a population is 9, the population variance is
- 3
 - 9
 - 21.35
 - 81.
- xiv) Sequential games can be solved using
- tit-for-tat
 - dominated strategies
 - backward induction
 - risk averaging.
- xv) A prisoner's dilemma is a game with all of the following characteristics *except* one. Which one is not present in a prisoner's dilemma ?
- Players cooperate in arriving at their strategies
 - Both players have a dominant strategy
 - Both players would be better off if neither chose their dominant strategy
 - They play off from a strategy depends on the choices made by the other player.
- xvi) Which among the following is true about the value of coefficient of realism (α) when the decision maker is extremely optimist ?
- $\alpha = 0$
 - $\alpha = 1$
 - $\alpha \rightarrow \infty$
 - $\alpha \rightarrow 0$.

**GROUP – B****(Short Answer Type Questions)**

Answer any *three* of the following $3 \times 5 = 15$

2. For a distribution of 280 observations mean & standard deviation were found to be 54 & 3 respectively. On checking it was discovered that two observations, which should correctly read as 62 & 82, had been wrongly recorded as 64 & 80 respectively. Calculate the correct values of mean & standard deviation.
3. Define skewness. What are the various measures of skewness ? Discuss it in detail.
4. What are the different methods of data collection ? Discuss it in detail.
5. Calculate with the use of qualities of coefficient of skewness for the following frequency distribution :

Under years	10	20	30	40	50	60
No. of Persons	15	32	51	78	97	109

6. Define and distinguish between the terms 'risk' and 'uncertainty'.
7. What is meant by steady state probabilities in Markov chains ? Explain.
8. Explain the concept of saddle point in a game situation.
9. Discuss the advantages and limitations of simulation.

GROUP – C**(Long Answer Type Questions)**

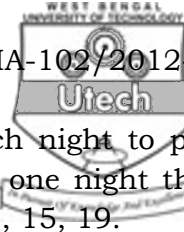
Answer any *three* of the following $3 \times 15 = 45$

10. a) What are the various types of data ? Explain them with proper examples.
- b) Calculate the arithmetic mean of the completed table.

Variable	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency (<i>f</i>)	12	30	?	65	?	25	18

Total frequency = 229.

You are given that the median value is 46. $5 + 10$



11. a) A group of boys and men gathered each night to play basketball at the neighbourhood court, one night their age were recorded as : 12, 14, 13, 11, 23, 15, 19.

Use this data to get the variance of the age of the boys playing basket ball on any given evening.

- b) Write a short note on Lorenz Curve. 8 + 7

12. a) Calculate the Quartile Deviation & its coefficient from the following :

Class-interval	10-15	15-20	20-25	25-30	30-40	40-50	50-60	60-70
Frequency	4	16	32	54	64	72	78	82

- b) Calculate the mean, median, mode and range for each set of data below :

3, 6, 3, 7, 4, 3, 9 10 + 5

13. a) What is the difference between raw moments & central moments ? Explain it.

- b) In the frequency distribution of 100 families given below, the number of families corresponding to expenditure groups 20-40 and 60-80 are missing from the table. However, the median is known to be 50. Find the missing frequencies.

Expenditure	0-20	20-40	40-60	60-80	80-100
No. of families	14	?	27	?	15

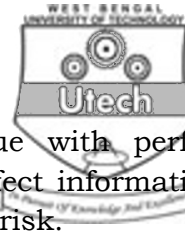
5 + 10

14. a) What are the types of the measures of dispersion ? Explain it in detail.

- b) Calculate the coefficient of variation from the following data, showing grades of 100 students in M.A. Mathematics :

Grades	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Frequency	2	3	11	20	32	25	7

6 + 9

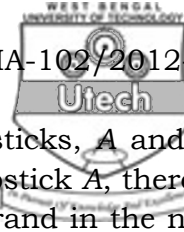


15. a) Define the concept of 'Expected value with perfect information' and 'expected value of perfect information' in the context of decision making under risk.
- b) 'Monginis', the reputed confectioner in India, has many franchisees spread all over India. The city centre outlet of the shop has sufficient space for storing up to 100 cartons of bread. Further, its demand for breads may vary between 0 and 100 cartons on a given day. The stock of inventory depends on its demand. The outlet buys breads from its mother company for Rs. 400 each carton. The company delivers the cartons as per order every morning before the shop opens. Any carton not sold at the end of a day is thrown away. The outlet sells each carton of bread for Rs. 600. Daily sales is subject to many conditions and cannot be known objectively with certainty.

However, the shop owner knows from his record of sale that demand for bread (number of cartons) on a day follows the following discrete probability distribution :

Daily demand (No. of cartons)	Probability
4	0.05
5	0.15
6	0.15
7	0.20
8	0.25
9	0.10
10	0.10

Using the marginal analysis find out how many cartons of bread the shop owner will order on any day.



16. In a certain market, only two brands of lipsticks, A and B , are sold. Given that a Lady last purchased lipstick A , there is 80% chance that she would buy the same brand in the next purchase, while if a lady purchased brand B , there is 90% chance that her next purchase would be brand B . Using this information, develop the transition probability matrix. Now, calculate
- the probability that if a customer is currently a brand A purchaser, she will purchase brand B two purchases from now
 - the probability that if a customer is a brand B purchaser, she will purchase brand A three periods from now
 - the probability that three periods from now, a customer shall buy brand B , given that the market share of the two brands is as follows :
Brand A — 70%, Brand B — 30%.
 - the steady state probabilities. 3 + 3 + 3 + 6
17. Consider the following pay-off matrix in respect of a two-person-zero-sum game :

A's strategy	B's Strategy				
	B_1	B_2	B_3	B_4	B_5
A_1	8	10	-3	6	-12
A_2	3	6	0	6	12
A_3	7	5	-2	-8	17
A_4	-11	12	-10	10	20
A_5	-7	0	0	6	2

- Write the maximin and minimax strategies.
- Is it a strictly determinable game ?
- What is the value of the game ?
- Is this game a fair one ? 8 + 2 + 3 + 2

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