

Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech (TT/APM)/SEM-3/TT-307/2009-10

2009

STATISTICS

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

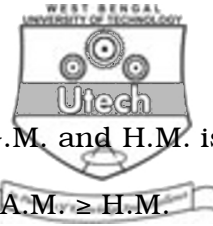
1. Choose the correct alternatives for the following : $10 \times 1 = 10$

i) If a constant k is added to each observation of a set, the mean is

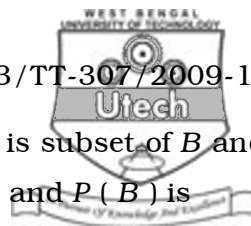
- a) increased by k
- b) decreased by k
- c) k times the original mean
- d) not affected.

ii) Which of the following represents median ?

- a) First quartile
- b) Fifth percentile
- c) Sixth decile
- d) None of these.



- iii) The correct relationship between A.M., G.M. and H.M. is
- a) $A.M. = G.M. = H.M.$ b) $G.M. \geq A.M. \geq H.M.$
c) $H.M. \geq G.M. \geq A.M.$ d) $A.M. \geq G.M. \geq H.M.$
- iv) Sum of the deviations about mean is
- a) zero b) minimum
c) maximum d) one.
- v) Sum of the squares of the deviations about mean is
- a) maximum b) minimum
c) zero d) none of these.
- vi) The probability that a leap year selected at random will contain 53 Wednesdays and 53 Thursdays is
- a) $\frac{3}{4}$ b) $\frac{1}{7}$
c) $\frac{2}{7}$ d) $\frac{3}{8}$.
- vii) If a simple random sample of size 2 is drawn without replacement from population of size 10, the total number of possible samples is
- a) 90 b) 45
c) 20 d) none of these.
- viii) If the two regression coefficients are $b_{xy} = -1.2$ and $b_{yx} = -0.3$, the correlation coefficient between x and y is
- a) 0.36 b) 0.6
c) -0.6 d) none of these.



- ix) If two events A and B are such that A is subset of B and vice versa, the relation between $P(A)$ and $P(B)$ is
- a) $P(A) \geq P(B)$ b) $P(A) \leq P(B)$
- c) $P(A) = P(B)$ d) none of these.
- x) If A is subset of B , then $P(A/B)$ is equal to
- a) zero b) one
- c) $P(A) / P(B)$ d) $P(B) / P(A)$.

GROUP – B
(Short Answer Type Questions)

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

2. Find the median of the following data :

Marks	Less than 40	41 – 50	51 – 60	61 – 70	71 – 80	81 and above
No. of students	10	20	15	25	10	20

3. The probability that a student Mr. X passed Mathematics is $2/3$, the probability that he passes Statistics is $4/9$. If the probability of passing at least one subeject is $4/5$, what is the probability that Mr. X will pass both the subjects ?
4. The population of Cyprus is 75% Greek, 25% Turkish ; 20% of the Greeks and 10% of the Turks speak English. A visitor to the town meets someone who speaks English. What is the probability that he is Greek ?



5. A continuous random variable X has the probability density function :

$$f(x) = \frac{1}{2} - ax, \quad 0 \leq X \leq 4$$

$$= 0 \quad \text{elsewhere}$$

Find :

- i) value of a
 - ii) mean of X
 - iii) $P(2X + 3 > 5)$.
6. Obtain the mean and variance of the Binomial distribution with parameters n and p .

GROUP – C

(Long Answer Type Questions)

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

7. A factory produces two types of electric bulbs A and B. In an experiment relating their life the following results were obtained :

Length of Life (in hours)	No. of bulbs	
	A	B
500 – 700	5	4
700 – 900	11	30
900 – 1100	26	12
1100 – 1300	10	8
1300 – 1500	8	6

Find which type of bulbs less varies in length of life.



8. Calculate the correlation coefficient and the lines of regression from the following data :

X	100	98	78	85	110	93	80
Y	85	90	70	72	95	81	74

Find the value of y when $x = 82$.

9. a) In a large institution 2.28% of employees receive income below Rs. 4,500 and 15.87% of employees receive income above Rs. 7,500 per month. Assuming the income follows normal distribution, find the mean and standard deviation of the distribution

$$[\phi(-2) = 0.4772, \phi(1) = 0.3413].$$

- b) If 4 of 12 scooterists do not carry driving licence, what is the probability that a traffic inspector randomly selects 4 scooterists, will catch

i) 1 for not carrying driving licence

ii) at least 2 for not carrying driving licence ? 8 + 7



10. a) A random variable X follows binomial distribution with mean $\frac{5}{3}$ and $P(X = 2) = P(X = 1)$. Find variance of

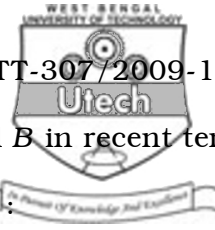
X , $P(X \geq 1)$ and $P(X \leq 1)$.

- b) There are two identical boxes containing respectively 4 white and 3 red balls, and 3 white and 7 red balls. A box is chosen at random and a ball is drawn from it. Find the probability that the ball is white. If the ball is white, what is the probability that it has come from the first box ?

- c) The probability that an individual suffers from a bad reaction from an injection is 0.001. What is the probability that out of 3000 individuals exactly 3 individuals will suffer from a bad reaction ?

$$[e^{-3} = 0.0489].$$

$$6 + 6 + 3$$



11. a) The scores made by two batsmen, A and B in recent ten one-day cricket matches are given below :

A :	30	44	15	90	0	2	78	88	6	15
B :	21	26	58	5	19	43	26	51	36	36

Calculate mean and standard deviation of runs scored for each batsman. Which batsman may be said to be more consistent ?

- b) Obtain the maximum likelihood estimates of the parameter of the binomial distribution (N, P) for n sample values.

7 + 8

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