Course Title: PROBABILITY AND STATISTICS

Time Allowed: 01:30hrs. Max Marks: 30

Read the following instructions carefully before attempting the question paper.

1. Match the Paper Code shaded on the OMR Sheet with the Paper code mentioned on the question paper and ensure that both are the same.

2. This question paper contains 30 questions of 1 mark each. 0.25 marks will be deducted for each wrong answer.

3. All questions are compulsory.

4. Do not write or mark anything on the question paper and/or on rough sheet(s) which could be helpful to any student in copying, except your registration number on the designated space.

5. Submit the question paper and the rough sheet(s) along with the OMR sheet to the invigilator before leaving the examination hall.

Q(1) Let P(E) donate the probability of the event E. Given P(A) = 1, P(B) = 1/2, the values of P(A/B) and P(B/A) respectively are

(a) 1/4, 1/2 (b) 1/2 , ¼ (c) 1/2, 1 (d) 1 , ½

Q(2) Let X and Y be two independent random variables. Which one of the relations between expectation (E), variance (Var) and covariance (Cov) given below is FALSE? CO1,L1

(a) E(XY) = E(X) E(Y)
(b) Cov (X, Y) = 0
(c) Var (X + Y) = Var (X) + Var (Y)
(d) E(X2 Y2) = (E(X))² (E(Y))2

Q(3) A random variable is uniformly distributed over the interval 2 to 10. Its variance will be CO1,L1

(a) 16/3 (b) 6 (c) 256/9 (d) 36

Q(4) Probability density function of a random variable X is given below CO1,L1

F(x) = [0.25 if 1≤ x≥5] P{X ≤4)

0 otherwise

(a) ¾ (b) ½ (c) 1/4 (d) 1/8

Q(5) Let the probability density function of a random variable, X, be given as: CO1,L1

$$fx(x) = +\frac{3}{2}e^{-3x}u(x) + ae^{4x}u(-x)$$

Where u(x) is the unit step function. Then the value of 'a' and prob {X≤ 0}, respectively, are

(a) 2, ½ (b) 4, ½ (c) 2, ¼ (d) 4, 1/4

Q(6) The first moment about origin of binomial distribution is CO1,L1

(a) np (b) npq (c) n(1-p) (d) n (1-p)q

Q(7) For the regression equations CO1,L1

y= 0.516x + 33.73

x = 0.512y + 32.52

the means of x and y are nearly

(a) 67.6 and 68.6 (b) 68.6 and 68.6 (c) 67.6 and 58.6 (d) 68.6 and 58.6

Q(8)Consider a random variable to which a Poisson distribution is best fitted .It happens that P(x = 1) = $2^{\frac{3}{3}}$ P(x = 2) on this distribution plot. The variance of this distribution will be CO1,L1

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

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Q(9) If X is a discrete random variable that follows Binomial distribution, then which one of the following recurrence relations is correct?

a) $P(r+1) = \frac{n-r}{r+1} p(r)$

b) $P(r+1) = pq^{n} p^{p}(r)$

c) $P(r+1) = \frac{n+r}{r+1} P q^{q} P(r)$

d) $P(r+1) = \frac{n-r}{r+1} P q^{q} P(r)$

CO1,L1

Q(10) Suppose the mean of the Poisson distribution of a random variable x is 2. Then find the value of $P(x > 1.5)$

(a) $1 - \frac{3}{e^2}$

(b) $\frac{3}{e^2}$

(c) $\frac{3}{e}$

(d) None of these

CO1,L1

Q(11) Let x be a random variable following normal distribution with mean + 1 and variance 4. Let y be another normal variable with mean -1 and variance unknown. If $P(x \leq -1) = P(y \geq 2)$. The standard deviation of y is

(a) 3

(b) 2

(c) 7

(d) 1

CO1,L1

Q(12) A random variable x has the distribution

x	2	3	4
$P(x)$	0.3	0.4	0.3

Then variance of the distribution is:

(a) 10.55

(b) 0.77

(c) 0.7

(d) 0.6

CO1,L1

Q(13) If the mean of a Poisson distribution is 2, then the ratio of P(x = 3) to P(x = 2) is:

(a) 1.2

(b) 1.4

(c) 1.6

(d) 1.8

CO1,L1

Q(14) A random variable x has the following probability distribution.

x	1	2	3	4	5	6	7	8
$P(x)$	0.15	0.23	0.12	0.10	0.20	0.08	0.07	0.05

for the events E = {x is prime no.} and F{x<4) the probability P (E ∪ F) is

(a) 0.87

(b) 0.77

(c) 0.35

(d) 0.50

CO1,L1

Q(15) If P and Q are two random events then the following is True:

(a) Independence of P and Q implies. That probability (P ∩ Q)=0

(b) Probability (P ∪ Q) ≥ Probability P + Probability Q

(c) If P and Q are mutually exclusive. Then they must be independent.

(d) Probability (P ∩ Q) ≤ Probability (P)

CO1,L1

Q(16) If the difference the expectation of the square of a variable $E[x^2]$ and the square of the expectation of the random variable $(E[x])^2$ is denoted by R. Then

(a) R is equal to 0.

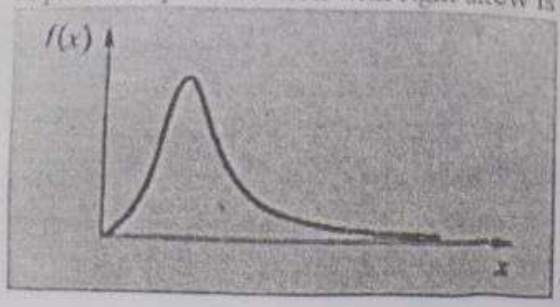
(b) R is less than 0.

(c) R is greater than or equal to 0.

(d) R is greater than 0.

CO1,L

Q(17) If probability distribution with right skew is shown in the figure below:



The correct statement for probability distribution is:

(a) Mean is equal to mode.
(b) The Mean is greater than the median but less than the mode
(c) The Mean is greater than the median and mode
(d) The Mode is greater than the median.

Q(18) If X is a discrete random variable that follows Binomial distribution, then which one of the following response relations is correct? CO1,L1

(a) $P(r+1)=\frac{n-r}{r+1}P(r)$ (b) $P(r+1)=\frac{p}{q}P(r)$ (c) $P(r+1)=\frac{n+r}{r+1}\frac{p}{q}P(r)$ (d) $P(r+1)=\frac{n-r}{r+1}\frac{p}{q}P(r)$

Q(19) The mean of the natural numbers 1 to 100 is on CO1,L1
(a) 51 (b) 50.5 (c) 49.5 (d) 50

Q(20) For the regression equations: $y = 0.516x + 33.73$ $x = 0.512y + 32.52$ the means of x and y are nearly:
(a) 67.6 and 68.6 (b) 68.6 and 68.6 (c) 67.6 and 58.6 (d) 68.6 and 58.6

Q(21) In the negative Binomial Distribution of probability, the random variable is also classified as CO1,L1
(a) discrete random variable
(b) continuous waiting time random variable
(c) discrete waiting time random variable
(d) discrete negative binomial variable

Q(22) Find the probability of success, if getting 3 is termed as success when a dice is thrown. CO1,L3
(a) 1/6 (b) ¼ (c) ½ (d) 1/3

Q(23) The measuring theorem which helps in determining the proportion of observations for specific intervals of mean and standard deviation is classified as: CO1,L3
(a) Pearson Theorem (b) Chebyshev's Theorem (c) Sampling Theorem (d) Population Theorem

Q(24) The mean score of an Insurance Commission Licensure Examination is 75, with a standard deviation of 5. What percentage of the data set lies between 50 and 100? CO1,L3
(a) 50% (b) 68% (c) 79% (d) 96%

Q(25) A discrete random variable X has the probability functions as: CO1,L3

X	0	1	2	3	4	5	6	7	8
f(x)	K	2k	3k	5k	5k	4k	3k	2k	k

The value of E(X) is:

(a) 97/26 (b) 107/26 (c) 93/26 (d) 103/26

Q(26) Suppose the probability that team 'A' wins each game in a tournament is 60 percent. 'A' plays until it loses, find the probability P that 'A' plays in at least 4 games. CO1,L
(a) 21.6% (b) 28.7% (c) 35.4% (d) 41.4%

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Q(27) If two lines of regression are x+3y-5=0 and 4x+3y-8=0, then the correlation co-efficient between x and y is:
(a) ½ (b) -1/2 (c) 1/3 (d) -3/5

CO1,L3

Q(28) The co-efficient of correlation between X and Y is 0.6. Their covariance is 4.8, Var(X)=9, then σy is equal to:

(a) 8/3 (b) 3/8 (c) 8/9 (d) Data is insufficient.

CO1,L3

Q(29) The missing frequency marked * of the given distribution whose mean is 27,is

Class	Frequency
0-10	5
10-20	*
20-30	15
30-40	16
40-50	6

(a) 7 (b) 8 (c) 9 (d) 10

CO1,L3

Q(30) Which of the following is a random variable?
(a) Height of a student whose roll number in a class is 15.
(b) Height of tallest student in a class.
(c) Height of a student who will enter first in the classroom tomorrow.
(d) None of the above.

CO1,L3

--End of Question paper--