

(DMCA208)**Total No. of Questions :18]****[Total No. of Pages : 03****M.C.A. DEGREE EXAMINATION, MAY - 2018****Second Year****PROBABILITY & STATISTICS****Time : 3 Hours****Maximum Marks : 70****SECTION - A****(3 × 15 = 45)****Answer any THREE questions**

- Q1)** a) From vessel containing 3 white and 5 black balls, 4 balls are transferred into an empty vessel. From this vessel a ball is drawn and is found to be white. What is the probability that out of four balls transferred 3 are white and 1 is black?
- b) Prove that $P(A \cup B|C) = P(A|C) + P(B|C) - P(A \cap B|C)$ for any three events A, B and C.

- Q2)** A random variable has the c.d.f : $F(x) = \begin{cases} 0 & : x < 0 \\ 1 - e^{-x/500} & : x \geq 0 \end{cases}$,

Find the i) $P(100 \leq X \leq 200)$ and $P(X \geq 300)$

- Q3)** X is normally distributed and the mean of X is 12 and standard deviation is 4. Find out the probability of the following
- a) $X \geq 20$.
- b) $X \leq 20$.
- c) $0 \leq X \leq 12$.
- d) Find x^1 , when $P(X \geq x) = 0.24$.

- Q4)** Fit a curve of the form $y = ae^{bx}$ from the following data:

x:	1	2	3	4	5	6
y:	1.6	4.5	13.8	40.2	125	300

- Q5)** Find the value of Chi-square for the following data :

Observed frequency :	10	4	15	18	20	15	5	2	3
Expected frequency :	10	7	10	15	25	10	5	5	5

SECTION - B (5 × 4 = 20)

Answer any FIVE questions

- Q6)** If A and B are two mutually exclusive events, show that $P(A|\bar{B}) = \frac{P(A)}{[1 - P(B)]}$.
- Q7)** Define marginal and conditional probabilities of a bivariate probability distribution.
- Q8)** X and Y are independent random variables with variance 2 and 3. Find the variance of $3X + 4Y$.
- Q9)** A continuous random variable X has a.d.f. $f(x) = 3x^2, 0 \leq x \leq 1$. Find 'a' such that $p(X \leq a) = p(X > a)$.
- Q10)** Describe the F-test for testing equality of variances.
- Q11)** Obtain the correlation co-efficient to the following data :

x	10	14	18	25	30
y	18	12	24	30	36

- Q12)** Explain the method of least squares. Fit a straight line $y = a + bx$ to the data given below by the method of least segment.
- X : 5 10 15 20 25
- Y : 16 19 23 26 30
- Q13)** Write short notes on statistical quality improvement programs.

SECTION - C

(5 × 1 = 5)

Answer ALL questions

- Q14)** State the Bayesian Rule.
- Q15)** Define continuous random variable.
- Q16)** Define statistical hypothesis.
- Q17)** Define correlation co-efficient.
- Q18)** What is normal distribution?

