SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
B.Sc.AI - END SEMESTER EXAMINATIONS - NOV'2024
SEMESTER - IV
22UAIAT4004 - Allied Statistics - II

Total Duration : 2 Hrs.30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Explain the following with examples:
   (i) Mutually exclusive events (ii) Equally likely events (iii) Exhaustive events
2. If A and B are any two events and are not disjoint, then show that
   $P(A \cup B) = P(A) + P(B)$ - $P(A \cap B)$
3. A random variable X has the following probability function:

x:	0	1	2	3	4	5	6	7
p(x):	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2$+k

   Interpret k and distribution function of X.
4. The mean and variance of the binomial variate X with parameters n and p are 16 and 8.
   Compute (i) $P(X = 0)$ (ii) $P(X = 1)$ and (iii) $P(X = 2)$
5. Sketch any five Properties of normal distribution.
6. Compute the maximum likelihood estimate for the Poisson distribution on the basis of a sample of size n.
7. Define student's t – distribution and also list its applications.
8. Organize the steps in solving testing of hypothesis problem.

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. It is 8 : 5 against the wife who is 40 years old living till she is 70 and 4 : 3 against her husband now 50 living till he is 80. Compute the probability that
   (i) Both will be alive
   (ii) None will be alive
   (iii) Only wife will be alive
   (iv) only husband will be alive
   (v) At least one will be alive

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10. (i) Define Poisson distribution and mentions its mean and variance. (4)
    (ii) A call centre receives an average of 10 calls per hour, following a Poisson distribution.
    a) Compute the probability that exactly 8 calls are received in a given hour.
    b) Compute the probability that more than 12 calls are received in a given hour.
    c) Given that at least 1 call is received, what is the probability that exactly 5 calls are received in a given hour? (6)
11. If the masses of 300 students are normally distributed with mean 68 kgs and standard deviation 3kgs. Determine the number of students have masses
    i) Greater than 72kgs.
    ii) Less than or equal to 64 kgs
    iii) Between 65 and 71 kgs inclusive.
12. Derive the probability density function of chi- square distribution.
13. In a certain sample of 2,000 families; 1,400 families are consumers of tea. Out of 1,800 Hindu families, 1,236 families consume tea. Use Chi – Square test and examine whether there is any significant difference between consumption of tea among Hind and non – Hindu families.

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