NOVEMBER 2025

52506/125E2B/ 141E2B/120E2B/ 127E2B/126E2B/ 220E4B/241E4B/ 226E4B/227E4B/ 225E4B

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions

1. Define random experiment with an example.

2. State Baye's theorem.

3. Define independent events.

4. Define random variable.

5. If the mean of a Poisson distribution is 4, find the standard deviation, skewness, kurtosis.

6. The mean of binomial distribution is 20 and the S.D is 4. Find the parameters n and p.

7. Define probability density function.

8. Define normal distribution.

9. Define null hypothesis.

10. What do you mean by type-I error and type-II error?

11. Define standard error.

12. Write the test statistics for difference of means.

PART B — ($5 \times 5 = 25$ marks)

Answer any FIVE questions.

13. Four cards are drawn from a well shuffled pack of cards. Find the probability that

    (a) all the four queens,

    (b) there is one card from each suite and

    (c) two cards are diamonds and two are spades.

14. An ordinary die tossed twice and the difference between the numbers of spots turned up is noted. Find the probability of a difference of 3.

15. Derive the mean and variance of binomial distribution.

16. Derive MGF of Poisson distribution.

17. Write the uses of chi-square distribution.

18. Explain working procedure for testing single proportion.

19. Write the properties of t-distribution.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

20. A continuous random variable X that can assume any value between $x = 2$ and $x = 5$ has density function given by $f(x) = k(1 + x)$. Find $P(X < 4)$ and $P(3 < X < 4)$.

21. Find the probability that at most 5 defective fuses will be found in a box of 200 fuses if experience shows that 2% are defective.

22. If X is a normal variate with mean 30 and standard deviation 5, find

(a) $P(26 \le X \le 40)$

(b) $P(X \ge 45)$

(c) $P(25 < X < 35)$

23. What is chi-square distribution? Mention its important properties.

24. The following are the numbers of mistakes made in 5 successive days of 4 technicians working for a photographic laboratory:

Technician I (X_1)	Technician II (X_2)	Technician III (X_3)	Technician IV (X_4)
4	14	10	9
6	9	12	12
10	12	7	8
8	10	15	10
11	14	11	11

Test at 1% level of significance, whether the difference among the 4 sample means, can be attributed to chance.

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