22. If X is normally distributed and the mean of X is 12 and S.D is 4. Find out the probability of the following :

(a) $X \geq 20$

(b) $X \leq 20$ and

(c) $0 \leq X \leq 12$

23. State and prove the additive property of the χ^2-distribution.

24. Write the theoritical procedure for testing more than the population means using ANOVA.

APRIL 2024

52506/120E2B/ 125E2B/127E2B/ 126E2B/141E2B

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions.

1. Define random experiment with example.

2. Define empirical approach to probability.

3. Define

   (a) Exhaustive event

   (b) Mutually exclusive event

4. Define probability mass function.

5. If the mean and variance of binomial distribution are 4 and 4/3 respectively, obtain the probability function.

6. Write the p.d.f. of Normal distribution.

7. Define exponential distribution.

8. Write p.d.f of student's t distribution.

9. Define chi square distribution.

10. What do you mean by testing of hypotheses?

11. Define null hypothesis.

12. Write the test statistic for single proportion.

PART B — ($5 \times 5 = 25$ marks)

Answer any FIVE questions.

13. State and prove the addition theorem on probability.

14. A bag contains 6 while and 9 black balls. Four balls are drawn at a time. Find the probability for the first draw to give 4 white and the second draw to give 4 black balls in each of the following cases:

(a) The balls are replaced before the second draw.

(b) The balls are not replaced before the second draw.

15. Define the cumulative distribution function. State its properties.

16. Derive the MGF of Binomial distribution.

17. Derive the mean and variance of Poisson distribution.

18. Write the properties of t- distribution.

19. Explain the test procedure for testing single mean.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

20. If two dice are thrown, what is the probability that the sum is

(a) greater than 8 and

(b) neither 7 nor 11?

21. Bring out the recurrence relation for the moment of Poisson distribution.