B.Sc. DEGREE EXAMINATION,APRIL 2019
I Year I Semester
Probability and Random Variables

Time : 3 Hours   **Max.marks :60**

Section A $(10 \times 1 = 10)$ Marks

Answer any **TEN** questions

1. Define mutually Exclusive events.
2. Define independence for three events.
3. State addition theorem of Probability.
4. Define Random Variable.
5. State any two properties of mathematical expectations.
6. Define conditional Expectations.
7. State Chebychev's inequality.
8. State conditional probability?
9. Define Beta Distribution of first kind.
10. Write the mean and variance of F distribution.
11. Define limiting cases.
12. Define Correlation between two random variables.

Section B $(5 \times 4 = 20)$ Marks

Answer any **FIVE** questions

13. State and prove the extension of addition theorem of probability to 'N' events.
14. State and prove Baye's theorem.
15. State and prove any four properties of Mathematical Expectation.
16. Write the seven properties of distribution function.
17. A problem in mathematics is given to three students A,B and C whose chances of solving it arell4,ll2 and3l4 respectively. Find the probability that the problem will be solved if all of them try independently. Also find the probability that exactly two of them will solve the problem.
18. An integer is chosen at random from two hundred digits. The integer is divisible by 6 or 8?
19. Prove that $V(X) = E[V(x/y)] + V[E[x/y]]$.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. State and prove Chebychev's inequality.

21. State and prove Boole's inequality for n events.

22. State and prove the extension of Multiplication theorem of probability to 'N' events.

23. From a vessel containing 5white and 3 black balls, three balls are transferred to an empty vessel and a ball is drawn at random. What is the probability that all the transferred balls were white given that the chosen ball was white?

24. Let the random variables X and Y have joint pdf f(x,y)=8xy for $0 < x < y < 1$. Find the conditional variance of Y given X.

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