M.Sc DEGREE EXAMINATION,APRIL 2019
I Year I Semester
Probability and Distribution Theory

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Define Sample Space.
2. Define conditional probability.
3. What do you mean by random variables?
4. Define the probability mass function.
5. Define a negative binomial distribution.
6. What do you mean by Poisson random variable?
7. Define a hyper-geometric random variable.
8. Define a Multinomial distribution.
9. State bivariate poisson distribution.
10. Define bivariate continuous distribution.
11. Define a bivariate normal distribution.
12. State Multivariate normal distribution.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. State and prove multiplication rule for probability.
14. A card is chosen at random from a deck of 52 cards. Let A be the event that the card is an ace, and B, the event that it is a club then prove that A and B are independent.
15. Find Mean and variance of hyper-geometric distribution.
16. Prove that the correlation coefficient ρ between two random variables X and Y satisfies $|\rho| = 1$.
17. If $Ex^2 < \alpha$ then prove that Var(x) = Var(E{XIY}) + E (Var{XIY})
18. Find Mean and variance of bivariate binomial distribution.
19. Find Moment generating function of a multinomial distribution.

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

Answer any **THREE** questions

20. State and prove Bayes' theorem.
21. Let Eh(x) exists then prove that Eh(x) = E{E(h(x)) IY}
22. Find the Mean and variance of a Gamma distribution.
23. Find the Mean and variance of a Multinomial distribution.
24. Prove that if (x,y) has a bivariate normal distribution, X and Y are independent if and only if ρ =0.

M.Sc DEGREE EXAMINATION,APRIL 2019
I Year I Semester
Probability and Distribution Theory

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Define Sample Space.
2. Define conditional probability.
3. What do you mean by random variables?
4. Define the probability mass function.
5. Define a negative binomial distribution.
6. What do you mean by Poisson random variable?
7. Define a hyper-geometric random variable.
8. Define a Multinomial distribution.
9. State bivariate poisson distribution.
10. Define bivariate continuous distribution.
11. Define a bivariate normal distribution.
12. State Multivariate normal distribution.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. State and prove multiplication rule for probability.
14. A card is chosen at random from a deck of 52 cards. Let A be the event that the card is an ace, and B, the event that it is a club then prove that A and B are independent.
15. Find Mean and variance of hyper-geometric distribution.
16. Prove that the correlation coefficient ρ between two random variables X and Y satisfies $|\rho| = 1$.
17. If $Ex^2 < \alpha$ then prove that Var(x) = Var(E{XIY}) + E (Var{XIY})
18. Find Mean and variance of bivariate binomial distribution.
19. Find Moment generating function of a multinomial distribution.

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

Answer any **THREE** questions

20. State and prove Bayes' theorem.
21. Let Eh(x) exists then prove that Eh(x) = E{E(h(x)) IY}
22. Find the Mean and variance of a Gamma distribution.
23. Find the Mean and variance of a Multinomial distribution.
24. Prove that if (x,y) has a bivariate normal distribution, X and Y are independent if and only if ρ =0.