B.Sc. DEGREE EXAMINATION,APRIL 2019
II Year III Semester
Mathematical Statistics - I

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

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

Answer any **TEN** questions

1. Define Mutually Exclusive event.
2. What is the probability that a leap year selected at random will have 53 Sundays?
3. Define random variable with an example.
4. What is distribution function?
5. Prove that for any two event A in S, $P(A \cap A^C) = 0$.
6. List any two properties of MGF.
7. Write down the conditions which satisfy the Bernoulli trials.
8. Write the probability mass function of poisson distribution.
9. Give the mean value of uniform distribution.
10. Write the variance of beta distribution first kind.
11. Define Random Experiment.
12. Define conditional probability.

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

Answer any **FIVE** questions

13. Twenty five books are placed at random in a shelf. Find the probability that a particular pair of books shall be (i) always together and (ii) never together
14. Let X be a random variable with the following probability distribution:

x:	-3	6	9
p(x)	1/6	1/2	1/3

Find E(x), $E(x^2)$ and hence $E(2x+1)^2$

15. An MBA candidate applies for a job in two firms X and Y. The probability of his being selected in firm X is 0.7 and being rejected at Y is 0.5. The probability of at least one of his applications being rejected is 0.6. What is the probability that he will be selected in one of the firms?

16. Three newspapers A, B and C are published in a certain city. It is estimated from a survey that, out of the adult population 20% read A, 16% read B, 14% read C, 8% read both A and B, 5% read both A and C, 4% read both B and C, 2% read all the three. Find what percentage read at least one of the papers.
17. Derive the mean and variance of binomial distribution.
18. Derive the mgf of uniform distribution.
19. A random variable x has the the following probability mass function

X	0	1	2	3	4	5	6	7
P(x)	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2 + k$

i) find k

ii) Evaluate P(x < 6)

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

Answer any **THREE** questions

20. a)State and Prove Baye's theorem

b) Three groups of children contain respectively 3 girls and 1 boy and 2 girls and 2 boys and 1 girl and 3 boys. One child is selected at random from each group. Find the chance that the 3 selected comprise 1 girl and 2 boys.

21. State and prove addition and multiplication theorem of probability.
22. State and prove Chebychev's inequality
23. Derive the mgf of normal distribution.
24. Find the mean and variance of Gamma Distribution.

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