



NP – 233

10

II Semester B.Sc. Examination, July/August 2024

(NEP)

STATISTICS

Paper – II : DSC – 2 : Probability and Distributions

Time : 2½ Hours

Max. Marks : 60

Instructions : 1) Scientific calculators are **permitted**.

2) Statistical tables and graph sheets are provided on request.

PART – A



Answer **any four** questions. (2 marks **each**)

(2×4=8)

1. Define sample space and event.
2. Define a random variable with example.
3. Define moment generating function.
4. Obtain the mean of uniform distribution.
5. Write any two properties of normal distribution.
6. Write the output of the following R-programs.
 - 1) $> Y \leftarrow C(10, 12, 13, 16)$
 $> S \leftarrow \text{Sum}(Y)$
 $> S$
 - 2) $> Y \leftarrow C(4, 1, 6, 2, 8)$
 $> M \leftarrow \text{Median}(Y)$
 $> M$

PART – B,

Answer **any four** questions. (5 marks **each**)

(5×4=20)

7. State and prove Baye's theorem.
8. Prove that the m.g.f. of sum of 'n' independent random variables is equal to the product of their m.g.f's.

P.T.O.



9. If X and Y are two independent random variables, then show that $E(XY) = E(X) E(Y)$.
10. State and prove lack of memory property of geometric distribution.
11. Obtain the recurrence relation for even order central moments.
12. Explain the arithmetic operators used in 'R'.

PART – C

Answer **any four** questions. (8 marks **each**)

(8×4=32)

13. a) State and prove multiplication law of probability.
b) Define conditional probability. (5+3)
 14. a) Explain the methods of generating moments from m.g.f.
b) State and prove addition theorem of mathematical expectations. (4+4)
 15. a) If x is continuous random variable with pdf $f(x) = 2x^3$, $0 < x < 1$ then find its mean and variance.
b) Show that $E(ax + b) = aE(x) + b$. (5+3)
 16. a) State and prove additive property of the binomial distribution.
b) Define Bernoulli distribution. Find its mean, variance and m.g.f. (4+4)
 17. a) State and prove additive property of normal distribution.
b) Define exponential distribution and find its mean. (4+4)
 18. Explain the various library functions used in 'R'. 8
-