Model Question Paper

Fourth Semester M.Sc Degree Examination (CSS)

ST4E06 - ADVANCED DISTRIBUTION THEORY

Time: 3 hours Total Weights: 30

Part A

(***Answer any five questions. Weightage 1 for each question.***)

1. Show that for the Pearson type III distribution, $2\beta_2 - 3\beta_1 - 6 = 0$.
2. State any three properties of Pearson system.
3. Logistic distribution is a member of Burr family. Do you agree? Establish your claim.
4. Explain lack of memory property of exponential distribution.
5. Let X and Y be independent random variables such that $X + Y$ is normal. Does this a characterizing property of normal distribution? Explain.
6. Give a generalization of Poisson distribution. Describe a real life situation in which one come across this distribution.
7. Explain M estimation.
8. Explain briefly non-parametric density estimation.

Part B

(***Answer any* five *questions. Weightage* 2 *for each question.***)

9. Define Burr family of distributions. Show that Weibull distribution is related to the Burr family.
10. In the case of Chebyshev-Hermite polynomials $H_r(x)$, show that:

$$H_r(x) - xH_{r-1}(x) + (r-1)H_{r-2}(x) = 0,$$

for $r \geq 2$.

11. Define Power series distributions. Show that binomial and geometric distributions belong to PSD.
12. Show that the points of inflection for the Pearson system are equi distant from the mode.
13. Explain Edgeworth and Gram-charlier series of expansions.

14. Show that the family of Power Series distributions are closed under convolutions. Obtain the UMVUE of the parameter θ in the PSD.

15. Define hyper-Poisson family of distributions. Obtain its mean and variance.

16. Briefly discuss Edgeworth and Gram-Charlier series.

Part C

(*Answer any* three *questions. Weightage* 5 *for each question.*)

17. Describe the Pearson's classification of distributions into various types.

18. Describe Johnson's system of distributions.Obtain mean and variance of the system.

19. State and prove any one of the characterization of normal distribution.

20. Describe the characterizations of normal law based on the property of regression function.

21. Explain how will you estimate the parameters of a generalized power series family.

22. Define Kernel estimator. State and establish its properties.