## B.Sc. DEGREE EXAMINATION,APRIL 2020
## II Year III Semester
## Distribution Theory - II

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

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

Answer any **TEN** questions

1. Define Beta distribution of first kind.
2. State the mean and variance of the Gamma distribution.
3. State the pdf of Log - Normal distribution.
4. State the mean of the Weibul distribution.
5. State the relationship between Chi – square distribution and Standard Normal distribution.
6. What is the sampling distribution?
7. State $\mu_{2r} + 1$ of Fisher's 't' distribution.
8. Define F – statistic.
9. Define r$^{th}$ order statistics.
10. State the cumulative distribution function of the smallest order statistics.
11. What are the assumptions of the't' distribution?
12. State the r$^{th}$order moment about origin of exponential distribution.

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

Answer any **FIVE** questions

13. State and prove the memory less property of the exponential distribution.
14. Find variance for Laplace distribution.
15. Find the moment generating function of Chi – Square distribution.
16. List the applications of t – distribution.
17. Explain the joint distribution of two order statistics.
18. Prove that sum of independent Chi – square variates also a Chi – square variate.
19. State and prove the additive property of Gamma distribution.

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

Answer any **THREE** questions

20. Let X $\sim$ $\beta_1(\mu,\ \nu)$ and Y $\sim$ $\gamma(\lambda, \mu+\nu)$ be independent random variables($\mu$, $\nu$,$\lambda$>0). Find the probability density function of XY and identify its distribution.
21. Let $X_i$ (i=1,2,...n) be iid random variables. Then prove that min($X_1$, $X_2$,....$X_n$) has a Weibul distribution if and only if the common distribution of $X_i$'s is a Weibul distribution.
22. Let $X_1$, $X_2$,...$X_n$ be random samples from a normal population with mean $\mu$ and variance $\sigma^2$. Then prove that
    (a) $\overline{X} \sim N\left(\mu, \sigma^2/n\right)$
    (b) $\sum_{i=1}^{n}\left(\frac{X_{i-}\overline{X}}{\sigma}\right)^2$ is a Chi –square variate with (n – 1) d.f.
23. Derive the probability density function of Snedecor's F – distribution.
24. Find the distribution of Median of a random sample from $\cup\,(0, \theta)$.

**B.Sc. DEGREE EXAMINATION,APRIL 2020**
**II Year III Semester**
**Distribution Theory - II**

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

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

Answer any **TEN** questions

1. Define Beta distribution of first kind.
2. State the mean and variance of the Gamma distribution.
3. State the pdf of Log - Normal distribution.
4. State the mean of the Weibul distribution.
5. State the relationship between Chi – square distribution and Standard Normal distribution.
6. What is the sampling distribution?
7. State $\mu_{2r} + 1$ of Fisher's 't' distribution.
8. Define F – statistic.
9. Define r$^{th}$ order statistics.
10. State the cumulative distribution function of the smallest order statistics.
11. What are the assumptions of the'tʼ distribution?
12. State the r$^{th}$order moment about origin of exponential distribution.

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

Answer any **FIVE** questions

13. State and prove the memory less property of the exponential distribution.
14. Find variance for Laplace distribution.
15. Find the moment generating function of Chi – Square distribution.
16. List the applications of t – distribution.
17. Explain the joint distribution of two order statistics.
18. Prove that sum of independent Chi – square variates also a Chi – square variate.
19. State and prove the additive property of Gamma distribution.

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

Answer any **THREE** questions

20. Let X $\sim$ $\beta_1(\mu,\ \nu)$ and Y $\sim$ $\gamma(\lambda, \mu+\nu)$ be independent random variables($\mu$, $\nu$,$\lambda$>0). Find the probability density function of XY and identify its distribution.
21. Let $X_i$ (i=1,2,...n) be iid random variables. Then prove that min($X_1$, $X_2$,....$X_n$) has a Weibul distribution if and only if the common distribution of $X_i$'s is a Weibul distribution.
22. Let $X_1$, $X_2$,...$X_n$ be random samples from a normal population with mean $\mu$ and variance $\sigma^2$. Then prove that
(a) $\overline{X} \sim N\left(\mu, \sigma^2/n\right)$
(b) $\sum_{i=1}^{n}\left(\frac{X_{i-}\overline{X}}{\sigma}\right)^2$ is a Chi –square variate with (n – 1) d.f.
23. Derive the probability density function of Snedecor's F – distribution.
24. Find the distribution of Median of a random sample from $\cup(0, \theta)$.