I BSC MATHEMATICS

Statistics - III

2 Mark

1. Define Binomial distribution
2. Determine the binomial distribution for which the mean is 4 and variance 3. find the mode
3. Define characteristic function of binomial distribution
4. write down the formula for poisson distribution
5. write down the moment generating function of poisson distribution.
6. write down the formula of normal distribution
7. Define the Central limit theorem
8. write down the formula for Chi-Square
9. write down the moment generating function of rectangular distribution
10. write the definition of Gamma distribution
11. write the definition of beta distribution of first kind
12. write the definition of beta distribution of second kind
13. write down f distribution definition
14. State that the ~~memory~~ moment low Property of exponented distribution
15. Give any two applications of students 't' distribution
16. State uniqueness theorem
17. what is the mean and variance of exponential distribution
18. write down the mode of a binomial distribution
19. Definition of poisson distribution
20. write down the characteristic function of poisson distribution
21. state that the Reproductive Property
22. write down the area of Properties
23. write down the characteristic function of chi-Square distribution

24. ~~Define~~ define the uniform distribution
25. define the Exponential distribution
26. write the definition for Student t distribution
27. write the definition for Correlation
28. write down the types of correlation
29. write down the example for positive and negative correlation
30. write the formula for Karlpearson's coefficient of correlation
31. write the formula for the repeated rank correlation
32. write the formula for x on y and y on x in normal equation
33. Correlation coefficient geometric mean between the regression coefficient
34. write down the formula for regression coefficient.
35. write down the angle between two lines of regression
36. Define hypothesis
37. write down the types of hypothesis
38. Define the Standard error.
39. write down the large sample test
40. write down the formula population of two sample mean
41. Define Error in Sampling
42. Define one tail and two tail test
43. write down the test of significance for single mean
44. Define t-test for single mean
45. when does (H_0) null hypothesis is rejected and accepted

5 marks

1. The moment generation function of a random variable is $(\frac{2}{3}+\frac{1}{3}e^t)^9$. show that $P(\mu-2\sigma<x<\mu+2\sigma)$

$\sum_{x=1}^{5} \binom{9}{x} (\frac{1}{3})^x (\frac{2}{3})^{9-x}$

2. If the independent random variable X, Y are binomial distributed respectively with $n=3, p=1/3$ and $n=5, p=1/3$ with down the probability that $X+Y \geq 1$

3. State that recurrence relation for moment of Poisson distribution

4. If X and Y are independent Poisson variate such that $P(X=1)=P(X=2)$ and $P(Y=2)=P(Y=3)$ the find variance of $X-2Y$

5. State and Prove that uniqueness theorem of characteristic function

6. State and prove that additive property of chi-square distribution

1. If X is a uniformly distributed with mean 1 and variance $\frac{4}{3}$ find probability of $X<0$

3. Write the Cumulant generating function of gamma distribution

State and prove that additive property of gamma distribution

1. If $X \sim N(\mu, \sigma^2)$ obtain the p.d.f. of $u = \frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2$

Write down the moments generating function of Exponential distribution

2. If x and y are independent with a common p.d.f (exp)

$$f(x) = \begin{cases} e^{-x}; & x \geq 0 \\ (0); & x < 0 \end{cases}$$ find p.d.f are $x-y$

3. Calculate the correlation coefficient for the following data

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

4. Calculate the rank obtained by ten students in two subjects

Tamil	7	2	1	10	8	4	9	6	3	5
English	9	1	2	10	7	6	5	8	4	3

5. Calculate repeated rank correlation coefficient

X	49	39	41	10	17	17	69	25	17	58
Y	14	14	25	7	16	5	21	10	7	20

6. Arithmetic mean of the regression coefficient is greater than correlation coefficient r provided

7. If $r_{12}=0.5$, $r_{13}=0.3$, $r_{23}=0.4$ to find $R_{3.12}$

18. If $r_{13}=0.6$, $r_{23}=0.5$, $r_{12}=0.8$ to find $r_{13.2}$

19. Using difference of significance of normal population has a mean 6.48 and S.D 1.5 in a sample test 400 members in mean is 6.75 is the difference of significance.

20. Two random sample size 900 and 400 have mean 21 and 21.3 with S.D 3 and 3.1 respectively. These two samples are drawn from the population

21. In a sample of 1000 people in maharastra 540 are rice eaters and the rest of wheat eaters can be assume that both rice and wheat are equally populor in this state at 1% level of significance

22. Find the 95% confidence limits of the population mean?

23. The means of two single large sample of 1000 and 2000 members 67.5 inches respectively can the samples the recorded as drawn from the same population 2.5 inches

24. State and prove that t- test for difference of means

25. The height of 10 males of given locality are found to be 70, 67, 62, 68, 61, 68, 70, 64, 64, 66 inches. It reasonable to believe that the average height is greater than 64 inches. Test at 5% level of significant assuming that for p.d.f $P(t > 1.83) = 0.05$

10 marks

1. Derive the moment of Normal distribution function

2. If x is a normal variate with mean 30 and derivation 5. find the Probability of (i) $26 \le x \le 40$ (ii) $x \ge 45$ (iii) $|x - 30| > 5$

3. In a distribution exactly normal 10.03% of a items under 25 kg weight 89.97% of a items under 70 kg weight. what are the mean and standard derivation of the distribution

4. State and prove that the application of central limit theorem

5. If x_1 and x_2 are two independent chi-square variate with n_1 and n_2 degrees of random respectively. The x_1/x_2 is a β_2 of $(\frac{n_1}{2}, \frac{n_2}{2})$ variate

6. The necessary and sufficient condition for the random variables X_1 and X_2 to be independent is that their joint characteristic function is equal to that is $\phi_{x_1 x_2}(t_1, t_2) = \phi_{x_1}(t_1) \cdot \phi_{x_2}(t_2)$.

7. Define gamma variate and find its mean and variance

8. Derive the chi-square (χ^2) distribution

9. Derive the constants of beta distribution of second kind

10. If x and y are independent gamma variate with paramaters μ and v show that $u = x+y$, $z = x/y$ are independent that μ is a $\gamma(\mu+v)$ variate and z is a $R_2(\mu, v)$ variate

11. ~~Derive~~

(i) If $x_1, x_2 \cdots x_n$ are independent random variable x_i having an exponential distribution with parameters θ_i, $i = 1, 2 \cdots n$ then $z = \min(x_1, x_2 \cdots x_n)$ the exponential distribution with parameter $\sum_{i=1}^{n} \theta_i$

(ii) Derive the distribution of fisher's 't' distribution test function

12. write the definition of 'F' distribution and also derive that the derivation of Snedecor's F- distribution function

13. obtain the rank correlation of coefficient of the following data

X	65	68	67	64	68	62	70	66	68	67	69	71
Y	68	66	68	65	69	66	68	65	71	67	68	70

14. (i) If one of the regression to coefficient is greater than unity. The otherwise be less than unity

(ii) If the correlation coefficient x, y is 0.5. find the correlation coefficient between $2x+1$ and $3y-1$

15. The two lines of regression are $8x - 10y + 66 = 0$, $40x - 18y - 214 = 0$ The variance x is 9. find the mean value of x and y and the correlation coeffient between x and y

16. The following data of two marks in economics and statistics

Economics	25	28	35	32	31	36	29	38	34	32
statistics	43	46	49	41	36	32	31	30	33	39

17. Find the rank correlation coefficient from the following data.

Father (A)	3	6	1	10	8	9	4	5	2	7
Mother (B)	5	8	3	9	10	7	1	2	4	6
Son (C)	4	7	2	8	9	6	3	1	5	10

18. In a trivariate $\sigma_1 = 2$, $\sigma_2 = \sigma_3 = 3$, $r_{12} = r_{21} = 0.7$, $r_{23} = r_{31} = 0.5$. Find (i) $r_{23.1}$ ii) $R_{1.23}$ iii) $b_{12.3}$ iv) $b_{13.2}$ v) $\sigma_{1.23}$

19. A random sample of 400 men and 600 women are asked wheather the recidency 200 men and 325 women were fawour of the proposal test the hypothesis the proposition of men and women at 5% level of significance

20. Below are given the gain in weight (in kgs) of pigs fed on two diets A and B gain in weight

Diet A : 25 32 30 34 24 14 32 24 30 31 35 25

Diet B : 44 34 22 10 47 31 40 30 32 35 18 21 35 29 22

Test if the two diets differ significantly as regards their effect on increase in weights.