JNTU ONLINE EXAMINATIONS [Mid 2 - Probability and Statistics]

1. **If the variance of the population is 9 and the maximum error of estimate of population mean with a probability 0.95 is 0.5, then sample size is (given that $Z_{0.475}$=1.96 & $Z_{0.495}$=2.58) [01D01]**
   a. 152
   b. 138
   c. 175
   d. 201
2.
3. **If the standard deviation of population is 9 and the maximum error of estimate of population mean with a probability 0.99 is 0.5, then sample size is (given that $Z_{0.475}$=1.96 & $Z_{0.495}$=2.58) [01D02]**
   a. 240
   b. 138
   c. 135
   d. 201
4. **If the deviation of population is 10 and the maximum error with a probability 0.99 is 1.2 then the sample size is (given that $Z_{0.475}$=1.96 & $Z_{0.495}$=2.58) [01M01]**
   a. 265
   b. 267
   c. 305
   d. 462
5. **If the standard deviation of population is 9 and the maximum error of estimate of population mean with a probability 0.95 is 0.8, then sample size is (given that $Z_{0.475}$=1.96 & $Z_{0.495}$=2.58) [01M02]**
   a. 519
   b. 344
   c. 486
   d. 212
6. **A statistic is known as unbiased estimator of the corresponding parameter if [01S01]**
   a. E(statistic)=mean of population
   b. E(parameter)=mean of sample
   c. E(statistic) =parameter
   d. statistic = parameter
7. **The maximum error of estimate E with (1-α) probability is given by E= [01S02]**
   a. Z(1-α).σ/√n
   b. Zα/2.σ/√n
   c. Z-α/2. √σ/n
   d. Z(1-α).√n/ σ
8. **The sample size n in terms of α, E(maximum error), σ is given by n= [01S03]**
   a. $(Z\text{-}_{\alpha/2}\ \sigma/E)^2$
   b. $(Z\alpha\ \sigma)^2$ /E
   c. Zα σ /E
   d. $Z\text{-}_{\alpha/2}$ σ /E
9. **If there are x success among n trials, then the unbiased estimate of Binomial parameter p is [01S04]**
   a. nx
   b. n/x
   c. x/n
   d. x/√n
10. **If the standard deviation of the population is 10 and the maximum error with a probability 0.95 is 1.2. Then the size of the sample is (given that $Z_{0.475}$=1.96 & $Z_{0.495}$=2.58) [01S05]**
    a. 265
    b. 267
    c. 305
    d. 462
11. **If the maximum error to assert with a probability of 0.95 is 0.5,the variance of the population being 9,then the size of the sample needed is ____ (given that $Z_{(0.475)}$=1.96,$Z_{(0.495)}$=2.58) [02D01]**
    a. 139
    b. 152
    c. 169
    d. 101
12. **The maximum error to assert with a probability of 0.95 is 0.7,the standard deviation of the population being 5, then the size of the sample needed is ____ (given that $Z_{(0.475)}$=1.96,$Z_{(0.495)}$=2.58) [02D02]**

a. 176
b. 196
c. 191
d. 202

13. The maximum error to assert with a probability of 0.95 is 0.6, the variance of the population being 16,then the size of the sample needed is ____ (given that $Z_{(0.475)}$=1.96,$Z_{(0.495)}$=2.58) [02D03]

a. 190
b. 195
c. 200
d. 171

14. If the maximum error to assert with a probability of 0.95 is 1.2, with the standard deviation of the population being 10, the size of the sample needed is____ (given that $Z_{(0.475)}$=1.96,$Z_{(0.495)}$=2.58) [02M01]

a. 64
b. 79
c. 96
d. 74

15. If the maximum error to assert with a probability of 0.99 is 0.86,with the sample size 144 then variance of the population is____(given that $Z_{(0.475)}$=1.96,$Z_{(0.495)}$=2.58) [02M02]

a. 16
b. 22
c. 35
d. 30

16. The maximum error to assert with a probability of 0.95 is 0.7 with the standard deviation of the population being 5,the sample size needed is ____ (given that $Z_{(0.475)}$=1.96,$Z_{(0.495)}$=2.58) [02M03]

a. 142
b. 178
c. 196
d. 206

17. Let $\theta_1$and θ_2 are to unbiased estimators of θ , W_1 θ1+W_2 θ_2 is an unbiased estimator of θ if [02S01]

a. $\theta_1+\theta_2=1$
b. $W_1+W_2=1$
c. $\theta_1= 1/\theta_2$
d. $W_1=1/W_2$

18. If $X_1,X_2,$______,X_n is a random sample with mean X and μ,σ^2 are the mean and variance of the population, then [02S02]

a. E(X) = μ
b. E(X) = σ
c. E(X) = σ^2
d. E(X) = μ^2

19. If 5,7,8,9,6 is a sample from a population then an unbiased estimate of population mean is [02S03]

a. 5
b. 6
c. 7
d. 8.75

20. If 3,6,9,14,28 is a sample from of population then an unbiased estimate of population mean is [02S04]

a. 12
b. 9
c. 15
d. 5

21. A Random sample of size 90 with mean 40 is drawn from a population whose variance is 6.25. The 99% confidence interval for the population mean is (Given $Z_{0.48}$=196; $Z_{0.495}$ =2.58; $Z_{0.49}$=2.33; $Z_{0.48}$=2.55) [03D01]

a. (39.48, 40.52)
b. (39.72, 40.27)
c. (40.75, 41.91)
d. (37.45, 38.08)

22. A Random sample of size 81 with mean 32 is drawn from a population whose variance is 20.25. The 96% confidence interval for the population mean is (Given $Z_{0.48}$=196; $Z_{0.495}$ =2.58; $Z_{0.49}$=2.33; Z<SUB.0.48< sub>=2.55) [03M01]

a. (20.28, 22.9)
b. (30.84, 33.17)
c. (30.73, 33.28)

d. (19.1, 22.8)

23. A Random sample of size 81 with mean 32 is drawn from a population whose variance is 20.25. The 95% confidence interval for the population mean is (Given $Z_{0.48}$=196; $Z_{0.495}$ =2.58; $Z_{0.49}$=2.33; $Z_{0.48}$=2.55) [03M02]

a. (20.28, 22.9)
b. (30.84, 33.17)
c. (22.9, 20.3)
d. (31.02, 32.98)

24. A Random sample of size 90 with mean 40 is drawn from a population whose variance is 6.25. The 95% confidence interval for the population mean is (Given $Z_{0.48}$=196; $Z_{0.495}$ =2.58; $Z_{0.49}$=2.33; $Z_{0.48}$=2.55) [03M03]

a. (39.48, 40.52)
b. (39.72, 40.27)
c. (40.75, 41.91)
d. (37.45, 38.08)

25. A Random sample of size 100 with mean 21.6 is drawn from a population with standard deviation 5.1. The 95% confidence interval for the population mean is (Given $Z_{0.48}$=196; $Z_{0.495}$ =2.58; $Z_{0.49}$=2.33; $Z_{0.48}$=2.55) [03S01]

a. (20.28, 22.9)
b. (20.6, 22.6)
c. (22.9, 20.3)
d. (19.1, 22.8)

26. A Random sample of size 100 with mean 21.6 is drawn from a population with standard deviation 5.1. The 99% confidence interval for the population mean is (Given $Z_{0.48}$=196; $Z_{0.495}$ =2.58; $Z_{0.49}$=2.33; $Z_{0.48}$=2.55) [03S02]

a. (20.28, 22.9)
b. (20.6, 22.6)
c. (22.9, 20.3)
d. (19.1, 22.8)

27. A Random sample of size 100 with mean 21.6 is drawn from a population with standard deviation 5.1. The 98% confidence interval for the population mean is (Given $Z_{0.48}$=196; $Z_{0.495}$ =2.58; $Z_{0.49}$=2.33; $Z_{0.48}$=2.55) [03S03]

a. (20.28, 22.9)
b. (20.6, 22.6)
c. (22.9, 20.3)
d. (19.1, 22.8)

28. A Random sample of size 100 with mean 21.6 is drawn from a population with standard deviation 5.1. The 96% confidence interval for the population mean is (Given $Z_{0.48}$=196; $Z_{0.495}$ =2.58; $Z_{0.49}$=2.33; $Z_{0.48}$=2.55) [03S04]

a. (20.28, 22.9)
b. (20.6, 22.6)
c. (20.3,22.9)
d. (19.1, 22.8)

29. A Random sample of size 81 with mean 32 is drawn from a population whose variance is 20.25. The 98% confidence interval for the population mean is (Given $Z_{0.48}$=196; $Z_{0.495}$ =2.58; $Z_{0.490.48=2.55)}$ [03S05]

a. (20.28, 22.9)
b. (30.84, 33.17)
c. (22.9, 20.3)
d. (19.1, 22.8)

30. A Random sample of size 81 with mean 32 is drawn from a population whose variance is 20.25. The 99% confidence interval for the population mean is (Given Z0.48=196; Z<SUB.0.495< sub> =2.58; Z0.49<sub.0.48<>=2.55) [03S06]

a. (30.71, 33.29)
b. (30.84, 33.17)
c. (22.9, 20.3)
d. (19.1, 22.8)

31. A sample of size 13 has mean 15.5 and s=1.15,with t $\alpha/2$ =2.13(for 12(d.f) at 5% LOS) then the confidence interval for the mean is [04D01]

a. (14.868,16.132)
b. (12.921,14.208)
c. (16.528,19.172)
d. (10.371,13.139)

32. For a small sample the maximum error E=1.12,s,the unbiased estimate of standard deviation is 1.15 and t $\alpha/2$(for 5% level of significance) is given as 2.13 then the sample size n= [04D02]

a. 9
b. 13
c. 18
d. 21

33. The feeling about monthly sales of computers by a distributors is expressed as normal distribution with μ_0=470

and σ0=30. the mean sales for 6 months is found to be 500 with a standard deviation 35 . If s=35 is used as estimate for àthen posterior Standard deviation σ 1= [04D03]

a. 12.1
b. 11.8
c. 3.6
d. 12.9

34. **If a mean of a sample of size 15 drawn from a normal population with a mean 20.32 and unbiased estimate of standard deviation is 2.03 having t α/2 for approximate d.f is 2.14,then the confidence interval for the mean of the population is [04M01]**

a. (17.86,19.21)
b. (16.46,17.95)
c. (19.20,21.44)
d. (22.43,24.51)

35. **For a small sample the maximum estimate of the error E=1.12,s the unbiased estimate of standard deviation is 2.03 and t α/2 (for 5% level of significance) is given as 2.14,then the sample size n is [04M02]**

a. 13
b. 16
c. 18
d. 22

36. **For a sample of size 13, with s=1.15 and t α/2 for 12 degree freedom is 2.13, the maximum error E is [04M03]**

a. 1.36
b. 0.19
c. 0.96
d. 0.68

37. **If the mean of the sample of 10 members of a normal population is 13 and unbiased estimate of population variance is 40/3 ,then 95% confidence limits for the mean are. (given that t 0.975 for 9(d .f)=2.26) [04S01]**

a. 7.34 and11.62
b. 10.39and15.61
c. 9.8 and 11.0
d. 10.4 and 15.6

38. **A Sample of size 10 was drawn from a population and the unbiased estimate of the population standard deviation is 0.03 .The maximum error of estimate of population with 99% confidence is (given that t ?/2 for 9(d .f)=3.25) [04S02]**

a. 0.0308
b. 0.0650
c. 1.325
d. 0.01625

39. **If the mean of the sample of 25 members of a normal population is 35 and unbiased estimate of population standard deviation is 4,then 95% confidence limits for mean of the population are.(given that t ±/2 for 24(d .f)=2.06) [04S03]**

a. 31.42&33.63
b. 28.94&30.72
c. 33.35&36.65
d. 45.63&46.93

40. **If the mean of the sample of 9 members of a normal population is 12.5 and unbiased estimate of population standard deviation is 4,then 95% confidence limits for mean of the population are.(given that t ±/2 for 8(d .f)=2.31) [04S04]**

a. (11.01,13.21)
b. (12.42,15.58)
c. (14.53,16.22)
d. (16.84,16.28)

41. **If a sample of the size 15 drawn from a normal population with an unbiased estimate of standard deviation 2.03 having t α/2 for approximate degrees of freedom as 2.14,then maximum error of estimate is given by [04S05]**

a. 1.12
b. 0.98
c. 1.24
d. 3.28

42. **If the prior estimates of mean μ0=14.75 and standard deviation σ0=3.25 and a random sample of size 40 has a mean x=15.5 and standard deviation s==3.50,then the posterior mean μ1= (take s=3.5 as an estimator for σ) [05D01]**

a. 14.5
b. 15.5
c. 16.5
d. 17.5

43. **If the prior estimates of mean μ0=18.25 and standard deviation σ0=6.85 and a random sample of size 30 has a mean x=20.5 and standard deviation s=7.5, then the posterior mean μ1= (take s=7.5 as an estimator for σ) [05D02]**

a. 17.26
b. 19.33
c. 20.41
d. 21.59

44. The feeling about monthly sales of computers by a distributors is expressed as normal distribution with $\mu_0=470$ and $\sigma_0=30$. the mean sales for 6 months is found to be 500 with a standard deviation 35 . If s=35 is used an estimate for àthen posterior mean $\mu_1=$ [05M01]

a. 475
b. 494
c. 485
d. 445

45. The feelings about the life of the tube lights by a manufacturer is expressed as normal distribution$\mu_0=800$ hours and $\sigma_0=10$ hours .The mean life of 5o bulbs over a period of 10 months is found to be 810 hours with standard deviation 12 hours. If s=12hours is used an estimate for àthen the posterior mean $\mu_1=$ [05M02]

a. 809
b. 815
c. 790
d. 825

46. If the prior estimates of mean $\mu_0=17.25$ and standard deviation $\sigma_0=5.0$ and a random sample of size 80 has a mean x=18.5 and standard deviation 5.5 then the posterior mean $\mu_1=$ [05M03]

a. 17.93
b. 14.23
c. 18.48
d. 19.70

47. The feelings about the life of the tube lights by a manufacturer is expressed as normal distribution $\mu_0=800$ hours and $\sigma_0=10$ hours .The mean life of 5o bulbs over a period of 10 months is found to be 810 hours with standard deviation 12 hours. If s=12hours is used an estimate for σ then the posterior standard deviation $\sigma_1=$ [05S01]

a. 3.547
b. 4.921
c. 3.012
d. 4.171

48. If the prior estimates of mean ?0=17.25 and standard deviation $\sigma_0=5.0$ and a random sample of size 80 has a mean x=18.5 and standard deviation 5.5 then the posterior standard deviation $\sigma_1=$ [05S02]

a. 1.82
b. 0.25
c. 0.61
d. 1.31

49. If the prior estimates of mean $\mu_0=14.75$ and standard deviation $\sigma_0=3.25$ and a random sample of size 40 has a mean x=15.5 and standard deviation s==3.50,then the posterior standard deviation $\sigma_1=$ (take s=3.5 as an estimator for σ) [05S03]

a. 0.95
b. 0.55
c. 1.25
d. 1.57

50. If the prior estimates of mean $\mu_0=18.25$ and standard deviation $\sigma_0=6.85$ and a random sample of size 30 has a mean x=20.5 and standard deviation s=7.5, then the posterior standard deviation $\sigma_1=$ (take s=7.5 as an estimator for σ) [05S04]

a. 1.34
b. 0.96
c. 2.13
d. 2.85

51. In case of a left-tailed test, for determining the critical value at the level of significance α [06D01]

a. (1- α)% of the area of under the left -tail comprises of the rejection region
b. α% of the area of under the left -tail comprises of the rejection region
c. (1 -α/2) % of the area of under the left -tail comprises of the rejection region
d. α /2 % of the area of under the left -tail comprises of the rejection region

52. In case of a two-tailed test, for determining the critical value at the level of significance α [06D02]

a. (1- ?) % of the area equally distributed under both the tails comprises of the rejection region
b. 2 α% of the area equally distributed under both the tails comprises of the rejection region
c. α % of the area equally distributed under both the tails comprises of the rejection region
d. α /2 % of the area equally distributed under both the tails comprises of the rejection region

53. A right tailed alternative has an hypothesis of the form [06M01]

a. $H_0 : \mu=\mu_0$
b. $H_1: \mu\neq\mu_0$
c. $H_1 : \mu >\mu_0$
d. $H_1 : \mu< \mu_0$

54. A left tailed alternative has an hypothesis of the form [06M02]

a. $H0 : \mu=\mu0$
b. $H1: \mu \neq \mu 0$
c. $H1 : \mu > \mu0$
d. $H1 : \mu < \mu0$

55. In case of a right-tailed test, for determining the critical value at the level of significance α [06M03]

a. (1- α)% of the area of under the right -tail comprises of the rejection region
b. α % of the area of under the right -tail comprises of the rejection region
c. (1- α/2)% of the area of under the right -tail comprises of the rejection region
d. α/2 % of the area of under the right -tail comprises of the rejection region

56. Type I error is [06S01]

a. Reject H0 when it is wrong
b. Reject H0 when it is true
c. Accept H0 when it is wrong
d. Accept H0 when it is true

57. Type II error is [06S02]

a. Reject H0 when it is wrong
b. Reject H0 when it is true
c. Accept H0 when it is wrong
d. Accept H0 when it is true

58. The probability of committing Type I error is denoted by [06S03]

a. α
b. β
c. x
d. σ

59. The probability of committing Type II error is denoted by [06S04]

a. α
b. β
c. x
d. σ

60. A two tailed alternative has an hypothesis of the form [06S05]

a. $H0 : \mu=\mu0$
b. $H1: \mu \neq \mu 0$
c. $H1 : \mu > \mu0$
d. $H1 : \mu < \mu0$

61. A sample consisting of 22 items has mean 39 ,drawn from a population with a mean 36.75 with unbiased estimate 7.98 for the standard deviation. the value of t- statistic is [07D01]

a. 1.322
b. 0.165
c. 1.739
d. 0.189

62. A sample consisting of 11 items has mean 6.38 ,drawn from a population with a mean 7.28 with unbiased estimate 39.75 for the standard deviation. the value of t- statistic is [07D02]

a. -0.08
b. -1.36
c. -1.63
d. -0.47

63. A sample consisting of 8 items has mean 14, drawn from a population with a mean 10.5 with unbiased estimate 10.3 for the standard deviation. The value of t- statistic is [07M01]

a. 1.76
b. 3.08
c. 1.96
d. 0.96

64. A sample consisting of 12 items has mean 22 ,drawn from a population with a mean 19 with unbiased estimate 4.8 for the standard deviation. the value of t- statistic is [07M02]

a. 2.167
b. 3.08
c. 1.92
d. 0.98

65. A sample consisting of 18 items has mean 4.75 ,drawn from a population with a mean 4.25 with unbiased estimate 1.26 for the standard deviation. the value of t- statistic is [07M03]

a. 2.28
b. 2.09
c. 1.68
d. 1.75

66. If the mean of the sample of size 100 is 116, sample being taken from a population with mean 120 and variance 225, then the value of the test statistic Z is [07S01]

a. 3.12
b. 1.60
c. 3.08
d. 2.51

67. If the mean of the sample of size 45 is 76.7, sample being taken from a population with mean 73.2 and Standard deviation 8.6, then the value of the test statistic Z is [07S02]

a. 2.73
b. 2.98
c. 3.14
d. 3.45

68. If the mean of the sample of size 24 is 82, sample being taken from a population with mean 78 and Standard deviation 6.2, then the value of the test statistic Z is [07S03]

a. 3.33
b. 6.66
c. 46.6
d. 3.16

69. If the mean of the sample of size 60 is 102, sample being taken from a population with mean 110 and Standard deviation 20, then the value of the test statistic Z is [07S04]

a. -0.523
b. -0.731
c. -3.098
d. -3.527

70. If the mean of the sample of size 52 is 35,sample being taken from a population with mean 32.5 and Standard deviation 8.5, then the value of the test statistic Z is [07S05]

a. 1.567
b. 2.121
c. 0.978
d. 4.887

71. The means of the two samples of sizes 1000 and 2000 are 69.5 and 68 with standard deviations of the populations from which the samples are drawn are given as 10 and 11. The value of the Z- statistic is under the null hypothesis that there is no significant different between the means is [08D01]

a. 2.523
b. 1.092
c. 1.786
d. 2.197

72. The mean yield of milk in a month for two sets of cows and there variability of milk yields are given below

	Set of 80 cows	Set of 50 cows
Mean yield	165	160
Standard deviation	10	12

The value of Z-Statistic under the null hypothesis that there is no significant different between the means is [08M01]

a. 2.46
b. 3.92
c. 1.72
d. 0.97

73. The means of the two samples of sizes 100 and 120 are 2.75 and 2.25 with standard deviations of the populations from which the samples are drawn are given as 1.00 and 1.12. The value of the Z- statistic is under the null hypothesis that there is no significant different between the means is [08M02]

a. 3.023
b. 0.876
c. 2.092
d. 1.748

74. The means of the two samples of sizes 100 and 120 are 60 and 5860 with standard deviations of the populations from which the samples are drawn are given as 5 and 6. The value of the Z- statistic under the null hypothesis that there is no significant different between the means is [08M03]

a. 2.92
b. 2.67
c. 2.08
d. 1.97

75. A normal population has a variance 4. Two samples of sizes40 each are drawn and their means are 14 and 12.The value of the of Z-Statistic under the null hypothesis that there is no significant different between the means is [08M04]

a. 4.472
b. 3.085
c. 4.173

d. 3.173

76. The mean yield of two sets of plants in an orchid and there variability in the yields are as follows

	Set of 40 plants	Set of 60 plants
Mean yield per plot	1258	1243
Standard deviation per plant	34	28

The value of Z statistic under the Hypothesis that the mean yield per plant is same is [08S01]

a. 1.7
b. 2.3
c. 3.2
d. 4.6

77. The mean hourly wages of supervisors in two companies and the variability in their wages are as follows

	Group of 50 supervisors of company A	Group of 60 supervisors of company B
Mean wages in Rupees	32	31.5
Variance in Wages	5	6

The value of Z statistic under the hypothesis that the mean hourly wages are same is [08S02]

a. 3.42
b. 0.18
c. 2.04
d. 1.12

78. The mean hourly wages of supervisors in two companies and the variability in their wages are as follows

	Group of 80 supervisors of company A	Group of 100 supervisors of company B
Mean wages in Rupees	52	47
Variance in Wages	25	32

The value of Z statistic under the hypothesis that the mean hourly wages are same is [08S03]

a. 3.12
b. 2.16
c. 6.28
d. 9.36

79. The means of two samples of sizes 400 and 100 are 57 and 55 ,variances of the populations from which the samples are drawn are given as 100 and 225. The value of Z statistic under the null hypothesis that there is no significant different between the means is [08S04]

a. 1.96
b. 2.78
c. 0.75
d. 1.26

80. The means of two samples of sizes 100 and 150 drawn from two large populations are 32 and 30 ,variances of the populations from which the samples are drawn are given as 2.25 and 4. The value of Z statistic under the null hypothesis that there is no significant different between the means is [08S05]

a. 10.18
b. 9.02
c. 8.79
d. 1.96

81. A region in sample space which amounts to rejection of null hypothesis is known as [09D01]

a. Null region
b. Acceptance region
c. Critical region
d. Complimentary region

82. The probability α that a random value of the statistic belongs to the critical region is known as [09D02]

a. Critical value
b. Level of significance
c. Acceptance value
d. Rejection value

83. Type I error is also referred to as [09M01]

a. critical value
b. Producer's risk
c. Significant value
d. Consumer's risk

84. Type II error is also referred to as [09M02]

a. critical value
b. Producer's risk
c. Significant value
d. Consumer's risk

85. The value of test statistic which separates the acceptance region and the rejection region is known as [09M03]

a. Acceptance value
b. Standard error
c. Significant value
d. Rejection value

86. The probability of committing Type I error is denoted by [09S01]

a. β
b. $1-\beta$
c. α
d. $1-\alpha$

87. Type I error is [09S02]

a. Prob(Rejecting H0 / H0 is true)
b. Prob(Accepting H0 / H0 is true)
c. Prob(Accepting H0 / H0 is false)
d. Prob(Rejecting H0 / H0 is false)

88. Type II error is [09S03]

a. Prob(Rejecting H0 / H0 is true)
b. Prob(Accepting H0 / H0 is true)
c. Prob(Accepting H0 / H0 is false)
d. Prob(Rejecting H0 / H0 is false)

89. The Probability of accepting H0 when H0 is false is denoted by [09S04]

a. β
b. $1-\beta$
c. α
d. $1-\alpha$

90. Power function of the test of hypothesis H0 is denoted by [09S05]

a. β
b. $1-\beta$
c. α
d. $1-\alpha$

91. For a two tailed test 10% level of significance , the area occupied by acceptance region under a standard normal curve to the left of Z=0 axis is [10D01]

a. 0.10
b. 0.90
c. 0.95
d. 0.05

92. The critical value of Z for a single tailed test at α level of significance is same as the critical value of Z for a two tailed test at a level of significance --- [10D02]

a. α
b. 2α
c. $\alpha/2$
d. 4α

93. If the critical value of the test statistic at ± level of significance for a two tailed test is given by $Z\alpha$ then [10M01]

a. $P(Z > Z\alpha)= \alpha$
b. $P(Z <- Z\alpha)= \alpha$
c. $P(Z > Z\alpha)= \alpha/2$
d. $P(Z <- Z\alpha)= \alpha/2$

94. If the critical value of the test statistic at ± level of significance for a right tailed test is given by Z± then [10M02]

a. $P(Z > Z\alpha)= \alpha$
b. $P(Z <- Z\alpha)= \alpha$
c. $P(Z > Z\alpha)= \alpha/2$
d. $P(Z <- Z\alpha)= \alpha/2$

95. If the critical value of the test statistic at ? level of significance for a left tailed test is given by $Z\alpha$ then [10M03]

a. $P(Z > Z\alpha)= \alpha$
b. $P(Z <- Z\alpha)= \alpha$
c. $P(Z > Z\alpha)= \alpha/2$
d. $P(Z <- Z\alpha)= \alpha/2$

96. For a two tailed test with a level of significance α the area occupied by acceptance region under a standard normal curve is [10S01]

a. α
b. $\alpha/2$

c. **1-α**
d. 1-α/2

97. For a right tailed test with a level of significance α , the area occupied by acceptance region under a standard normal curve to the left of Z=0 axis is [10S02]

a. 1-α
b. 0.5
c. α
d. 1-α/2

98. For a right tailed test with a level of significance 5% , the area occupied by acceptance region under a standard normal curve to the left of Z=0 axis is [10S03]

a. 1.0
b. 0.95
c. 0.50
d. 0.05

99. For a left tailed test with a level of significance 5% , the area occupied by acceptance region under a standard normal curve to the left of Z=0 axis is [10S04]

a. 0.05
b. 0.50
c. 0.45
d. 0.475

100. For a two tailed test with a level of significance 5% , the area occupied by rejection region under a standard normal curve to the right of Z=0 axis is [10S05]

a. 0.025
b. 0.50
c. 0.45
d. 0.475

101. The mean weight of 10 oil tins is 16 kgs. . The sum of squares of the deviation taken from the mean is 0.625. If the population mean of oil tins is regarded as 15.8 kgs.,, the value of t-statistic is [11D01]

a. 2.4
b. 1.2
c. 2.8
d. 0.92

102. The mean weight of 10 oil tins is 123.68 kgs. . The sum of squares of the deviation taken from the sample mean is .9321. If the population mean of oil tins is regarded as 123.50 kgs.,, the value of - statistic is [11D02]

a. 2.192
b. 2.082
c. 1.256
d. 1.769

103. The mean weight of a random sample of 10 boys' is 97.2 lbs. The sum of squares of the deviation taken from the sample mean is 1833.6. If the population men is regarded as 100 lbs, the value of | t |- statistic is [11M01]

a. 1.36
b. 0.49
c. 0.98
d. 0.62

104. The mean heights of 10 males in a locality are 66 inches. The sum of squares of the deviation taken from the mean is 90. If the population men are regarded as 64 inches, the value of t- statistic is [11M02]

a. 1.98
b. 2.0
c. 2.25
d. 3.16

105. A sample of 11 articles chosen at random has a mean weight of 68.09 kgs. The sum of squares of the deviation taken from the mean is 91.201. If the population mean is regarded as 66 kgs.,, the value of t- statistic is [11M03]

a. 3.721
b. 1.076
c. 2.295
d. 1.735

106. The variable t- in Students t-distribution ranges from [11S01]

a. -3 to3
b. 0 to 30
c. -∞ to +∞
d. 0 to ∞

107. The t- distribution curve is [11S02]

a. Skewed towards right
b. Skewed towards left
c. increasing in(0 , ∞)
d. Symmetrical about f(t) axis

108. The mean of 10 items 12. The sum of squares of the deviation taken from the mean is 81. If the population men is 11.4, the value of t- statistic is [11S03]

a. 0.63
b. 2.52
c. 3.41
d. 0.72

109. The mean of 15 items 42. The sum of squares of the deviation taken from the mean is 57. If the population men is 44, the value of t- statistic is [11S04]

a. -2.76
b. 1.08
c. 2.76
d. -3.84

110. The mean of 14 items 0.56. The sum of squares of the deviation taken from the mean is 2.56. If the population men is 0.49, the value of t-statistic is [11S05]

a. 1.9
b. 0.59
c. 0.98
d. 0.46

111. The F- distribution is used to test [12S01]

a. The equality of population means from which two small samples are drawn
b. The equality of population means from which two large samples are drawn
c. The equality of population proportions from which two small samples are drawn
d. The equality of population variances from which two small samples are drawn

112. Two random samples gave the following results.

Sample	Size	Sample mean	Sum of squares of Deviations from mean
1	12	14	108
2	10	15	90

The value of F-statistic is [12S02]

a. 0.982
b. 1.02
c. 1.23
d. 0.871

113. Two random samples gave the following results

Sample	Size	Sum of squares of Deviations from mean
1	9	160
2	8	91

The value of F- statistic is [12S03]

a. 1.54
b. 0.649
c. 0.798
d. 5.129

114. Two random samples gave the following results

Sample	Size	Sum of squares of Deviations from mean
1	7	153
2	9	102

The value of F- statistic is [12S04]

a. 1.75
b. 2.0
c. 0.50
d. 1.25

115. If Oi and Ei denote the observed and expected frequencies in the table

Oi –E_i	12	9	7	14
Ei	10	11	5	16

Then the value χ^2 -statistic is [13D01]

a. 12.18
b. 2.96
c. 4.29
d. 11.72

116. If Oi and Ei denote the observed and expected frequencies in the table

$O_i - E_i$	18	25	14	13
Ei	22	23	12	10

Then the value χ^2 -statistic is [13D02]

a. 4.371
b. 3.128
c. 4.981
d. 3.276

117. Chi- square distribution is used to [13M01]

a. test the hypothesis about the population mean
b. test the equality of population variances from which two small samples are drawn
c. determine whether an actual sample distribution matches a known theoretical distribution
d. test the equality of two population means from which two large samples are drawn

118. If Oi and Ei denote the observed and expected frequencies in the table

$O_i - E_i$	64	25	49	36
Ei	18	30	18	30

Then the value χ^2 -statistic is [13M02]

a. 7.9
b. 8.3
c. 12.8
d. 6.4

119. The mean of the Chi- square distribution is equal to [13S01]

a. Twice the number of degrees of freedom
b. Thrice the number of degrees of freedom
c. Half the number of degrees of freedom
d. The number of degrees of freedom

120. The variance of the Chi- square distribution is equal to [13S02]

a. Twice the number of degrees of freedom
b. Thrice the number of degrees of freedom
c. Half the number of degrees of freedom
d. The number of degrees of freedom

121. The variance of the Chi- square distribution is equal to [13S03]

a. Twice the number of degrees of freedom
b. Thrice the number of degrees of freedom
c. Half the number of degrees of freedom
d. The number of degrees of freedom

122. As the number of degrees of freedom approach infinity chi- square distribution approaches [13S04]

a. Poisson's distribution
b. Students t-distribution
c. Normal distribution
d. F-distribution

123. If 18 pencils out of 100 are defective, then a 95% confidence interval for the true Proportion of defective pencils is______ (Given that significant value of Z at 95% confidence level is 1.96) [14D01]

a. (0.112,0.274)
b. (0.105,0.225)
c. (0.157,0.262)
d. (0.134,0.217)

124. If 90 persons out of 900 are found to be vegetarians then a 95% confidence interval for the true proportion is____ (Given that significant value of Z at 99% confidence level is 2.58) [14D02]

a. (0.0742,0.1258)
b. (0.1274,0.1792)
c. (0.1408,0.1976)
d. (0.2101,0.2876)

125. If x 1= 100 ,n 1 = 250 ,x 2 = 50 , and n 2 =250 The standard error of difference of proportion is [14M01]

a. 0.168
b. 0.040
c. 0.020
d. 0.010

126. A test on 150 randomly selected bricks showed 20% are defective. Then a 95% confidence interval for the true proportion is__________ (Given that significant value of Z at 95% confidence level is 1.96) [14M02]

- **a. (0.136 ,0.264)**
- b. (0.183,0.247)
- c. (0.147,0.212)
- d. (0.152, 0.279)

127. If x1 = 200 ,n1 = 500 ,x = 200, and n2=400 ,the standard error of difference of proportion is [14S01]

- a. 0.011
- **b. 0.033**
- c. 0.022
- d. 0.0108

128. If x1 = 200 ,n1 = 800 ,x 2 = 100 , and n 2 =400 The standard error of difference of proportion is [14S02]

- **a. 0.0265**
- b. 0.0682
- c. 0.1357
- d. 0.2692

129. If x1 = 100 ,n1 = 700 ,x 2 = 200 , and n2 =800 The standard error of difference of proportion is [14S03]

- a. 0.917
- b. 0.632
- c. 0.0439
- **d. 0.207**

130. If P =0.5 and the maximum error with 95% confidence is 0.07, then the sample size is (Given that critical value of Z is 1.96) [15D01]

- a. 206
- **b. 196**
- c. 58
- d. 85

131. On examination of 600 bolts 200 are found to be defective. If the maximum error with 95 % Confidence is________ (Given that critical value of Z is 1.96) [15D02]

- **a. 2123**
- b. 3454
- c. 1179
- d. 46

132. If the standard error of proportions is0.035, then the maximum error with 95% confidence is (Given that critical value of Z is 1.96) [15M01]

- a. 0.0178
- b. 0.1325
- c. 0.0923
- **d. 0.0686**

133. If P =0.3 and the sample size is 50, then the maximum error with 95% confidence is (Given that critical value of Z is 1.96) [15M02]

- a. 0.0331
- **b. 0.1274**
- c. 0.3986
- d. 0.1782

134. If P = 0.5 and the sample size is 750 then standard error of proportion is [15S01]

- **a. 0.0182**
- b. 0.098
- c. 0.333
- d. 0.1972

135. If P = 0.25 and the sample size is 120 then standard error of proportion is [15S02]

- a. 0.01
- **b. 0.04**
- c. 0.15
- d. 0.07

136. If P = 0.95 and the sample size is 200 then standard error of proportion is [15S03]

- a. 0.0023
- b. 0.1793
- **c. 0.0154**
- d. 0.0192

137. If P = 0.4 and the sample size is 100 then standard error of proportion is [15S04]

- a. 0.002
- **b. 0.049**
- c. 0.127
- d. 0.013

138. If P = 0.3 and the sample size is 50 then standard error of proportion is [15S05]

a. 0.042
b. 0.965
c. 0.138
d. 0.065

139. A Cashier in a bank counter can serve 10 customers in 5 minutes. Suppose that 9 customers arrive on the average every 5mintues.The traffic intensity is [16D01]

a. 0.9
b. 1.11
c. 5/9
d. 1/2

140. In a public telephone booth 6customers arrive in 4 minutes for making calls. The operators can service 15 persons in 8 minutes. The traffic intensity is [16D02]

a. 16/45
b. 4/5
c. 45/16
d. 16/45

141. If a group of customers arrive for service, but one among them only joins queue then such customer behavior is known as [16M01]

a. Jockeying
b. blanking
c. Reneging
d. Collision

142. A Cashier in a bank counter can serve 10 customers in 5 minutes. Suppose that 9 customers arrive on the average every 5mintues.The mean arrival rate of customer is [16M02]

a. 1/2
b. 5/9
c. 9/5
d. 2

143. If a customer coming for the sevice, may leave without joining a queue then such customer behavior is known as [16S01]

a. Jockeying
b. blanking
c. Reneging
d. Collision

144. A customer arriving for service jumps from one queue to another when there is more than one queue then such customer behavior is known as [16S02]

a. Jockeying
b. blanking
c. Reneging
d. Collision

145. If a customer waiting in a queue for a long time choose to leave the queue then such behavior is known as [16S03]

a. Jockeying
b. blanking
c. Reneging
d. Collision

146. A customer behavior is known as reneging if [17D01]

a. if a group of customers arrives for service but one among them joins the queue
b. a customer coming for service, may leave without joining a queue
c. The customer jumps from one queue to another when more then one queue is available
d. A customer chooses to leave the queue upon waiting for service for a long time

147. An Example of memory less distribution is [17D02]

a. Binomial distribution
b. Exponential distribution
c. Normal distribution
d. Uniform distribution

148. A customer behavior is known as collusion if [17M01]

a. if a group of customers arrives for service but one among them joins the queue
b. a customer coming for service, may leave without joining a queue
c. The customer jumps from one queue to another when more then one queue is available
d. A customer chooses to leave the queue upon waiting for service for a long time

149. A customer behavior is known as collusion if [17M02]

a. if a group of customers arrives for service but one among them joins the queue
b. a customer coming for service, may leave without joining a queue
c. The customer jumps from one queue to another when more then one queue is available

d. A customer chooses to leave the queue upon waiting for service for a long time

150. A customer behavior is known as jockeying if [17M03]

a. if a group of customers arrives for service but one among them joins the queue
b. a customer coming for service, may leave without joining a queue
c. The customer jumps from one queue to another when more then one queue is available
d. A customer chooses to leave the queue upon waiting for service for a long time

151. If the operating characteristic are dependent of time such state is called [17S01]

a. Steady state
b. Explosive state
c. Poisson state
d. Transient state

152. If the operating characteristics are independent of time such state is called [17S02]

a. Steady state
b. Explosive state
c. Poisson state
d. Transient state

153. if the queue length increases rapidly and tends to infinity as time passes, such state is called [17S03]

a. Steady state
b. Explosive state
c. Poisson state
d. Transient state

154. If Pn(t) is a probability of n customers remaining after t time units , the pure death model is represented by [18D01]

a. $Pn(t)=(\lambda t)^{n}\, e^{-\lambda t}/n!$,for n=0,1,2,3__________
b. $Pn(t)=(\lambda t)^{n}\, e^{\lambda t}/(n-1)!$,for n=1,2,3_________
c. $Pn(t)=(\mu t)^{N-n}\, e^{-\mu t}/(N-n)!$,for n=1,2,3__________.N
d. $Pn(t)=(\mu t)^{N+n}\, e^{-\mu t}/(N+n)!$,for n=1,2,3______N

155. If Pn(t) is a probability of n arrivals during t time units represents pure birth model, Then E(Pn(t))= [18M01]

a. λ/t
b. t/ λ
c. λ
d. λt

156. If Pn(t) is a probability of n arrivals during t time units represents pure birth model, Then Var(Pn(t))= [18M02]

a. λ/t
b. t/ λ
c. λ
d. λt

157. The process in which there are arrivals only and no departures is known as [18S01]

a. Normal process
b. Pure birth process
c. Binomial process
d. Pure death process

158. The process in which there are departures only and no arrivals is known as [18S02]

a. Normal process
b. Pure birth process
c. Binomial process
d. Pure death process

159. Pure birth model is a [18S03]

a. Binomial distribution
b. Poisson distribution
c. Normal distribution
d. t-distribution

160. The process of creation of birth certificate for newly born babies is an example of [18S04]

a. Normal process
b. Pure birth process
c. Binomial process
d. Pure death process

161. Random withdrawal of inventory items from the stock is an example of [18S05]

a. Normal process
b. Pure birth process
c. Binomial process
d. Pure death process

162. If Pn(t) is a probability of n arrivals during t time units represents pure birth model, then P10(1)= (given that λ =5 births per hour) [18S06]

a. 0.09271
b. 0.08345
c. 0.01813
d. 0.03419

163. If cars arrive at service station at an average rate of 3 per hour and are serviced at a mean rate of 4 per hour as a part of poison process, then probability that there are 2 cars waiting to be served in queue at any instant of time is [19D01]

a. 81/256
b. 81/1024
c. 9/64
d. 27/256

164. If cars arrive at service station at an average rate of 3 per hour and are serviced at a mean rate of 4 per hour as a part of poison process, then probability that there is a car being served at any instant of time is [19D02]

a. 3/4
b. 3/16
c. 9/16
d. 27/256

165. For M/M/1 : (∞/FCFS) queuing model with arrival rate and departure rate and P,sub>n(t) is the probability that n customers are in a queuing system to be served at any given time t then the probability that the number of customers in the system exceeds K is [19M01]

a. $(\alpha/\beta)^{k}$
b. $(\beta/\alpha)^{k}$
c. $\boldsymbol{(\alpha/\beta)^{k+1}}$
d. $(\beta/\alpha)^{k+1}$

166. If cars arrive at service station at an average rate of 3 per hour and are serviced at a mean rate of 4 per hour as a part of poison process ,then probability that there are 3 cars waiting to be served in queue at any instant of time is [19M02]

a. 81/256
b. 81/1024
c. 9/64
d. 27/256

167. The distribution function FX(x) of an exponential random variate X with mean β is [19S01]

a. $e^{-\beta/x} - 1$
b. $e^{\beta/x} - 1$
c. $\boldsymbol{1 - e^{-x/\beta}}$
d. $1 + e^{-x/\beta}$

168. The single sever queuing system with exponential inter arrival times and service times and a FIFO queue discipline is called [19S02]

a. ei/es/1 queue
b. ia/is/1 queue
c. 1/M/M queue
d. M/M/1 queue

169. For M/M/1 : (∞/FCFS) queuing model with arrival date and departure rate and Pn(t) is the probability that n customers are in a queuing system to be served at any given time t then P0(t)= [19S03]

a. 1- β/α
b. 1+β/α
c. 1- αβ
d. 1+ α/β

170. For M/M/1 : (∞/FCFS) queuing model with arrival rate and departure rate and Pn(t) is the probability that n customers are in a queuing system to be served at any given time t then Pn(t)= [19S04]

a. $\boldsymbol{(1 - \alpha/\beta)(\alpha/\beta)^{n}}$
b. $(1 - \alpha/\beta)(\alpha/?)^{n+1}$
c. $(1 - \beta/\alpha)(\beta/\alpha)^{n}$

d. $(-\beta/\alpha)(\beta/\alpha)^{n+1}$

171. Telephone exchange receives one call in every minute and connects one call every 3 minutes. If the rate of arrivals follows Poisson's distribution and service rate follow exponential distribution then the average waiting time for a call in the queue is [20D01]

a. 7.5
b. 9
c. 4.3
d. 2.9

172. Telephone exchange receives one call in every minute and connects one call every 3 minutes. If the rate of arrivals follows Poisson's distribution and service rate follow exponential distribution then the average waiting time for a call in the queuing system is [20D02]

a. 7.5
b. 9
c. 4.3
d. 12

173. If cars arrive at service station at an average rate of 3 per hour and are serviced at a mean rate of 4 per hour as a part of poison process ,then average number of cars already in queue in [20M01]

a. 9/4
b. 9/16
c. 9/4
d. 3/4

174. Customers arrive at a deluxe tickets counter of a theatre at an average rate of 0.9 per minute, the queue model beingM/M/1. The average number of customers in the queuing system is [20M02]

a. 3.5
b. 1.28
c. 0.43
d. 0.29

175. For M/M/1 : (∞/FCFS) queuing model with arrival rate ? and departure rate ? ,the average number of customers in a queuing system is [20S01]

a. $\beta / (\alpha - \beta)$
b. $\beta / (\beta - \alpha)$
c. $\alpha / (\beta - \alpha)$
d. α / β

176. Customers arrives an eating place at an average rate of 0.3 per minute and they are served at an average rate of 0.5 per minute, the queuing model being M/M/1. The average number of customers in the queuing system is [20S02]

a. 1.75
b. 0.661.14
c. 0.6
d. 1.75

177. Customers arrive an at the booking counter of a small railway station at an average rate of 0.4 per minute and they are served at an average rate of 0.75 per minute, the queuing model being M/M/1. The average number of customers in the queuing system is [20S03]

a. 0.875
b. 1.14
c. 2.76
d. 3.92

178. For M/M/1 : (∞/FCFS) queuing model with arrival rate α and departure rate β , then average number of customers already in queue is [20S04]

a. $\alpha^2 / \beta(\alpha - \beta)$
b. $\beta^2 / \alpha(\beta - \alpha)$
c. $\alpha / \beta(\beta - \alpha)$
d. $\beta / \alpha(\beta - \alpha)$