**Important Questions for II Sessional Examination**

**Unit III**

1. A professor’s feeling about the mean mark in the final examination in “probability” of a large group of students is expressed subjectively by normal distribution with μ0=67.2 and σ0=1.5

a)If the mean mark lies in the interval (65,70),determine the prior probability the professor should assign to the mean mark.

b) Find the posterior mean and standard deviation μ1 and σ1 , if the examinations are conducted on a random sample of 40 students yielding mean 74.9 and S.D 7.4 .

c) Determine the posterior probability which he will assign to the mean mark being in the interval (65,70) using results obtained in(b).

d) Construct 95% Bayesian interval for μ.

1. Prove that for a random sample of size n, X1, X2,…,Xn taken from an infinite population is not unbiased estimator of the parameter σ2 but is unbiased.
2. Determine a 95% confidence interval for the mean of a normal distribution with variance 0.25 , using a sample of n=100 values with mean 212.3.
3. A sample of 11 rats from a central population had on average blood viscosity of 3.92 with a S.D of 0.61. Estimate 99% confidence Interval for mean blood viscosity of the population
4. A normal population has mean of 0.1 and standard deviation of 2.1. Find the probability that mean of sample of size 900 will be negative.
5. When a sample is taken from an infinite population, what happens to the standard error of the mean if the sample size is decreased from 800 to 200.
6. What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence.

**Unit IV**

1. Explain the terms i) Hypothesis and types of hypothesis ii) critical value iii) type-I and type-II errors iv) one tailed and two-tailed tests v) level of significance vi)Acceptance and Critical region
2. A sample of 900 members is found to have a mean of 3.4cm. Can it be reasonably regarded as a truly random sample from a large population with mean 3.25cm and S.D 1.61 cm
3. A random sample of 10 boys had the following I.Q’s : 70,120,110,101,88,83,98,107,100. i) Do these data support the assumption of a population mean I.Q of 100
4. In a random sample of 1000 persons from town A , 400 are found to be consumers of wheat. In a sample of 800 from town B , 400 are found to be consumers of wheat. Do these reveal a significant difference between town A and town B, so far as the propotion of wheat consumers is concerned?
5. The mean life of a sample of 10 electric bulbs was found to be 1456 hours with standard deviation of 432 hours. A second sample of 17 bulbs chosen from a different batch showed a mean life of 1280 hours with standard deviation of 398 hours. Is there a significant difference between the means of two batches?
6. Two researchers adopted different sampling techniques while investigating the same group of students to find the number of students failing under different intelligence levels .From the results given as follows, would you say that the sampling techniques adopted by the 2 researchers are independent of the number of students in each level?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Researcher | Number of students in each level | | | | Total |
| Below average | Average | Above average | Genius |
| X | 86 | 60 | 44 | 10 | 200 |
| Y | 40 | 33 | 25 | 2 | 100 |
| Total | 126 | 93 | 69 | 12 | 300 |

1. Two independent samples of sizes 8 and 7 items respectively had the following values.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample I | 11 | 11 | 13 | 11 | 15 | 9 | 12 | 14 |
| Sample II | 9 | 11 | 10 | 13 | 9 | 8 | 10 | -- |

Is the difference between the means of the sample significant? Test at 5% LOS.

1. The number of automobile accidents per week at a certain junction is as follows:12,8,20,2,14,10,15,6,9,4.Are these frequencies in agreement with the belief that accidents conditions are same during this 10 week period?

**Unit V**

1. Calculate the correlation coefficient and the lines of regression from the following data.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | 62 | 64 | 65 | 69 | 70 | 71 | 72 | 74 |
| y | 126 | 125 | 139 | 145 | 165 | 152 | 180 | 208 |

1. Using the method of least squares find the constants a and b such that y=aebx for the following data.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 |
| y | 0.10 | 0.45 | 2.15 | 9.15 | 40.35 | 180.75 |

1. By the method of least squares fit a parabola of the form yfor the following data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | 0 | 1 | 2 | 3 | 4 |
| y | 1 | 1.8 | 1.3 | 2.5 | 6.3 |

1. Obtain the lines of regression from the following data and estimate the value of y when x=12.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| X | 2 | 4 | 5 | 7 | 8 | 13 | 16 |
| y | 2.4 | 5.6 | 5.8 | 8.9 | 9.0 | 17.0 | 21.2 |

1. The lines of regression in a bivariate distribution are X+9Y=7 and Y+4X=49/3. Find i) mean of X and Y ii) Coefficient of correlation.
2. Calculate the correlation coefficient and the lines of regression from the following data.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 100 | 101 | 102 | 102 | 100 | 99 | 97 | 98 | 96 | 95 |
| y | 98 | 99 | 99 | 97 | 95 | 92 | 95 | 94 | 90 | 91 |

1. Find the rank correlation coefficient for the following data

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 82 | 68 | 75 | 61 | 68 | 73 | 85 | 68 |
| y | 81 | 71 | 71 | 68 | 62 | 69 | 80 | 70 |

1. Test whether the equations 2x+3y=4 and x-y=5 represent valid regression lines.