10+2 Statistics Mock Test
December 10, 2019

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1. **(Group A)** Very Short type questions. (**1 mark each**)

   (a) For a Poisson distribution with probability of 0 being $1/e^5$, what is the coefficient of variation.

   (b) Does Regression coefficient get affected due to change of scale and origin?

   (c) How does the standard error depend on sample size?

   (d) Mention a real life situation where census is a must.

   (e) What are the points of the inflection of a normal distribution with mean 5 and variance 9?

   (f) Give a real life example of seasonal variation.

   (g) What is the ratio of $QD : SD$ for rectangular $(2, 5)$ distribution.

   (h) What are the two methods of estimating trend in a time series?

   (i) What is the maximum possible value of Rank correlation in case of no ties?

2. **(Group B)** Short type questions. (**2 marks each**)

   (a) Given two regression coefficients b_{xy} and b_{yx}, how can you find the correlation coefficient r_{xy} between them?

   (b) If X and Y are independent variables, then is it possible that $(X + Y)$ and $(X - Y)$ are also independent?

3. **(Group C)** Long type questions. (**3 marks each**)

   (a) Show that for any positive integer n, $\Gamma(n)\Gamma(n + 1/2) = 2^{1-2n}\sqrt{\pi} \ \ \Gamma(2n)$.

   (b) Find the formula for factorial moments for a binomial distribution with parameter n and p.

   (c) A total number of 80 defective units were found in 20 samples, each of size 100, work out the control limits and central line for np-chart.

   (d) Five unbiased dice are thrown simultaneously. If there are more number of odd faces than even faces, then I get a prize of 100 rupees. If there are less number of odd faces than even faces, I lose 100 rupees. Should I play this game? (**Hint:** Find the expected winning if I play this game. Then think, if one average my winnings is negative, should I play it?)

4. **(Group D)** Very long type questions. (**5 marks each**)

   (a) Define Population, Sample, Unbiased estimator, MVUE, Procedural bias.

   (b) In order to test whether a coin is unbiased, the coin is tossed 6 times. Suppose, you reject the null hypothesis is either all tosses are head or all tosses are tail. Then, what is the probability of type I error? What is the probability of type II error when the corresponding probability of head is 0.4? What is the power of the test when probability of head is 0.4? Does it change if the probability of head is 0.6?