**Biostatistics Lab Problems**

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| **01.** | Generate a data set and perform pdf, cdf, survival function and hazard function for Normal, Exponential, Weibull distribution for given values of parameters. Represent the functions graphically |  |
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| **02.** | Randomly generate a sample of size 5000 from Normal distribution, with mean 8 and standard deviation 3.   1. Find the maximum likelihood estimate of the mean and variance. 2. Estimate the density function and survival function for the mle. Hence, represent the graphs. 3. Find the mean, median time to failure and B10 life. | **15** |
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| **03.** | For a give data set with failure and censored life time, perform MLE for type-I censoring for Normal, Exponential and Weibull distribution. Applying the ‘survreg’ function, also estimate the parameters of the corresponding distributions. |  |
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| **04.** | Suppose we have the following dataset that shows how long a patient was in a medical trial (*column A*) and whether or not the patient was still alive at the end of the trial (*column B*).  Survival curve data in Excel   1. Calculate the empirical survival function based on the data for the clinical trial. 2. Estimate the survival function for Weibull, Exponential and Normal distribution for this data. 3. Construct the chart of survival functions and compare the survival function of Weibull, Exponential and Normal distribution with the empirical survival function to find out the best fitted distribution. 4. Calculate the median time to failure for the parametric distribution, compare them with that of Kaplan-Meier method and comment on your findings. | **05** |
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| **05.** | Suppose we have given dataset of the lifetime of some patients of before and after vaccination for a specific treatment. Calculate the empirical survival function and construct the chart based on the data for before and after vaccination group to evaluate which group survives better than the other. |  |