IT302 Lab: End Sem Exam

1. **(a)** Suppose a dice is rolled 6 times with probabilities of getting one, two, three, four, five, six are 0.06, 0.19, 0.17, 0.20, 0.22, 0.16, respectively. Write a R/Python code to find the probability that sum of the number is less than 22. **[2.5]**

1. **(b)** Suppose that a new born baby is a boy, is 0.5 and a girl is 0.5. Suppose further that the probability that a new born baby is blue eyed is 0.25 and black eyed is, 0.75. If 5 new-born babies are selected at random, write a R/Python code to find probability that there will be exactly 3, blue eyed girls and 2 black eyed boys. **[2.5]**

2. The repair time (in hours) for an industrial machine has a gamma distribution with mean 1.5 and variance 0.75. Write a R/Python code to determine the probability that **[1.5+1.5+1+1]**
   (a) the repair time exceeds 1.2 hours.
   (b) the repair time is at least 4 hours given that it already exceeds 1.2 hours.
   (c) Plot the p.d.f. of the given gamma distribution.
   (d) Plot the c.d.f. of the given gamma distribution

3. The marks (package "bnlearn") data set contains the examination marks of 88 students on five different subjects. **[2.5+2.5]**
   (a) The variable STAT contains marks of the statistics subject of the students. Write a R/Python code to decide whether the average mark of the statistics subject is less than 38 at a 5% level of significance.
   (b) The variable MECH contains marks of the mechanics subject of the students. Consider only the first 25 students' mechanics marks. Write a R/Python code to decide whether the average mark of those 25 students is greater than 56 at a 10% level of significance.