EE1004 Assignment 3 - 2020-21 Semester B

1. John was tested positive for COVID-19. We assume that a person gets COVID-19 with 2% of the chance. When a person actually gets COVID-19, the test correctly predicts positive 80% of the time. When a person doesn't get COVID-19, the test correctly predicts negative 90% of the time. What is the probability that Join gets COVID-19? [30 marks]

2. The following are scores on IQ tests of a random sample of 9 students at a large university.

130, 122, 119, 142, 136, 127, 120, 152, 141,

Construct 95 and 99 percent confidence interval estimates of the average IQ score of all students at the university, respectively. [40 marks]

3. A producer specifies that the mean lifetime of a certain type of battery is at least 245 hours. Assume that the population standard deviation is 12. A sample of 8 such batteries yielded the following data.

237, 242, 232, 242, 248, 230, 244, 243

Assuming that the life of the batteries is approximately normally distributed, do the data indicate that the specifications are not being met at the $\alpha = 0.15$ level of significance? What is the conclusion if the mean lifetime of a certain type of battery is at least 235 hours? [30 marks]