INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR
Algorithmic Game Theory 2021-22: Second Class Test

Date of Examination: 1^{st} **November 2022**
Duration: 45 minutes
Subject: CS60025 Algorithmic Game Theory

The last digit of your roll number from right be d'. Let us define $d = d' + 2$.

1. Suppose we have two non-identical machines and two identical jobs. The speed of one machine is d times more than the speed of the other machine. Compute the price of anarchy of this selfish load balancing game.

[5 Marks]

2. Compute a Bayesian Pure Strategy Nash equilibrium of first price auction with d identical risk neutral buyers where each buyer's valuation is distributed uniformly randomly in $[0, 1]$.

[10 Marks]

3. Suppose we have a Bayesian game with d players where the type set of the i-th player has i elements and each player has d strategies. How many players are there in the corresponding Selten game? How many strategies each player in the Selten game have? Explain your answer.

[5 Marks]