INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH, BHOPAL

MID-SEMESTER EXAMINATION
ACADEMIC YEAR: 2019-20, SEMESTER-I

COURSE: ECO307/607 **FULL MARKS: 30**

▶ *Answer any three of the following questions. (Two hours.)*

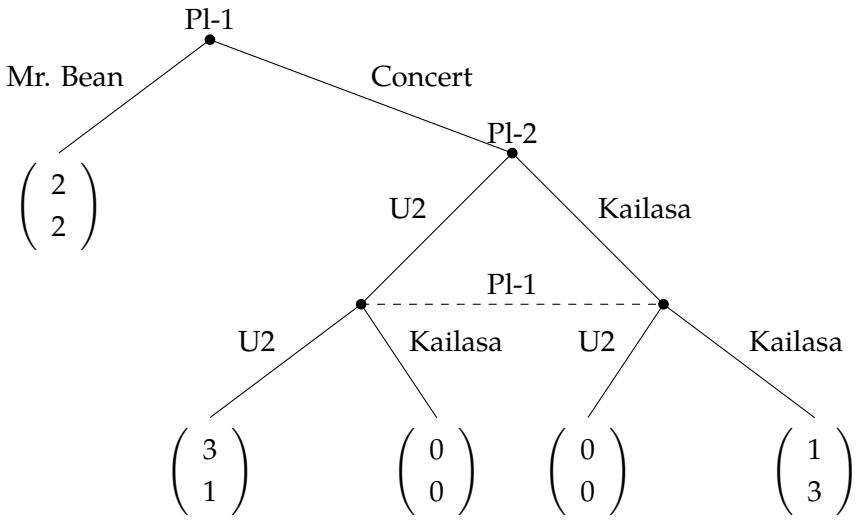
Q 1. (a) Consider two player namely Viper and Krait rolls the same die in turn. If sum of their die-roll outcome is even Viper wins \$ 10 and Krait gets nothing. On the other hand, if the sum of the roll outcome is odd Kriat wins \$ 10 and Viper gets nothing. Can you infer something about NE outcome? (2)

(b) Illustrate the following with specific examples: (2+2+2+2)

i. Not all the NEs are dominant strategy equilibria
ii. Not all of the NEs of an extensive form game is SPNE.
iii. Not all rationalizable strategies are NE strategies.
iv. A NE need not survive iterated elimination of weekly dominated strategies.

Q 2. Consider the following game with two players, where action available to player $i \in \{1, 2\}$ is $a_i \in \{Stone, Paper\}$. Note that $u_1(a_1, a_2) = 1$ if $a_1 = a_2$ and -1 otherwise. On the other hand $u_2(a_1, a_2) = -u_1(a_1, a_2)$. Find the maximin strategy of player 1 and value of this game. Find and draw the best response correspondence for player 2. Calculate the NE of this game. (4+4+2)

Q 3. (a) Find all SPNEs for the following extensive form game: (5)



(b) Suppose two people playing a four period alternative barging game on a value V. Calculate the SPNE outcome of this game if the commonly accepted rate of depreciation is δ. (5)

Q 4. Consider seller $i \in \{1, 2\}$ with the following cost function $C_i(q_i) = 4q_i$. The demand for the product q (produced by these sellers) in the market is given by the following function $q = 10 - p$ where p is the price of the product. Both the sellers are in price competition with each other. The firm who charges lower price gets all the customers. If both the sellers charge equally, they get equal profit. Assume that prices and quantities are all **non-negative integers**.

i. Find the best response correspondence for a firm $i \in \{1, 2\}$. (5)
ii. Find all the NEs. (3)
iii. Calculate NE payoffs. (2)