INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR
End-Spring Semester 2016-17

Date of Examination: _____ Session (FN/AN) _____ Duration: 3 hrs
Subject No. : EP60008 Subject Name: Economics of Entrepreneurship
Department/Center/School: Rajendra Mishra School of Engineering Entrepreneurship
Specific charts, graph paper, log book etc., required: _____
Special Instructions (if any): Please write in brief and to the point. Please clearly state the assumptions made in the solution. All questions are compulsory.

Question I

1. The manager of the quality products company is faced with two alternative investment projects. Project A involves the introduction of a higher quality version of its basic shaving cream, and project B, the introduction of a men's hair lotion (a new line of business for the company). The two projects involve the following expected streams of net cash flows and initial outlays: **(2.5*2=5)**

	Net Cash Outflows			
Investment	Year 1	Year 2	Year 3	Initial Outlay
A	$ 40,000	$ 60,000	$ 40,000	$ 110,000
B	$ 30,000	$ 80,000	$ 50,000	$ 104,000

(a) Calculate the net present value of each investment project with the basic risk-free discount rate of 8 percent.
(b) Which of the two projects should the manager adopt if the risk premium is 2 percent on project A and 6 percent on project B?

2. Fitness World Sporting Co. wants to move into a new sales region and must determine which of the two plants to build. It can build a large plant that costs $4 million or a small plant that costs $2 million. Company estimated that the probability that the economy will be booming, normal, or in a recession is 30%, 40%, and 30%, respectably. The company also estimated the present value of net cash flows for each type of plant under each state of the economy to be as indicated in the following payoff matrix. Construct a decision tree for the firm to show which of the two plants the company should build based on expected NPV. Assume that the company is risk neutral. **(4)**

Present Value of Net Cash Flows (in millions)		
	Large Plant	Small Plant
Boom	$ 10	$ 4
Normal	$ 6	$ 3
Recession	$ 2	$ 2

Question II.

1. Two firms A and B, produce goods A and B, respectively. The linear demands for the two goods are, respectively, **(2*5=10)**

$$Q_A = 100\text{-}4P_A + 1.5P_B \qquad Q_B = 120\text{-}2P_B + 0.5P_A$$

Production costs are constant but not equal:

$$LAC_A = LMC_A = \$2 \qquad LAC_B = LAC_B = \$3$$

(a) Sketch a graph of the two best-response curves. Be sure to label both axes and both response curves.
(b) If firm A expects firm B to set the price at $20, what is firm A's best response? If firm B predicts firm A will price good A at $36, what is firm B's best response?

(c) What is the Nash equilibrium price and quantity for each firm?
(d) How much profit does each firm earn in Nash equilibrium?
(e) If A and B se price of $22 and $35, respectively, how much profit does each firm earn? Why don't they choose these prices then?

2. Compare the Lucas model with the Kihlstrom and Laffont. **(3)**

Question III

1. The two largest diner chains in Kansas compete for weekday breakfast customers. The two chains Colden Inn and Village Diner, each offer weekday "breakfast club" membership that entitles customers to a breakfast buffet between 6:00 A.M. and 8:30 A.M. Club memberships are sold as "passes" good for 20 weekday breakfast visits. Golden Inn offers a modest but tasty buffet, while Village Diner provides a wide variety of breakfast items that are also said to be quite tasty. The demand functions for breakfast club memberships are: **(2+2+1=5)**

$$Q_G = 5000 - 25P_G + 10P_V \qquad Q_V = 4200 - 24P_V + 10P_G$$

Were Q_G and Q_V are the number of club memberships sold monthly and P_G and P_V are the price of club memberships, both respectively, at Golden Inn and Village Dine chains. Both diners experience long-run constant costs of production, which are

$LAC_G = LMC_G = \$50$ per membership $\quad LAC_V = LMC_V = \$75$ per membership

The best-response curves for Golden Inn and Village Diner are, respectively,

$$P_G = BR_G(P_V) = 125 + 0.2P_V \qquad P_V = BR_V(P_G) = 125 + 0.3125P_G$$

(a) If Village Diner Charges $200 for its breakfast club membership, find the demand, inverse demand, and marginal revenue functions for Golden Inn. What is the profit-maximizing price for Golden Inn given Village Diner charges a price of $200?
(b) Find the Nash equilibrium for the two diners. How many breakfast club memberships will each diner sell in Nash equilibrium? How much profit will each diner make?
(c) How much profit would Golden Inn and Village Diner earn if they charged prices of $165 and $180, respectively? Compare these profits to the profits in Nash equilibrium. Why would you not expect the managers of Golden Inn and Village Diner to choose prices of $165 and $180, respectively?

2. Little Kona is a small coffee company that is considering entering a market dominated by big Brew. Each company's profit depends on whether Little Kona enters and whether Big Brew sets a high price or a low price: **(4)**

Big Brew / Little Kona	High Price (in million $)	Low Price (in million $)
Enter	Brew Makes $3 / Kona Makes $2	$1 / $1
Don't Enter	$7 / 0	$2 / 0

(a) Does either player in this game have a dominant strategy?
(b) Does your answer to part (a) help you figure out what the other player should do? What is Nash equilibrium? Is there only one?
(c) Big Brew threatens Little Kona by saying, "If you enter, we are going to set a low price, so you had better stay out" Do you think Little Kona should believe the threat? Why or why not?
(d) If the two firms could collude and agree on how to split the total profits, what outcome would they pick?

Question IV

1. Consider a firm that is deciding whether to operate plants only in the United States or also in either Mexico or Canada or both. Congress is currently discussing an overseas investment in new capital (ONIC) tax credit for U.S. firms that operate plants outside the country. If congress passes ONIC in 2008 and the firm dos operate plants in Mexico and Canada, it will incur rather large losses. It is also possible that Congress will table OINC in 2009 and wait until 2006 to vote on it. The profit payoff matrix (profits in 2008) is shown here:

	States of nature		
Operate plants in	OINC passes	OINC fails	OINC stalls
U.S. only	$10 million	-$1 million	$2 million
U.S. and Mexico	$15 million	-$4 million	$1.5 million
U.S., Mexico and Canada	$20 million	-$6 million	$4 million

Assuming the managers of this firm have no idea about the likelihood of congressional action on OINC in 2008, what decision should the firm make using each of the following rules? **(4)**

(a) Maximax (b) Maximin (c) Minmax regret (d) Equal probability

2. Now in the previous problem suppose the managers of the firm decide on the following subjective probabilities of congressional action on OINC: **(2+2+1=5)**

	Probability
OINC passes	40%
OINC fails	10%
OINC stalls	50%

(a) Compute the expected profits for all three decisions. Which option should the managers choose?
(b) Compute the standard deviations for all three decisions. Using the mean-variance rule, does any one of the decisions dominate? If so, which one?
(c) What decision would the firm make using the coefficient of variation rule?

Question V

1. Consider an economy described by the following equations: **(2*3=6)**

Y=C+I+G+NX; Y= 5000; G=1000; T=1000; C=250+0.75(Y-T); I=1000 -50r; NX=500-500€; r=r*=5

(a) In this economy, solve for national saving. Investment, the trade balance, and the equilibrium exchange rate.
(b) Suppose now the G rises to 1250. Solve for national saving, investment, the trade balance and the equilibrium exchange rate. Explain what you find.
(c) Now suppose that the world interest rate rise from 5 to 10%. (G is again 1000), Solve for national saving, investment, the trade balance, and the equilibrium exchange rate. Explain what you find.

2. Suppose that some foreign countries begin to subsidize investment by instituting an investment tax credit. **(1+1+2 = 4)**

(a) What happens to world investment demand as a function of the world interest rate?
(b) What happens to the world interest rate?
(c) What happens to investment in our small open economy? What happens to our trade balance?