Strathmore
UNIVERSITY

STRATHMORE INSTITUTE OF MATHEMATICAL SCIENCES (SIMS)
MASTER OF SCIENCE IN DATA SCIENCE AND ANALYTICS
END OF SEMESTER EXAMINATION
DSA 8105: FUNDAMENTAL CONCEPTS IN FINANCE AND ECONOMICS

DATE: 6th September 2021   Time: 3 Hours

Instructions
1.   This examination consists of **FIVE** questions.
2.   Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

QUESTION ONE (20 MARKS)

(a) For each of the following scenarios, use a supply and demand diagram to illustrate the effect of a given shock on the equilibrium price and quantity in the specified competitive market. Explain whether there is a shift in the demand curve, the supply, or neither

   i)   An unexpected temporary heat wave hits the South Coast. Show the effect in the ice cream market in Mombasa.   **(3 Marks)**

   ii) The government introduces a tax on ice cream which is paid by producers. What is the effect in the ice cream market?   **(3 Marks)**

(b) The price elasticity of demand for crude oil in country H has been estimated to be -0.06 in the short-run and -0.45 in the long run. Why would the demand for crude oil be price elastic in the long run than in the short run? Briefly explain.   **(3 Marks)**

(c) Briefly explain why a supply shock leads to stagflation.   **(3 Marks)**

(d) In the context of financial markets, distinguish between economic efficiency and informational efficiency.   **(4 Marks)**

(e) CanAm Financial offers investments that pay 12 percent interest compounded monthly, whereas UniMex Financial offers investments that pay 12.25 percent interest compounded semiannually, which investment offers the better effective annual return?

(4 Marks)

QUESTION TWO (20 Marks)

(a) Years ago, an apple producer argued that country X should enact a tariff, or a tax on imports of bananas. His reasoning was that "the enormous imports of cheap bananas into country X tend to curtail the domestic consumption of fresh fruits produced in country X"

    (i) Was the apple producer assuming that apples and banans are substitutes or compliments? Briefly explain. **(3 Marks)**

    (ii) If a tariff on bananas acts as an increase in the cost of supplying bananas in country X, use two demand and supply graphs to show the effects of the apple producer's proposal. One graph should show the effect on the banana market in country X, and the other graph should show the effect on the apple market in country X. Be sure to label the change in equilibrium price and quantity in each market and any shifts in the demand and supply curves. **(8 Marks)**

(b) In 2017, the Metropolitan Transportation Authority (MTA) in New York City raised the price of a monthly subway pass from $116.50 to $121.00. According to an article in the New York Times, "Officials at the authority have said they must raise fares every two years to pay for the rising costs of providing service."

    (i) In order for the MTA's strategy for covering its rising costs to be successful, what must be true about the price elasticity of demand for subway passes?

(3 Marks)

    (ii) Suppose that the MTA's strategy in (i) doesn't succeed. What must be true about the price elasticity for subway passes? On the same graph, draw a demand curve for subway passes assuming that the MTA's strategy succeeds and a second demand curve assuming that the strategy fails. **(6 Marks)**

QUESTION THREE (20 MARKS)

(a) Assume that OPEC starts enforcing oil production quotas and the global supply of oil declines. As a result, energy prices starts to increase. This causes the costs of production for Kenyan firms to increase. Use the AD-SRAS-LRAS diagram to describe the transion

of the macroeconomy from the short-run to the long-run without government intervention. **(12 Marks)**

(b) Now assume that the Central Bank and parliament are concerned about future inflation, output and unemployment. Describe in words, using AD-SRAS-LRAS diagram as a guide, the possible stabilization strategies for parliament and the Central Bank. In particular, discuss the tradeoffs they face. **(8 Marks)**

QUESTION FOUR (20 MARKS)

(a) Briefly ddiscuss the three versions of the efficient market hypothesis (EMH).
(9 Marks)

(b) Futuristic Coiffures (FC) must raise $85,000 to purchase a new machine. FC knows its component costs of capital are $r_d = 8\%$, $r_{ps} = 10\%$, $r_s = 13\%$, $r_{re} = 15\%$. FC maintains a capital structure that consists of 60 percent debt, 10 percent preferred stock, and 30 percent common equity. The firm's marginal tax rate is 30 percent. If FC expects to generate $27,000 in retained earnings this year, what marginal cost of capital will it incur to raise the needed funds? **(11 Marks)**

QUESTION FIVE (20 MARKS)

Consider the following information

Year	Project AB	Project LM	Project UV
0	$(90,000)	$(100,000)	$(96,500)
1	39,000	0	(55,000)
2	39,000	0	100,000
3	39,000	147,500	100,000

Compute the; the net present value, internal rate of return (IRR), modified internal rate of return (MIRR), and discounted payback period (DPB) for each of the above projects. The firm's required rate of return is 13 percent. Which project(s) should be purchased if they are mutually exclusive?