



SCHOOL OF COMPUTING AND ENGINEERING SCIENCES
BACHELOR OF SCIENCE IN COMPUTER NETWORKS AND CYBER SECURITY
BACHELOR OF SCIENCE IN INFORMATICS AND COMPUTER SCIENCE
END OF SEMESTER EXAMINATION
CNS 1105/ICS 1105: FUNDAMENTALS OF ECONOMICS

DATE: 22nd October 2024

Time: 2 Hours

Instructions

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

QUESTION ONE (30 Marks) (COMPULSORY)

a) Consider the following statements:

- **Statement A:** "Increasing the minimum wage will lead to higher unemployment among low-skilled workers."
- **Statement B:** "The government should increase the minimum wage to improve the living standards of workers."
- **Statement C:** "Kenya's GDP grew by 5% last year."
- **Statement D:** "The government should provide free internet access to all citizens to reduce the digital divide."

For each statement, identify whether it is a positive or normative statement and briefly justify your answer. **(4 Marks)**

b) Suppose there is a significant increase in the number of people working from home in Kenya, leading to higher demand for home office equipment such as computers and desks.

- **Required:** Use a demand and supply diagram to explain how this increase in demand will affect the equilibrium price and quantity of home office equipment. **(4 Marks)**

c) Assume that a major factory producing computer chips in Kenya experiences a fire, reducing the supply of chips in the market. Use a supply and demand diagram to illustrate the impact of this supply shock on the equilibrium price and quantity of computers. Explain the outcome. **(3 Marks)**

d) Explain the difference between short-run and long-run costs in production. Provide an example of a cost that might be variable in the short run but fixed in the long run, and explain why this distinction is important for business decision-making. **(5 Marks)**

- e) Describe the key characteristics of a perfectly competitive market. Why is it said that firms in perfect competition are "price takers"? Provide an example of a market that closely resembles perfect competition. **(4 Marks)**
- f) Discuss the shortcomings of using Gross Domestic Product (GDP) as a measure of a nation's economic well-being. Consider aspects such as income distribution, environmental degradation, and the informal economy in your answer. **(5 Marks)**
- g) Briefly differentiate between structural and frictional unemployment. **(2 Marks)**
- h) List and briefly explain the three primary functions of money. Provide examples of how digital currencies, such as M-Pesa in Kenya, fulfill these functions. **(3 Marks)**

QUESTION TWO

- a) With the rapid advancement of technology and automation, concerns have been raised about the potential impact on employment in Kenya, particularly in the ICT sector. As a computer science student with knowledge of economics, suggest FIVE strategies that could be employed to ensure that technological advancements lead to job creation rather than job losses in the country. **(10 Marks)**
- b) Given the following production process information, fill in the table below **(3 Marks)**

| Output | TC | AVC | MC |
|--------|------|----------|----|
| 0 | 2200 | ∞ | -- |
| 1 | 2700 | -- | -- |
| 2 | 3700 | -- | -- |

- c) A small manufacturing firm is analyzing the productivity of its workers as it increases the number of employees in the production process. The total output of the firm with varying numbers of workers is shown below:

| Number of Workers | Total Output (Units) |
|-------------------|----------------------|
| 1 | 10 |
| 2 | 25 |
| 3 | 45 |
| 4 | 60 |
| 5 | 70 |
| 6 | 75 |

- i) Calculate the Marginal Product (MP) and Average Product (AP) for each additional worker. Show all your workings. **(4 Marks)**
- ii) Using the data above, explain the law of variable proportions and how it relates to the firm's marginal and average products. **(3 Marks)**

QUESTION THREE

- a) Consider a scenario where the price of a popular brand of smartphones in Kenya increases from KSh 20,000 to KSh 25,000. As a result, the quantity demanded decreases from 10,000 units to 7,500 units.
- (i) Calculate the price elasticity of demand for the smartphones using the mid-point formula. Show all your workings. **(4 Marks)**
- (ii) Explain THREE factors that influence the price elasticity of demand for smartphones in Kenya. **(6 Marks)**
- b) The Central Bank is a government institution that is responsible for ensuring stability in the working of a country's financial system. Explain FIVE functions of the central bank in an economy. **(10 Marks)**

QUESTION FOUR

- (a) Imagine a tech company that produces and sells a software product in a perfectly competitive market. The market price for the software is KSh 50, which also represents the Marginal Revenue (MR) curve. The company's cost structures are represented by the Marginal Cost (MC) and Average Total Cost (ATC) curves.
- i) Draw a diagram showing the Marginal Cost (MC), Average Total Cost (ATC), and Marginal Revenue (MR) curves. Clearly label the profit-maximizing level of output for the software. **(6 Marks)**
- ii) Using your diagram, explain how the company determines the profit-maximizing level of output for the software product. **(3 Marks)**
- iii) On the same diagram, shade the area representing the company's profit or loss. Explain how you identified this area. **(4 Marks)**
- (b) Inflation is a general increase in prices across an economy over a period of time. Consider the following scenario: In a certain country, the Consumer Price Index (CPI) increased from 120 in 2022 to 132 in 2023.
- i) Calculate the inflation rate for the year 2023. Show all your workings. **(3 Marks)**
- ii) Explain two possible effects of inflation on the purchasing power of consumers. **(4 Marks)**

QUESTION FIVE

- a) A software company operates as a monopoly in a certain market, meaning it is the only provider of a particular software product. The company faces the following demand schedule:

| Quantity (Q) | Price (P) |
|--------------|-----------|
| 1 | KSh 100 |
| 2 | KSh 90 |
| 3 | KSh 80 |
| 4 | KSh 70 |
| 5 | KSh 60 |

The company has the following total cost (TC) structure:

Fixed Costs (FC): KSh 100

Variable Costs (VC): KSh 20 per unit

- i) Calculate the Total Revenue (TR), Marginal Revenue (MR), and Marginal Cost (MC) for each level of output. Show all your workings. **(5 Marks)**
- ii) Determine the profit-maximizing level of output and the corresponding price. Explain how you arrived at your answer. **(3 Marks)**
- b) Monopolies can arise due to various factors that give a single firm control over a market. Identify and briefly explain two sources of monopoly power. **(4 Marks)**
- c) In the process of determining the national income statistics of a country, economists may face several problems. Explain **FOUR** such problems **(8 Marks)**

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