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Subject: **Engineering Economics**
Marks: **20**

Exam: **Mid Term Fall 23**
Time Allowed: **2 Hours**

DIRECTIONS:

1. Be clear and precise in your answers. Avoid unnecessary details.
2. You are expected to have brought a calculator and necessary stationery, anything else found in possession would be tantamount to cheating. No sharing of calculators is allowed.
3. Pages are numbers from 1- 2. Make sure you have both of them.

Question 01 [Marks 5]

[CLO-1, CLO-2]

The Engineering Economic Environment Terminologies:

- i- According to the first principle of Engineering Economics what are the two phenomena that affect the time value of money?
- ii- Should the marginal costs be higher or lower for carrying out the profitable increase of operations?
- iii- What are the five main types of engineering economic decisions?
- iv- How is the Elasticity of an item related to demand?
- v- If the inflation rate is **10%** and the earning rate is **13%**. What should be done according to the principle of Engineering Economics

Question 02 [Marks 5]

[CLO-2]

NXP Semiconductors plans to increase its item's sales volume by decreasing the selling price from **\$70** to **\$50**. The fixed costs are estimated to be **\$1,145** per month and the total costs for 70% of demands are **\$1,647.5**. Net sales at 70% utilization are **\$2,556**. The demand relationship with the price is given by $D = 231.0965 - 1.025p$.

- i- Determine the volume for maximum profit.
- ii- Maximum profit for this venture.
- iii- Range of profitable demand.

Question 03 [Marks 05]

[CLO-1]

Suppose the management team of **Acer Inc.** is under pressure to return a loan of **\$3,000,000** in one year and purchase a more modern tech-oriented machine. One proposed solution is to sell the old chips and hardware to a local manufacturer for **\$2,500,000** instead of using them for old machines. If the inflation rate is **6%** and the interest rate on loans is **8%** per year, what decision will you make about returning the loan immediately with the amount from wood waste and selling the wood waste later after a one-year span? Devise an analysis process for this problem and justify your pick with Engineering Economics Principles.

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Question 04 [Marks 05]

[CLO-1]

Samsung plans to construct a new head office in New Zealand. According to a rough estimate the construction, setup, and equipment will cost up to **\$10,035,000**. The packages for employees would reach up to **\$25,500,000** per month. Monthly electricity expenses are expected around **\$400,000** depending upon the power usage. The increase in the revenue is expected to be **\$214,500,000**. If the head office was constructed in Canada the revenue would reach up to **\$420,000,000** but the company had previously purchased land worth **\$4,500,000** in New Zealand for some other purpose, so it is utilizing it now for the head office. There are services offered at the head office that are estimated to have a cost of **\$82,000** per eighty services and the price per batch (100 services) is **\$90,200**. Mark different types of costs and evaluate whether this is a profitable deal.

_____ **Good Luck** _____