

KATHMANDU UNIVERSITY
End Semester Examination [C]
June/July 2024

Level : B.Arch.
Year : III
Time : 2 hrs. 30mins.

Course : MGTS 305
Semester : I
F. M. : 40

SECTION "B"

Attempt *ALL* questions. Missing parameters can be assumed suitably.

3 0 JUN 2024

- 1 a. What is economics? Explain the law of diminishing marginal benefit with suitable example. [2]
 - b. How would the following events influence the supply curve for tomato juice? Draw a graph with price on the y axis and quantity on the x axis to illustrate your answer. Explain briefly your reasoning. [3]
 - a. The minimum wage for factory workers is increased by 14%, thereby increasing the price of the processing of the juice.
 - b. An engineer at Kathmandu University designs a new improved tomato juice press that increases the efficiency of tomato juice production by 6%.
 - c. The Government implements a new regulation that requires all tomato juice sold in Nepal to have at least 50% content of domestic tomatoes, and domestic tomatoes cost more than the imported tomatoes that currently are 80% of juice content.
 - c. A small company manufactures a certain product. Variable costs are \$20 per unit and fixed costs are \$10,875. The price-demand relationship for this product is $P = -0.25D + 250$, where P is the unit sales price of the product and D is the annual demand. [3]
 - a. Develop the equations for total cost and total revenue.
 - b. Find the breakeven quantity for the product.
 - c. What profit would the company obtain by maximizing its total revenue?
- 2 a. A couple wants to begin saving money for their child's education. They estimate that \$10,000 will be needed on the child's 18th birthday, \$12,000 on the 19th birthday, \$14,000 on the 20th birthday, and \$16,000 on the 21st birthday. Assume an 8% interest rate with only annual compounding. The couple is considering two methods of setting aside the needed money. [5]
 - a. How much money would have to be deposited into the account on the child's first birthday (note: a child's "first birthday" is celebrated one year after the child is born) to accumulate enough money to cover the estimated college expenses?
 - b. What uniform annual amount would the couple have to deposit each year on the child's first through seventeenth birthdays to accumulate enough money to cover the estimated college expenses?
 - b. Toselli Animation plans to offer its employees a salary enhancement package that has revenue sharing as its main component. Specifically, the company will set aside 1% of total sales revenue for year-end bonuses. The sales are expected to be \$5 million the first year, \$5.5 million the second year, and amounts increasing by 10% each year for the next 5 years. At an interest rate of 8% per year, what is the equivalent annual worth in years 1 through 5 of the bonus package? [3]
- 3 a. We want to donate a marble birdbath to the city park as a memorial to cats. We also want to set up a perpetual care fund to cover future expenses "forever." The initial cost of the bath is \$5000. Routine annual operating costs are \$200 per year, but every fifth year the cost will be \$500 to cover major cleaning and maintenance as well as operation. [3]
 - (i) What is the capitalized cost of this project if the interest rate is 8%?

(ii) How much is the present worth of this project if it is to be demolished after 75 years? The final \$500 payment in the 75th year will cover the year's operating cost and the site reclamation.

- b. Morton and Moore LLC (M^2) is trying to decide between two machines which are necessary in their manufacturing facility. Data concerning the two machines are presented below. If M^2 has a minimum attractive rate of return (MARR) of 15%, which machine should be chosen? [5]

	Machine A	Machine B
First cost	45,000	24,000
Annual Operating Costs	31,000	35,000
Repair in Years 2 and 4	-	6,000
Repair in Years 5	12,000	
Salvage Value	10,000	8,000
Useful Life	8 years	6 years

- 4 a. The Martian Corporation, a space vehicle development company, is starting a new division that will develop the next generation launch missile engine configuration. Use modified internal rate of return method (MIRR) to determine the external rate of return (EROR) for the estimated net cash flows (in \$1000 units) of \$-50,000 in year 0, \$+15,000 in years 1 through 6, and \$-8000 in year 7. Assume a borrowing rate of 12% and an investment rate of 25% per year. [2]
- b. The expansion of the hotel and conference center at Wicker Valley State Park is under study. The initial investment and annual operating benefits and costs are very different due to the differing magnitudes of the projects under consideration. These can be summarized as follows: [6]

	Alternative A	Alternative B	Alternative C
Investment cost	\$180,000	\$100,000	\$280,000
Annual operating costs	16,000	12,000	28,000
Annual benefits	53,000	35,000	77,000

Using a MARR of 10%, which alternative should be selected if all alternatives have a ten-year useful life? Use benefit/cost ratio analysis.

- 5 a. An asset will cost \$1,750 when purchased this year. It is further expected to have a salvage value of \$250 at the end of its five year depreciable life. Calculate complete depreciation schedules giving the depreciation charge, $D(n)$, and end-of-year book value, $B(n)$, for straight-line (SL), sum of the years digits (SOYD), double declining balance (DDB). [6]
- b. A robot used in simulated car crashes cost \$70,000, has no salvage value, and has an expected capacity of tests not to exceed 10,000 according to the manufacturer. Volvo Motors decided to use the unit-of-production depreciation method because the number of test crashes per year in which the robot would be involved was not estimable. Determine the annual depreciation and book value for the first 3 years if the number of tests were 3810, 2720, and 5390 per year. [2]

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Marks Scored:

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Exam Roll No. :

Time: 30 mins.

Course : MGTS 305

Semester : I

F. M. : 10

Registration No.:

Date **30 JUN 2024**

SECTION "A"

[20Q. × 0.5 = 10 marks]

Encircle the most appropriate option from the given choices

- Economics is the study of
 - choice under conditions of scarcity
 - production technology
 - how society decides what, how, and for whom to produce
 - the best way to run society
- Which of the following is a characteristic of a perfectly-competitive market?
 - The output sold by a particular firm may be quite different from the output sold by the other firms in the market.
 - The firms are price-setters.
 - It is difficult for new firms to enter the market due to barriers to entry.
 - All firms produce and sell a standardized or undifferentiated product.
- If sales of Figo car is 106 during January, 120 in February, 134 in March, and 142 in April, what will be in May according to three point moving average.
 - 132.
 - 126.
 - 142.
 - 138.
- A qualitative forecast _____
 - Predicts the quality of the new product
 - Predicts the direction, but not the magnitude, of change in a variable
 - Is a forecast that is classified on a numerical scale from 1 to 10
 - Is a forecast that is based on econometric methods
- The price of burgers increases by 22% and the quantity of burgers demanded falls by 25%. This indicates that demand for burgers is:
 - unitarily elastic
 - perfectly elastic
 - inelastic
 - elastic
- If you deposit \$1,000 over three years at 9% annual interest (meaning that you will make one lump sum withdrawal at the end of three years), what is the interest earned in the 2nd year?
 - \$90.00
 - \$98.34
 - \$98.10
 - \$106.93
- A toy manufacturing company has a capacity of 300,000 units annually. The fixed cost of the production line is \$200,000 per year with a variable cost of \$4 per unit and revenues of \$7 per unit. The percent of capacity that must be utilized for the company to breakdown is closest to:
 - 31
 - 22
 - 39
 - 46

8. Which of the following statements is incorrect?
- The simplicity of the payback period method is one of its most appealing qualities even though it fails to measure project profitability.
 - If you were to consider the cost of funds in a payback period calculation, you would have to wait longer to breakeven as you increase the interest rate.
 - Considering the cost of funds in a payback calculation is equivalent to finding the time period when the project balance becomes zero.
 - If two investors are considering the same project, the payback period will be longer for the investor with the higher MARR.
9. If you deposit \$1000 per month into an account which pays interest at a rate of 12% per year compounded monthly, the amount of money you would have at the end of five years is nearest to:
- \$81,670
 - \$76,234
 - \$68,321
 - \$6,353
10. If you deposit \$1,000 now and are promised payments of \$500 three years from now and \$1,500 five years from now, the equation that will yield the correct rate of return is:
- $1000 = -500(P/F, i, 3) - 1500(P/F, i, 5)$
 - $-1000 = 500(P/F, i, 3) + 1500(P/F, i, 5)$
 - $0 = -1000 + 500(P/F, i, 3) + 1500(P/F, i, 5)$
 - $0 = 1000 + 500(P/F, i, 3) + 1500(P/F, i, 5)$
11. A permanent historic monument has a first cost of \$20,000 with a maintenance cost of \$2,000 every three years. At an interest rate of 10% per year, the annual worth of the monument is nearest to:
- \$6,710
 - \$4,604
 - \$4,000
 - \$2,604
12. Alternative X has a first cost of \$5 million and an annual maintenance cost of \$200,000. Alternative Y has a first cost of \$7 million, a maintenance cost of \$40,000 and periodic expenditures of \$100,000 every five years. If both alternatives have infinite lives, the equation that will yield the rate of return on the incremental investment is:
- $0 = -\$2 \text{ million} + 160,000/i + 100,000(A/F, i, 5)/i$
 - $0 = -\$2 \text{ million} + 160,000/i - 100,000(A/F, i, 5)/i$
 - $0 = -\$2 \text{ million} + 160,000/i + 100,000(A/F, i, 5)$
 - $0 = -\$2 \text{ million} + 160,000/i + 100,000(P/F, i, 5)$
13. Alternative A has a first cost of \$10,000, an annual operating cost of \$5,000 and a salvage value of \$2,000. Alternative B has an initial cost of \$25,000, an annual operating cost of \$1,000 and a salvage value of \$12,000. If both alternatives have a five-year life, the equation that will yield the rate of return on the incremental investment is:
- $0 = -\$15,000 - 4,000(P/A, i, 5) + 10,000(P/F, i, 5)$
 - $0 = -\$15,000 + 4,000(P/A, i, 5) - 10,000(P/F, i, 5)$
 - $0 = -\$15,000 + 4,000(P/A, i, 5) + 12,000(P/F, i, 5)$
 - $0 = -\$15,000 + 4,000(P/A, i, 5) + 10,000(P/F, i, 5)$
14. An example of an indirect cost category is
- Direct labor hours
 - Engineering changes
 - Quality control costs
 - Total plant cost
15. If the output levels at which short-run marginal and average cost curves reach a minimum are listed in order from smallest to greatest, then the order would be
- MC, AVC, ATC
 - ATC, AVC, MC
 - AVC, MC, ATC
 - AVC, ATC, MC

16. The first cost of a permanent road that will improve access to a rural area is \$1,000,000. The annual maintenance cost is expected to be \$20,000 per year. Improved accessibility will result in benefits of \$70,000 per year. At an interest rate of 6% per year, the conventional B/C ratio is nearest to:
- a. 0.750
 - b. 0.875
 - c. 1.25
 - d. 1.75
17. Chose the option which does not support definition of depreciation
- a. Be inventory or investment property
 - b. Be used in business
 - c. Have a determinable useful life
 - d. Wear out, decay, get used up
18. An asset with a first cost of \$30,000 has been depreciated by the straight line method at \$4,000 per year. If the asset's depreciable life was five years, the salvage value used in calculating the depreciation was closest to:
- a. \$8,000
 - b. \$4,000
 - c. \$10,000
 - d. \$5,000
19. The LCM of lives is required to perform an analysis for different life assets for the following methods:
- a. AW and B/C
 - b. Life cycle costs
 - c. PW, B/C, and ROR
 - d. Payback period
20. The opportunity cost of a good is
- a. the time lost in finding it
 - b. the loss of interest in using savings.
 - c. the expenditure on the good
 - d. the quantity of other goods sacrificed to get another unit of that good

