MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : HSMC-301

PUID : 03446 (To be mentioned in the main answer script)

ECONOMICS FOR ENGINEERS

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) The opportunity cost of a good is

a) The time lost in finding it

b) the expenditure on it

c) the quantity of the next best alternative sacrificed to produce one unit of that good

d) the amount of savings lost.

ii) If the inflation rate is 7% per year, market interest rate is 15%, then the real interest rate will be

a) 7% b) 10%

c) 3% d) 12%.

iii) Gross Profit is the difference between
a) Net Sales and Cost of goods sold
b) Net Sales and cost of production
c) Net Sales and Net purchase
d) Tax and dividend.

iv) In a decision tree the node with which probability is attached is called
a) Decision node
b) Random or Chance node
c) Both (a) and (b)
d) None of these.

v) Depreciation charged on plant and machinery is
a) Discretionary Cost b) Committed Cost
c) Conversion Cost d) Future Cost.

vi) At Break-Even point
a) Total Sales = Total Cost
b) Total Revenue = Total Cost
c) Total Revenue = Total Fixed Cost.
d) None of these.

vii) Marginal cost curve cuts the Average Variable cost from
a) Above at its minimum point
b) Below at its falling part
c) Below at its minimum point
d) None of these.

viii) Debt to Equity Ratio comes under

a) Leverage Ratio b) Liquidity Ratio

c) Profitability Ratio d) Dividend Ratio.

ix) Which one of the following is involved to measure inflation

a) Nominal Interest Rate

b) MARR

c) Consumer Price Index

d) None of these.

x) If A and B are two independent events then $P(A \cap B) =$

a) $P(A/B) \times P(B)$ b) $P(A) \times P(B)$

c) $P(A \cup B)$ d) $P(A) + P(B)$.

xi) To compute the updated cost of a boiler with same capacity in a power plant, we use

a) Per Unit Cost Model

b) Cost Index Model

c) Power Sizing Model

d) Segmenting Model.

xii) Contribution margin is the

a) excess of sale price over variable cost

b) excess of sale price over fixed cost

c) excess of sale price over both variable cost and fixed cost

d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Write a brief note on Per Unit Cost method of estimation.

3. Distinguish between Consumer Price Index (CPI) and Wholesale Price Index (WPI).

4. A machine needed for 3 years can be purchased for Rs. 77,662 and sold at the end of period for about Rs. 25,000. A comparable machine can be leased for Rs. 30,000 per year. If a firm expects return of 20% on investments, should it buy or lease the machine ? Capital recovery factor (20%, 3 years) = .4747. Sinking fund factor (20%, 3 years = .2747).

5. Define inflation. What are the causes of inflation ? 2 + 3

6. A student has taken a loan of Rs. 3,00,000 for 3 years at 9% per annum. Calculate how much needs to be repaid at the end of 3 years under compound interest rate.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. A firm whose cost of capital is 10%, considering two mutually exclusive projects *X* and *Y*, the details are as follows :

Year	Project *A*	Project *B*
0	(70,000)	(7,00,000)
1	10,000	50,000
2	20,000	40,000
3	30,000	20,000
4	45,000	10,000
5	60,000	10,000
Total Cash Flow	1,65,000	1,30,000

Compute NPV, Profitability Index and IRR of the two projects. 5 + 5 + 5

8. a) Define Learning curve.

b) Five years ago, when the relevant cost index was 120, a nuclear centrifuge cost $40,000. The centrifuge had a capacity of separating 1500 gallons of ionized solution per hour. Today, it is desired to build a centrifuge with capacity of 4500 gallons per hour, but the cost index now is 300. Assuming a power-sizing exponent to reflect economies of scale, *x*, of 0·75, use the power-sizing model to determine the approximate cost (expressed in today's dollars) of the new rector.

5 + 10

[Turn over

9. a) What is decision tree ?

b) Ms. Sameera Goel is the vice president of an 'Oil Company', who is concerned about the plant's current production capability. She has three alternatives. The first alternative would result in significant changes in present operations, including increased automation. The second one involves small changes in plant operation and would not include any new automation. the third alternative is to make no changes (do nothing).

As a member of the plant management you have assigned the task of analysing the three alternatives and recommending a course of action. The increased cost and increased annual revenue for the first two alternatives are shown below :

Alternative	Increased Cost	Future Sale	Increased Annual Revenue
1	Rs. 3,00,000	Good	Rs. 1,42,000
		Average	Rs. 1,19,000
		Poor	Rs. 50,000
2	Rs. 85,000	Good	Rs. 66,000
		Average	Rs. 46,000
		Poor	Rs. 17,000
3 (Current operation)	0	....	0

The sales department estimates the probability of Good, Average and Poor future sales as 0·30, 0·60 and 0·10 respectively. The rate of interest per year is 20%. study period is 5 years. with help of a decision tree determine which alternative is preferred. 3 + 12

10. a) Define ratio analysis and state advantages of ratio analysis.

b) From following information resulting to Intel Limited you are supposed to prepare its summarized balance sheet

(i) Current Ratio = 2·5

(ii) Acid Test Ratio = 1·5

(iii) Gross Profit to Sales = 0·2

(iv) Net Profit/Working Capital = 0·3

(v) Sales/Net Fixed Asset = 2.

(vi) Sales/Net Worth = 1·5

(vii) Sales/Debtors = 6

(viii) Reserve/Capital = 1

(ix) Net worth/Long Term Loan = 20

(x) Stock velocity = 2 months

(xi) Paid up share capital = $ 10,00,000. 5 + 10

11. Write notes on any *three* of the following : 3 × 5

a) Break-even Analysis

b) Life-cycle costs

c) Opportunity costs

d) Probability & Joint Probability

e) Depreciation.