Mid-West University

Examinations Management Office

Semester End Examinations 2081

Bachelor level/ B.E. Civil/ 5th Semester — Full Marks: 50

Time: 3 hours — Pass Marks: 25

Subject: Engineering Economics (MS541/MS401)

- *Attempt all the questions*
- *Figures in the margin indicate full marks.*
- *Assume suitable values, with a stipulation, if necessary.*
- *Candidates are required to answer the questions in their own words as far as possible.*

1. Why does an engineer must have the knowledge of economics during decision making process? List out the principle of engineering economics. **[3]**

2. Differentiate between prime cost and overhead cost. How does their classification impact cost control in construction projects? Explain. **[3]**

3. If you deposit Rs. 2,500 per month for two years, what will be the amount at the end of five years if bank interest is 5% compounded semiannually. **[3]**

4. If you planned to invest in a project which has started following information regarding investment plan in its proposal. **[4]**
   Initial investment= Rs.20,00,000
   Salvage value = Rs.5,00,000
   Revenue = Rs. 10,00,000
   O & M cost = Rs. 3,50,000
   Project life = 5 years
   Draw your decision based on discounted payback period and modified benefit ratio. Take MARR=12%.

5. Compute the IRR for commercial building constructed on a lease land with contract period of 5 years, whose initial investment is Rs.25,00,00,000, annual rent is Rs.10,00,00,000, annual expense is Rs.2,00,00,000 and is to be sold at Rs. 5,00,00,000 to landowner after contract period. MARR=10% per year. **[6]**
   Also draw unrecovered investment diagram in graphical and tabular form.

6. Recommended the best project from the following projects by using repeatability assumption. Assume MARR= 10%. **[5]**

Project	A	B	C
Investment (Rs.)	5,00,000	7,00,000	9,00,000
Annual Revenue (Rs.)	2,00,000	2,75,000	3,50,000
Annual Cost (Rs.)	40,000	50,000	85,000
Salvage Value (Rs.)	60,000	90,000	1,00,000
Useful life (years)	6	10	14

7. Some engineering projects are being consider as following cash flow estimation over 5 years as shown. Determine what combination of project is based in capital will be invested is [6]

a) Unlimited

b) Limited to Rs. 50,000 by using PW method. MARR= 14% per year?

Project	A	B	C	D	E
Initial investment	50,000	30,000	14,000	15,000	10,000
Annual Revenue	20,000	12,000	4,000	5,000	6,000
A & B	Mutually Exclusive				
C & D	Mutually exclusive and contingent to B.				
E	Contingent on the acceptance of C & B.				

8. Perform sensitivity analysis of the following project over a range of ±20% in [5]

i. Initial investment

ii. Net annual revenue

iii. Useful life

Initial investment	Rs. 8,50,000
Net annual revenue	Rs. 4,25,000
Salvage value	Rs. 1,00,000
Useful life	6
MARR	10%

9. How many hours/years would the two motors have to be operated at full load so that the annual cost will be equal? [5]

Parameter	**Motor A**	**Motor B**
Capacity	150Hp	150Hp
Initial investment	Rs. 5,00,000	Rs. 10,00,000
Maintenance Cost per year	Rs.40,000	Rs. 30,000
Efficiency	80%	95%
Life year	5	5
Tax per year	Rs.10,000	Rs.15,000
Salvage value	10% of investment	
MARR	15% per year	
Electricity Cost	Rs. 10 / kw-hr	

10. Describe the causes of depreciation of assets. If a machine costing of Rs. 5,00,000 is purchased by expecting the salvage value of 10% of purchased value at the end of 5^{th} years. Calculate the depreciation amount and book value of each year by straight line method and SOYD method. [5]

11. Define VAT. Compare between corporate tax and VAT. [2]

12. How does inflation influence the economic viability of long-term infrastructure projects, and what strategic approaches can mitigate its risks in cost estimation and investment planning? [3]

The End