

Time allowed: 3 hours

All Questions Carry Equal Marks

**Problem # 1**

A new car can be purchased for SR 140,000. The dealer offers two alternative payment plans:

**Plan A:** Half of the price is to be paid at the time of the purchasing, and the remainder is to be paid as equal annual payments (EOY payment) for 5 years.

**Plan B:** 5 equal annual payments payable at the beginning of each year.

If interest rate is 10% compounded annually, calculate the size of payment in each plan.

**Problem # 2**

A Saudi Company purchases a computer-controlled filter for S.R. 200,000. The filter is expected to last 10 years, at which time it will have a salvage value of S.R. 30,000. Over the 10-year period the operating and maintenance costs are anticipated to equal S.R. 25,000/year; however, by making the investment, annual fines(غرامة) of S.R. 75,000 for pollution will be avoided. The firm expects to earn 8% on its investments. Determine the External Rate of Return measure of investment and state whether or not the filter purchase is economically sound.

**Problem # 3**

Two Alternatives A and B have lives of 10, and 5years, respectively. Their cash flows are as follows:

Alternative	Life years	First cost (SR)	Income for year k (SR)	O&M for year k (SR/year)	Salvage value for year k (SR)
A	10	160000	$40000(1.1)^k$	25000	$160000-12000k$
B	5	76000	$30000+2000k$	20000	$76000(0.8)^k$

$k=1,2,3,\dots,10$  for Alternative A

$k=1,2,3,\dots,5$  for Alternative B

A. Develop the net cash flow(NCF) profile for each alternative using:

- i. A planning horizon of 3 years
- ii. A planning horizon of 5 years
- iii. A planning horizon of 8 years

B. Calculate the equivalent uniform annual cost (EUAC) for each alternative. If interest rate is 10% compounded annually

t = 3 years

EOY	A	B
0		
1		
2		
3		

t = 5 years

EOY	A	B
0		
1		
2		
3		
4		
5		

t = 8 years

EOY	A	B
0		
1		
2		
3		
4		
5		
6		
7		
8		

**Problem # 4**

A. A small factory has purchased a computer system for SR 8,000 with an anticipated salvage value of SR 400 after 5 years of service. Compute the depreciation deduction and the resulting uncovered investment during each year of that period using 150% declining balance switching to straight-line depreciation. [ $(B_{t-1}-F) / \{ n-(t-1) \} > \rho B_{t-1}$ ]

B. Three public projects having the following annual benefits and costs:

Project	Annual Costs (SR/year)	Annual Benefits (SR/year)
A	78,500	115,000
B	50,000	95,000
C	79,000	167,000

Using an interest rate of 8%, determine which project should be selected using the benefit cost ratio (B/C).

**Problem # 5**

To connect two big centers in a city through one route, Transportation Company purchased ten small buses 4 years ago for SR 700,000 for this purpose. Each one of these buses has a present market value of SR 20,000 and a book value of SR 30,000. If kept, it can be to used for 8 years more, have annual O&M cost of 5,000 and a salvage value of SR 6,000 for each at that time. Due to the population increase, another two small buses must be purchased for SR 90,000 for each to supplement the route service. Annual O&M costs equal to SR 4,000 and has a salvage value of SR 15,000 for each in 8 years.

An alternative to retaining the old small buses, it could be replaced with new 7 big buses. The alternative buses with an expected life of 10 years cost SR 130,000 for each. The one bus of this alternative will have a SR 30,000 salvage value in 8 year and will have annual O&M cost of SR 2,000.

Using a MARR of 10%, outsider viewpoint approach and present worth comparison, what do you recommended?