INTERNATIONAL CENTRE FOR APPLIED SCIENCES
MAHE, MANIPAL

B.Sc. (Applied Sciences) in Engg.

End – Semester Theory Examinations – May 2021

IV SEMESTER - ENGINEERING ECONOMICS AND MANAGEMENT [IHS 241]

(Branch: Common to all)

Time: 3 Hours **Date: 10 May 2021** **Max. Marks: 50**

- ✓ **Answer ALL the questions.**
- ✓ **Missing data, if any, may be suitably assumed or calculated**
- ✓ **Use of interest factor table is permitted.**

1A A cooling-water pumping station at the LCRA plant costs $600,000 to construct, and it is projected to have a 25-year life with an estimated salvage value of 12% of the construction cost. However, the station will be book-depreciated to zero over a recovery period of 30 years. Calculate the annual depreciation charge for years 4, 10, and 25, using (a) Straight line depreciation and (b) DDB depreciation. **05**

1B Two possible routes for a power line are under study. Data on the routes are as follows: **05**

	Around the Lake	Under the Lake
Length	15Kms	5Kms
First cost	$ 5000/km	$ 25000/km
Maintenance	$ 200/km/year	$ 400/km/year
Useful life	15 years	15 years
Salvage value	$ 3000/km	$ 5000/km
Yearly power loss	$ 500/km	$ 500/km
Annual property taxes	2% of the first cost	2% of the first cost

If 12% interest is used, should the power line be routed around the lake or under the lake? Use Annual worth method.

2A Konica Minolta plans to sell a copier that prints documents on both sides simultaneously. The costs associated with two different technologies are shown below. At MARR of 12%, determine which is the best alternative based on incremental rate of return method? **05**

	Type 1	**Type 2**
First cost	-50,000	-95,000
Annual cost	-1,00,000	-85,000
Salvage value	5,000	11,000
Life	6 years	6 years

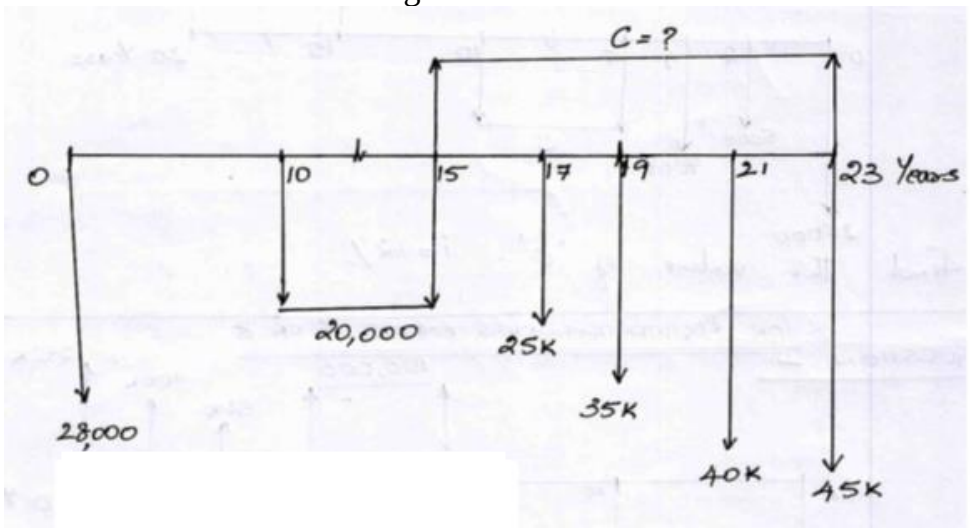
2B A piece of machinery costs $7500 and has no salvage value after it is installed. The manufacturer's warranty will pay the first year's maintenance and repair costs. In the second year, maintenance costs will be $900, and this item will increase on a $900 arithmetic gradient in subsequent years. Also, operating expenses for the machinery will be $500 in the first year and will increase on a $400 arithmetic gradient in the following years. If interest is 12%, what is the economic service life for this machine? **05**

3A Using an interest rate of 12%, what is the capitalized cost of a tunnel to transport water through the Girnar Mountain range if the first cost is $1,000,000 and the maintenance costs are expected to occur in a 6-year cycles as shown below? **05**

End of Year	1	2	3	4	5	6
Maintenance cost	$35,000	$35,000	$35,000	$45,000	$45,000	$60,000

3B A railway track will be used for 15 years. During the construction of the railway track line, either type A or type B ties may be used. Type A ties have an installed cost of $6 and a 10-year life; type B will cost $4.50 with a 6-year life. If at the end of 15 years, the ties used have a remaining useful life of at least 4 years they will be used elsewhere for a different project and can fetch a salvage value of $3 each. Any ties that are taken off after the end of their life or if it is very near to the end of its life to be used elsewhere, then, it can be sold for $0.50 each. Give the most cost-effective plan for the 15 year analysis period using NPW method at 8% interest. **05**

4A Find the value of 'C' in the figure below. Take the interest rate as 15%. **05**



4B Explain formal and informal organization with a neat sketch. **05**

5A Describe the activities associated with staffing. **05**

5B Explain the steps involved in the process of controlling. **05**

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