Code No: **R32081** **R10** **Set No. 1**

III B.Tech II Semester Supplementary Examinations, April - 2018

PROCESS ENGINEERING ECONOMICS

(Chemical Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1	a)	Explain the concepts of Future value and Present value. Explain how Future Value is related to Present Value using i) Simple Interest method ii) Compound Interest method	[7M]
	b)	A couple is planning to have a child in five years and want to have a minimum of 4 lakhs at that time in their hands. At present, the total savings in their hands is 270000. They decided to invest this amount in a bank as fixed deposit so that they withdraw the amount whenever they wanted. Three banks A, B and C in their town are offering same interest rate of 8 % but compounded yearly, half yearly and Quarterly respectively.Can you please suggest this couple to choose suitable Bank so that they can get the expected amount at the end of three years?	[8M]
2	a)	What is meant by depreciation? How can we calculate depreciation using i) Straight Line method ii) Declining Balance method and double declining Balance method iii) Sum of the year's digit method	[7M]
	b)	An equipment costing Rs 50000 was estimated to have a service life of 10 years with zero salvage value. A straight line depreciation fund is set up on this basis at the time of equipment installation. After two years of its service, the safety norms are revised and it is decided to sell this equipment for 20000 and buy more advanced equipment with high safety specifications for Rs 60000. If depreciation fund is available for use, then how much capital is required to purchase new equipment with high safety specification?	[8M]
3	a)	What are the different elements of Capital Cost of a project? Explain in detail about any one element.	[8M]
	b)	Explain the concept of cost index. What are the different types of Cost indices used in capital cost estimates?	[7M]
4	a)	Explain the following i) Annual Cost method ii) Present Worth Method iii) Profit before tax and Profit after tax	[6M]

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b) A company has signed an agreement for 10 years to set up a chemical plant with a total investment of 24 Crores. Annual profit is expected at a rate of 10 Crores/year. Company follows straight line depreciation method for tax purposes is followed at 10 % per year and tax rate is fixed at 40% per year. After its tenure of agreement, the company has to hand over the plant with no returns. If the interest rate is 12 %, then what is the net present worth of the project? [9M]

5 a) Write a brief notes on the following [8M]
i) Capitalized Cost ii) Book Value iii) Pay out period iv) Profit before tax and Profit after tax

b) The production capacity of a polymer plant operating in continuous basis is 10000 tonnes per year with 70% yield (kg on product/kg of raw material). The cost of raw material is Rs 50/kg. After implementation of process intensification project, the yield was increased to 75% with investment of Rs 20 Crores. How many years it will take to get the invested amount to be recovered with additional profit? [7M]

6 a) The effect of variablesa and b is given by the following equation. [6M]
C_T=5a+10000/ab+2b+5.
Find out the optimum value of C_T and justify your answer with the help of graphical representation.

b) A steel plant produces steel rods at a rate of S units per day. The variable costper rod isRs 47.73+0.1 $S^{1.2}$. Daily fixed cost is Rs1750 and other miscellaneous expenses are fixed at Rs 7325 per day. If the selling price of each rod is Rs 173 then find out [9M]
i) Maximum daily profit ii) Minimum cost per day iii) Break even production.

7 a) A zeroth order reaction is taking place in a reactor having the initial concentration of A at zero time is 0.5 kmol/m3. After 1200 s of this reaction, the concentration of A is estimated as 60 % of initial concentration. Assuming Isothermal operation, Determine the conversion of A after one hr of this reaction. [7M]

b) Filtration at constant pressure is represented by $dV/dt=1/(K_cV+1/q_o)$ where V is the total volume of filtrate collected in time t, and K_c and q_o are the constants. [8M]
What is the slope of the curve drawn between t/V versus and V from the above equation and also make a sketch of it.

8 a) Explain in brief about different methods of profitability evaluation. [7M]

b) Explain the following cyclic operations [8M]
i) Batch Operation
ii) Semi-continuous Operation

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