

VI SEMESTER B.TECH. (COMMON TO ALL)

END SEMESTER EXAMINATIONS- MAY 2022

SUBJECT: ENGINEERING ECONOMICS AND FINANCIAL

MANAGEMENT [HUM 3051]

REVISED CREDIT SYSTEM

Time: 3 hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALL the questions.
- Missing data may be suitably assumed.
- ✤ Interest factor table is provided in the last page (else use formulae).

1. The following information is available about Alex company.							
Average cash and marketable securities =Earnings Before Interest and Tax\$1 million\$2 million							
Average inventory = \$5 millionCost of Goods Sold = \$15 million							
Average accounts payable = \$3 million	Long-term loan = \$8 million						
Average accounts receivable = \$3 million	Interest rate on loan = 10%						
	Total Sales = \$20 million						
 a) Inventory turnover ratio b) Current ratio c) Quick ratio and d) Interest coverage ratio 							
An engineer took over a small-scale manufacturing plant for Rs.25,00,000 and would incur Rs.5,00,000 to operate it every year for the next 10 years. What is the minimum (annual revenue the firm has to generate to offset the costs of owning and operating the firm? However, after five years the engineer upgrades the plant by replacing old machines with newer ones with latest technology. This costs him Rs.15,00,000 and would save Rs.2,00,000 in the operating cost. What is the minimum revenue the firm							
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3.	An asset costs Rs.5,000 now and its salvage value is Rs.500 and an estimated service					(03)			
	life of 5	years. De	etermine the dep	preciation	schedu	le for 5 y	ears and its boo	k value at the	CO4
	end of y	/ear using	g Double Declir	ning Bala	nce me	ethod.			
- 1	A comp	any is pla	anning to replace	their thre	e-vear	-old macl	nine with a new i	machine now	(02)
4.	The det	ails of the	e two machines	are aiven	helow-				(03)
				are given	below				COS
			-			leebine	New Mechine	7	
		articular	S			lachine	New Machine	_	
		Irst Cost			1,50,0	000	1, 90,000		
	A	Annual Op	perating Cost		23,00	0	18,000		
	Life of the machine			15 ye	ars	15 years			
	S	Salvage v	alue at the end o	of the life	10,00	0	15,000		
	C	Current m	arket value		1,00,0	000	-		
	Using a	an approp	oriate Replacem	ent analy	ysis ap	proach	with an interest	rate of 12%,	
	determi	ne wheth	er the company	should re	place t	heir old n	nachine or not?		
5.	Determ	ine the E	conomic Servi	ce life tha	at has t	he follow	ving cash flow e	stimates. Use	(04)
	an inter	est rate c	of 12% per vear.						CO3
									000
		Year	Salvage	Mainten	ance				
			Value						
		0	P = \$10,000	0					
		1	\$3,000	\$300					
		2	\$3,500	\$300					
		4	\$4,500	\$600					
		5	\$5,000	\$1,200					
		6	\$5,500	\$2,400					
		7	\$6,000	\$4,800					
6.	A new ı	ock pit w	ill be operated fo	or a const	ruction	project tl	hat will last 5 yea	ars. Rock can	(03)
	be load	ed from a	an elevated box	loader se	rved b	y a conve	eyor from the pit	or by mobile	CO2
	shovel	loaders.							
	The box	k loader a	nd conveyor hav	ve an initia	l cost c	f Rs.2,64	,000 and will ha	ve no salvage	
	value a	t the end	of the project.						
	Two sh	ovel load	lers each priced	Rs.42,0	00 can	provide	the same capa	city, but their	
	operatir	ng costs t	together will be	Rs.36,000) per y	ear more	than the box lo	ader. Normal	
	service	life for a	a shovel loader	is 3 year	s with	zero sal	vage value, but	a 2-year old	
	machine can likely be sold for Rs.10,000.								
	Use Pr	esent W	orth method a	nd determ	nine wł	nich alter	native is prefer	red when the	
	interest	rate is 12	2%?						
7.	A softw	are engi	neer currently a	ged 45 y	ears is	planning	g his retirement	pension. He	(04)
	wishes to receive Rs.25,000 per month as a pension after his retirement at the age of ${f C}$					CO1			
	60. In this regard, the engineer plans to invest an equal amount every quarter starting								
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8.	one year from now. Upon attaining 55 years of age, the engineer continues to save the same amount monthly until his retirement. Determine the investment the engineer must make to receive his desired pension at an interest rate of 12 % p.a compounded monthly. Assume a life expectancy of 80 years. Two large-scale conduits are under consideration by a large municipal utility district (0 (MUD). The first involves construction of a Steel pipeline at a cost of \$225 million. CC Portions of the pipeline will have to be replaced every 40 years at a cost of \$50 million.					
	first five years and \$10 million for the next five years, after which this cost is expected to be \$11 million per year through its life. Alternatively, a Gravity flow canal can be constructed at a cost of \$350 million. The M&O costs for the canal are expected to be \$0.8 million per year for the first nine years and then onwards it remains constant at \$0.9 million per year through its life.					
9.	10% per year? What is the amount of quarterly deposits C, such that you will be able to withdraw the amounts in the cash flow diagram shown below, if the interest rate is 12%, compounded monthly? $ \begin{array}{c} & & & & & & & & & & & & & & & & & & &$	(03) 201				
10.	 Wilson Technology, a growing machine shop, wishes to set aside money now to invest (over the next four years in automating its customer service department. The company C can earn 10% compounded monthly for the first two years and 12% compounded quarterly for the last 2 years on its lump-sum deposit and it wishes to withdraw the money in the following manner: Year 1: \$50,000, to purchase a computer and database software designed for customer service use; Year 2: \$6,000, to purchase additional hardware to accommodate anticipated growth in the use of the system; Year 3: No expenses; and Year 4: \$10,000, to purchase software upgrades. How much money must be deposited now to cover the anticipated payments over the next 4 years? 	(03) CO1				

11.	A British food distribution conglomerate purchased a Canadian food store chain for £75 (04 million 3 years ago. There was a net loss of £10 million at the end of year 1 of ownership. CO Net cash flow is increasing with an arithmetic gradient of £5 million per year starting the second year, and this pattern is expected to continue for the foreseeable future. This means that breakeven net cash flow was achieved this year. Because of the heavy debt financing used to purchase the Canadian chain, the international board of directors expects a MARR of 12% per year from any sale. (a) The British conglomerate has just been offered £159.5 million by a French company wishing to get a foothold in Canada. Use Future Worth analysis to determine if the MARR will be realized at this selling price.							
	(<i>b</i>) If the British congromerate continues to own the chain, what selling price must be obtained at the end of 5 years of ownership to just make the MARR?							
12.	 Hewett Electronics manufactures amplified pressure transducers. It must decide between two machines for a finishing operation. The company's MARR is 12% per year. (a) Tabulate the incremental cash flow (b) Draw cash flow diagram for each alternative and the incremental cash flow (c) Recommend the best choice based on incremental analysis 							
		X7 · 11 1						
	First cost \$	Variable speed	Dual speed -245.000					
	Annual operating cost, \$ per year	-135,000	-139,000					
	Salvage value, \$	75,000	35,000					
	Life, years	0	0					
13.	You want to open a savings plan for your future retirement. You are considering the following three options: Option 1 : Deposit Rs. 1,000 at the end of each quarter for the first 10 years, then you leave the amount accumulated in the account for the next 15 years. Option 2 : Do nothing for the first 10 years. Then deposit Rs. 6,000 at the end of each year for the next 10 years and increase the deposit by Rs. 500 every year for the next five years. Option 3 : Deposit Rs.100 at the end of each quarter for the first 10 years and then increase the deposit amount by Rs.500 every month for the next 15 years. If your deposits earns an interest rate of 12%, compounded monthly for option 1, 12%, compounded quarterly for option 2 and 12%, compounded semi-annually for option 3, which is the best alternative? Use Future worth method.							

14.	An automobile company is planning to convert a plant from manufacturing economy cars to manufacturing sports cars. The initial cost for equipment conversion will be \$200 million with a 20% salvage value anytime within a 5-year period. The cost of producing a car will be \$21,000, and it will be sold for \$33,000. The production capacity for the first year will be 4,000 units. At an interest rate of 12% per year, by what uniform amount will production have to increase each year in order for the company to recover its investment in 3 years?	(04) CO1
15.	State the significance of the following types of Financial Ratios-a) Liquidity ratiosb) Structural ratios	(02) CO5
