

VI SEMESTER B.TECH. (COMMON TO ALL)

END SEMESTER MAKE-UP EXAMINATIONS- JULY 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.	Calculate the Current ratio and Quick asset ratio fi	om the following parameters.	(04)
	Particulars	Amount	
	Sundry debtors	400000	
	Stock	1600000	
	Marketable security	80000	
	Cash	12000	
	Prepaid expenses	40000	
	Bills payable	80000	
	Debenture	200000	
	Outstanding expenses	260000	
2.	A blast furnace for a metallurgical operation was p	burchased for Rs. 300,000. An amount of Rs.	(03)
	50,000 more was spent on its installation and com	missioning. The estimated residual value after	(00)
	50,000 more was spent on its instantation and com	missioning. The estimated residual value after	
	10 years was Rs. 70,000		
	(a) Calculate the Depreciation charge		
	(b) Determine the amount of Depreciation at the e	nd of 6 years after the purchase of the furnace	
	(b) Determine the amount of Depreciation at the e	nu or o years arter the purchase of the furnace.	
3.	A person buys a machine by making a down	payment of Rs.10,000 and the balance in	(03)
	payments of Rs.8,000 per year for five years s	starting three years from now at an interest	
	rate of 10% per annum. Determine the Cost of	the machine.	
4.	A person is planning to withdraw Rs.5,000 in	the tenth year from now and then onwards	(04)
	he increases his withdrawal amount by Rs 250	per year till the end of 15 th year. For these	Ì
		per jeur un une end er re jeur rer unese	
	expenses, he is planning to invest an equal an	nount for eight years starting from the end	
	(HUM 3051)	Page 1 of	6

	of f ann	irst year. Find thum.	he equal am	ounts that he	has to save using a	n interest rate of 10%	per
5.	A c expa sugg	ompany is planni ansion programm gest the best altern	ng to expan e and the cor native to the	d its present b responding ca company. Use	business activity. It l sh flows are tabulate ROR method.	nas two alternatives for d below. At MARR = 1	the (03)
	n	E1	E2]			
	0	-\$ 2,000	-\$ 3,000				
	1	1,000	4,000				
	2	1,000					
	3	1,000					
6.	An alter Dete	8-year-old asset in rnative are given ermine the best co	may be repla below, usin ourse of actic	ced with eitho g the Cash flo n.	er of the two new as	ssets. Current data for e erest rate of 12% per y	ach (03) ear.
		Course of actio	on Currei	nt asset (Rs)	Challenger 1 (Rs)	Challenger 2 (Rs)	
		First cost		-	30000	54000	
		Defender trade		-	10500	7500	
		Annual cost		9000	4500	3600	
		Salvage value		1500	3000	1500	
		Life, years		5 yr	5 yr	5 yr	
7.	A pl	lant engineer is co	nsidering two	types of solar	water heating systems	::	(04)
	-			Model A		Model B	
	Ini	tial cost		\$7000		\$10000	
	Ar	nual savings		\$700		\$1000	
	An	inual Maintenance	e	\$100		\$50	
	Ex	pected life		20 years		20 years	
	8	. Find ROR of	each system	φ τ υυ		φ.500	

	b. If MARF	R is 12%, v	what wil	l be yo	our reco	ommen	datio	on?						
8.	A sheltered work	shop requi	ires a lif	t truck	to han	dle pall	lets f	for a n	ew co	ontract.	A lift 1	ruck ca	an be	(03)
	purchased for Rs	.270,000.	Annual	insuraı	nce cos	sts are i	3% o	of the	purch	ase pri	ce, pay	able or	n the	
	first of each year	. An equiv	alent tru	ick car	n be rei	nted Rs	s. 15	,000 p	er mo	onth pag	yable a	it the er	nd of	
	each month. Oper	rating cost	s are san	ne for b	ooth alt	ernativ	ves. F	For wh	at mi	nimum	numbe	er of mo	onths	
	must a purchased	l truck be u	used on	the cor	ntract to	o make	pure	chasin	g mo	re attra	ctive th	nan leas	sing?	
	Interest rate is 12	% compou	inded me	onthly.	Assun	ne that	the p	ourcha	ised tr	uck has	s no sai	lvage v	alue.	
9.	Find the value	of C for th	ne data	given	below	∕ati=′	12%	, ass	uminę	g equiv	/alenc	e betw	/een	(03)
	Deposits and W	/ithdrawa	ls.											
	Period (n)	0	1	2	3	4	5	6	7	8	9	10		
	Deposits (Rs)	1000	800	600	400	200								
	Withdrawals(R	(s)						С	2C	3C	4C	5C		
	L	1					۱	-				1]		
10.	For equipment	that has	a first c	cost of	f \$10,0)00 ar	nd th	ie est	imate	ed ope	rating	costs	and	(04)
	year-end salvag	ge values	are sho	own be	elow. I	Jetern	nine	the E	:conc	mic se	ervice	life at	10%	
	per year.													
	Г													
	-	Year	Opera	ating (Cost \$	(Year))	Salva	age V	alue \$	5			
	-	1		-1,	200				7,00	0				
	-	2		- 1 ;	300				<u>5,00</u> 4,50	0				
	-	4		-2.	000				3.00	0				
	-	5		-3,	000				2,00	0				
	A low cost non c	ontaat tan	morotur	0.0000	uring t	ool ma	w ho	abla	to ide	ntifur		l oor wi	haala	(2.2)
11.	that are in need	of repair 1	ng befo	e meas	ouring l		iy De	aute		If the	tool is	hough	ncels	(03)
	railwave would e	ave \$25 0)) per a	ne a cl	in the v	veare 1	u iai thro	1010 0 110h 5	and f	his covi	inge ie	exnect	ed to	
	increase by \$2.50	0 every or	larter in	the ve	ars 6 th	rough (20 V	Vhat is	the a	nniial e	avinos	over th	ne 20	
	vears? Interest ra	te is 10%	per annu	im con	npound	ed ana	rterly	10 V.	. ine a		<u>6</u> 5	5 , C I U	20	
10	A series of ten o	guarterly	bavmen	its of 9	51.500	at the	rate	e of 1:	2% n	er ann	um co	mpour	nded	(02)
14.	quarterly is ea	uivalent t	o three	sem	i-annu	al wit	hdra	wals.	The	withd	Irawal	s will	start	(03)
	immediately after	er the last	pavme	nt is d	one. V	Vhat is	the	amou	int of	these	three	oavme	nts?	
	If the three with	drawals a	are anni	ual fro	m the	fourth	yea	r, rec	alcula	ate the	amou	unt.		
	A railway traal	will be used	1 for 15	VOOTO	Dunin -	the ec	noter	intion	ofth		ty free al	ling	ither	
13.	tuno A or tuno D	tios more	101 15	years.		heve co	nstrt	stelles		of $\mathfrak{q} \in \mathfrak{q}$	y track	line, e	lifer	(04)
	type A or type B		of the	r life l	A ues	nave a	ui 111 .f 1 5	statiec	tha t	00 30 3	and a l	o romai	me;	
	цуре в will cost S	p4.30 With	a o-yea	r nre. I	u at the		1 15	years	the ti	es used	i nave	a remai	tob o	
	userui ille of at l	east 4 years	ny tion	that are	usea e	off of				n proje			non a	
	sarvage value of	эз each. A	my ties t	inat are	e taken	or aft	er th	e end	or the	eir life (or 11 ft	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 10% interest.	
14.	To decrease the costs of operating a lock in a large river, a new system of operation is proposed.	(03)
	The system will cost \$650,000 to design and build. It is estimated that it will have to be reworked	
	every 10 years at a cost of \$100,000. In addition, an expenditure of \$50,000 will have to be	
	made at the end of the fifth year for a new type of gear that will not be available until then.	
	Annual operating costs are expected to be \$30,000 for the first 15 years and \$35,000 a year	
	thereafter. Also, there are cyclical maintenance costs, the cycle repeating every 4 years; \$1000	
	End of Year (EOY) 1, \$2000 EOY2, \$2500 EOY3 and \$3000 EOY 4. Compute the capitalized	
	cost of perpetual service at 10% interest.	
15.	A machine with 6 years of life was purchased two years ago for Rs.10, 000. Its annual	(03)
	maintenance cost is Rs.750 and salvage value at the end of its life is Rs.1, 000. Now, a company	
	is offering a new machine at a cost of Rs.10, 000. Its life is 5 years and its salvage value at the	
	end of its life is Rs.4, 000. The annual maintenance cost of the new machine is Rs.500. The	
	company which is supplying the new machine is willing to take the old machine for Rs.6, 500 if	
	it is replaced by the new machine. Assuming interest rate of 12%, compounded annually, perform	
	a replacement analysis, and suggest the best course of action.	

10%				Compound I	nterest Factors				10%
	Single Pag	yment		Uniform Pa	yment Series		Arithmeti	c Gradient	
п	Compound Amount Factor Find F Given P F/P	Present Worth Factor Find P Given F P/F	Sinking Fund Factor Find A Given F A/F	Capital Recovery Factor Find A Given P A/P	Compound Amount Factor Find F Given A F/A	Present Worth Factor Find P Given A P/A	Gradient Uniform Series Find A Given G A/G	Gradient Present Worth Find P Given G P/G	п
1	1.100	.9091	1.0000	1.1000	1.000	0.909	0	0	1
3	1.210	7513	3021	4021	3 310	2.487	0.476	2 320	3
4	1.464	.6830	.2155	.3155	4.641	3.170	1.381	4.378	4
5	1.611	.6209	.1638	.2638	6.105	3.791	1.810	6.862	5
6	1.772	.5645	.1296	.2296	7.716	4.355	2.224	9.684	6
7	1.949	.5132	.1054	.2054	9.487	4.868	2.622	12.763	7
9	2.144 2.358	4060	0736	18/4	13 570	5 750	3 372	10.029	0 0
10	2.594	.3855	.0627	.1627	15.937	6.145	3.725	22.891	10
11	2.853	.3505	.0540	.1540	18.531	6.495 6.814	4.064	26.396 20.001	11
13	3.452	.2897	.0408	.1408	24,523	7.103	4.699	33.377	13
14	3.797	.2633	.0357	.1357	27.975	7.367	4.996	36.801	14
15	4.177	.2394	.0315	.1315	31.772	7.606	5.279	40.152	15
16	4.595	.2176	.0278	.1278	35,950	7.824	5.549	43.416	16
17	5.054	.1978	.0247	.1247	40.545	8.022	5.807	46.582	17
10	6 116	1635	0105	1105	51 150	8 365	6.286	52.583	10
20	6.728	.1486	.0175	.1175	57.275	8.514	6.508	55,407	20
21	7.400	.1351	.0156	.1156	64.003	8.649	6.719	58.110	21
22	8.140	.1228	.0140	.1140	71.403	8.772	6.919	60.689	22
23	8.954	.1117	.0126	.1126	79.543	8.883	7.108	63.146	23
24	9.850	.1015	.0113	.1113	88.497	8.985	7.288	63.481	24
26	11.918	.0839	.00916	.1092	109.182	9.161	7.619	69.794	26
2/	15.110	.0763	.00826	.1083	121.100	9.257	7.770	71.777	27
20	15 863	0630	00673	1067	148.631	0 370	8 049	75 415	20
30	17.449	.0573	.00608	.1061	164.494	9.427	8.176	77.077	30
31	19.194	.0521	.00550	.1055	181.944	9.479	8.296	78.640	31
32	21.114	.0474	.00497	.1050	201.138	9.526	8.409	80.108	32
33	23.225	.0431	.00450	.1045	222.252	9.569	8.515	81.486	33
35	28,102	.0356	.00369	.1041	271.025	9.644	8,709	83.987	35
40	45 250	0221	00226	1023	442 503	0 770	0.006	88.053	40
45	72.891	.0137	.00139	.1014	718.905	9.863	9.374	92.454	45
50	117.391	.00852	.00086	.1009	1163.9	9.915	9.570	94.889	50
55 60	189.059 304.482	.00529 .00328	.00053	.1005	1880.6 3034.8	9.947 9.967	9.708 9.802	96.562 97.701	55 60
65	490.371	.00204	.00020	.1002	4893.7	9.980	9.867	98.471	65
70	789.748	.00127	.00013	.1001	7887.5	9.987	9.911	98.987	70

14.00								e 11 -	14
	Compound Amount Factor Find F Given P E/P	Present Worth Factor Find P Given F P/E	Sinking Fund Factor Find A Given F A/F	Capital Recovery Factor Find A Given P	Compound Amount Factor Find F Given A	Present Worth Factor Find P Given A P/A	Gradient Uniform Series Find A Given G A/G	Gradient Present Worth Find P Given G P/G	
<u> </u>	1.130	8010	1.0000	1 1200	1.000	0.802	0	0	
2	1 254	7077	4717	\$917	2 120	1.690	0 472	0 797	
3	1.405	.7118	.2963	.4163	3.374	2.402	0.925	2 221	
4	1.574	.6355	2092	3292	4,779	3.037	1.359	4,127	
5	1.762	5674	.1574	.2774	6.353	3.605	1.775	6.397	
6	1.974	.5066	.1232	.2432	8.115	4.111	2.172	8,930	
7	2.211	.4523	.0991	.2191	10.089	4.564	2.551	11.644	
8	2.476	.4039	.0813	.2013	12.300	4.968	2.913	14.471	
9	2.773	.3606	.0677	.1877	14.776	5.328	3.257	17.356	
10	3.106	.3220	.0570	.1770	17.549	5.650	3.585	20.254	
11	3.479	.2875	.0484	.1684	20.655	5.938	3.895	23,129	
12	3.896	.2567	.0414	.1614	24.133	6.194	4.190	25,952	
13	4.363	.2292	.0357	.1557	28.029	6.424	4.468	28,702	
14	4.887	.2046	.0309	.1509	32.393	6.628	4.732	31.362	
15	5.474	.1827	.0268	.1468	31,280	6.811	4.980	33.920	
16	6.130	.1631	.0234	.1434	42.753	6.974	5.215	36.367	
17	6.866	.1456	.0205	.1405	48.884	7.120	5.435	38.697	
18	7.690	.1300	.0179	.1379	55.750	7.250	5.643	40.908	
19	8.613	.1161	.0158	.1358	63,440	7.366	5.858	42,998	
20	9.646	.1037	.0139	.1339	72.052	7.469	6.020	44,968	
21	10.804	.0926	.0122	.1322	81.699	7.562	6.191	46.819	
22	12.100	.0826	.0108	.1308	92.503	7.645	6.351	48.554	
23	13.552	.0738	.00956	.1296	104.603	7.718	6.501	50.178	
24 95	12.179	.0639	.00846	.1283	118,133	7.04	0.041	21.093 62.106	
10	11.000	8800.	.00750	.1275	135.334	7.843	0.771	22,100	-
26	19.040	.0525	.00665	.1267	150.334	7.896	6.892	54,418	
- 44	21.323	.0409	.00090	1259	109.374	7.943	7.000	52,037	1
20	23,004	0374	00466	12.02	214 583	8.022	7.119	\$7.814	1
30	20.150	0334	00414	1247	241 333	8055	7.207	58 782	
0	22 666	0000	00240	1997	271 202	§ noc	7 001	\$0.777	
31	33.333	10298 1064	.00309	1237	271.293 304 949	8,083	7.381		
31	42.002	0238	00202	1220	342.420	8,135	7 \$30	61.261	
34	47.143	.0212	.00260	.1226	384.521	8.157	7.596	61.961	
35	52.800	.0189	.00232	.1223	431.663	8.176	7.658	62.605	
40	93.051	0107	00130	1213	767 091	8244	7 800	65116	
45	163.988	.00610	.00074	.1207	1358.2	8.283	8.057	66.734	
50	289.002	.00346	.00042	.1204	2400.0	8.304	8,160	67.762	
55	509.321	.00196	.00024	.1202	4236.0	8.317	8.225	68.408	
60	897.597	.00111	.00013	.1201	7471.6	8.324	8.266	68.810	
45	1 \$21.0	00063	00008	1201	13173.0	0 010	8 202	60.052	1