

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 714605**Date: 11-01-2013****Subject Name: Engineering Economics & Financial Management****Time: 02.30 pm – 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Explain the following terms. 07

1. “Time value of money”.
2. “Standard factor notation”.
3. “Cash Flow diagrams – with examples of inflow and out flow”

(b) Prepare a balance sheet of ABC Pvt. Ltd. with the help of following financial data of a company as on 31/3/2012. Calculate the working capital and current liquidity ratio. 07

<u>Details</u>	<u>Amount in Rs. (lacs)</u>
• Cash in hand -----	25
• Machinery of plant -----	430
• Vehicles -----	30
• Work in Progress -----	24
• Debenture purchased for 4 years -----	45
• Share capital -----	100
• Cash in bank account-----	32
• Raw material stock -----	15
• Finished goods stock -----	6
• Payment to be made in 45 days -----	22
• Payment to be received from customers (30 days) --	10
• Loan taken from bank for 5 years -----	140
• Building -----	40
• Share premium account -----	200
• Reserves -----	75
• Depreciation -----	10%

Q.2 (a) A Works Manager is trying to decide between two grinding machines with the estimates presented below. 07

	<u>Machine A</u>	<u>Machine B</u>
First cost, P (Rs)	6,00,000	9,00,000
Annual Operating Cost, (AOC)	20,000	25,000
Salvage Value (SV), Rs.	40,000	50,000
Life, (years)	3	6

Determine which machine should be selected on the basis of **Present Worth (PW) Analysis**, if rate of interest is 10% / year.

- (b) A city engineer is considering two alternatives for the local water supply. 07

First alternative: The construction of earthen Dam on a near by river, which has highly variable flow. The dam will form a reservoir, so the city may have a dependable source of water. Initial cost = Rs. 80,00,000; Annual upkeep cost = Rs. 25,000; Life of dam is expected to last infinitely.

Second alternative: Drilling of wells as needed and construct pipelines for transport of water. Average 10 wells are required.

Initial cost = 45,000 per well, including pipe line Average life = 5 years; Annual operating cost = Rs.12,000 per well. If $i = 10\%$ per year, which alternative should be selected on the basis of **Capitalized Cost**?

OR

- (b) A Metallurgical laboratory is trying to decide between installing a hardness tester equipment for measuring hardness or sending the samples to a private consultant. 07

In order to equip the laboratory, an initial expenditure of Rs. 2,50,000 will be required. In addition, a full time technician will have to be hired at a cost of Rs.5000 per month.

A total of 200 analytical tests are required each month. If the analysis are done in-house, the average cost is Rs. 40/sample, but if the samples are sent to an outside lab, the average cost will be Rs. 80 / sample.

The equipment purchased for the lab is expected to have a useful life of 10 years. If the utility uses an interest rate of 10% per year, determine the benefit / cost (B/C) ratio.

- Q.3** (a) The 'Dev Machinery' has following department-wise actual costing. Apportion the overheads to the workshops. 07

Cost Centers	Department Overheads	No. of people	Floor area m ²	Direct Material Cost
Administration	40,000	4	-	-
Purchase & stores	60,000	5	-	-
Building & Services	30,000	3	-	
Machine shop	80,000	12	500	2,00,000
Press shop	90,000	12	1000	1,60,000
Assembly shop	70,000	18	1000	1,40,000
	3,70,000	54	2500	5,00,000

- (b) 1. A person is investing 75,000 in term deposit now, and how much money will be accumulated (compound) at interest rate of 10% and after 10 years? Draw cash flow diagram. 07
2. How much money should be invested that is guaranteed to yield Rs. 10,000/- per year for 9 years starting from next year, at an interest of 10% per year? Draw cash flow diagram.

OR

- Q.3** (a) 1. Define fixed cost and variable cost by giving examples for each. 07
2. A product is manufactured in the batch of 500 quantity. The direct material cost is Rs.12,500, direct labour cost is Rs. 5,500, consider overheads as 50% of direct costs, marketing expenses are Rs.14 / unit. If 25% profit margin is expected,

what is the selling price of the product?

- (b) 1. What is depreciation? Why is required to consider in the balance sheet? **07**
2. The cost of a car is Rs. 2,00,000, scrap value is Rs. 25000, estimated life = 10 years, Depreciation rate = 10%. Calculate the book value for first 4 years using **Reducing balance method**.

- Q.4** (a) 1. What are the important factors of production? Explain significance of each factor. **07**
2. Draw a Break Even Chart using following details with appropriate scale. Also find the Break Even Point (BEP) graphically. Selling Price = Rs. 10 / unit; Variable Cost = Rs. 5/ unit; Fixed Cost = Rs. 30,000
Volume of sales = 2000, 4000, 6000, 8000 & 10000

- (b) 1. Explain: Law of Demand with nature of curve. **07**
2. What are the different methods of long term financing? Explain any one.

OR

- Q.4** (a) 1. What is division of labour? What are the advantages and disadvantages of making divisions of labour? Is it advisable? **07**
2. Explain: 'Product Life Cycle' with significant features of its four stages along with nature of curve.
(b) 1. Explain: Law of diminishing marginal utility **07**
2. Compare the features of Shares and Debentures for capital financing.

- Q.5** (a) 1. What is budget? Why it is necessary? **07**
2. Define Lease? Explain leverage leasing.
(b) 1. What is perfect market? What is the condition for it? **07**
2. What are the characteristics of sole proprietary type of business?

OR

- Q.5** (a) 1. What are the advantages and disadvantages of partnership form of business? **07**
2. Explain "trend analysis" in the context of balance sheet.
(b) 1. Compare simple and compound interest methodology. **07**
2. Explain the characteristics of 'bonds' as capital finance.

10%		Table 15 Discrete cash flow: compound interest factors					10%	
n	Single Payments		Uniform-Series Payments				Uniform Gradient	
	Compound Amount F/P	Present Worth P/F	Sinking Fund A/F	Compound Amount F/A	Capital Recovery A/P	Present Worth P/A	Gradient Present Worth P/G	Gradient Annual Series A/G
1	1.1000	0.9091	1.00000	1.0000	1.10000	0.9091		
2	1.2100	0.8264	0.47619	2.1000	0.57619	1.7355	0.8264	0.4762
3	1.3310	0.7513	0.30211	3.3100	0.40211	2.4869	2.3291	0.9366
4	1.4641	0.6830	0.21547	4.6410	0.31547	3.1699	4.3781	1.3812
5	1.6105	0.6209	0.16380	6.1051	0.26380	3.7908	6.8618	1.8101
6	1.7716	0.5645	0.12961	7.7156	0.22961	4.3553	9.6842	2.2236
7	1.9487	0.5132	0.10541	9.4872	0.20541	4.8684	12.7631	2.6216
8	2.1436	0.4665	0.08744	11.4359	0.18744	5.3349	16.0287	3.0045
9	2.3579	0.4241	0.07364	13.5795	0.17364	5.7590	19.4215	3.3724
10	2.5937	0.3855	0.06275	15.9374	0.16275	6.1446	22.8913	3.7255
11	2.8531	0.3505	0.05396	18.5312	0.15396	6.4951	26.3963	4.0641
12	3.1384	0.3186	0.04676	21.3843	0.14676	6.8137	29.9012	4.3884
13	3.4523	0.2897	0.04078	24.5227	0.14078	7.1034	33.3772	4.6988
14	3.7975	0.2633	0.03575	27.9750	0.13575	7.3667	36.8005	4.9955
15	4.1772	0.2394	0.03147	31.7725	0.13147	7.6061	40.1520	5.2789
16	4.5950	0.2176	0.02782	35.9497	0.12782	7.8237	43.4164	5.5493
17	5.0545	0.1978	0.02466	40.5447	0.12466	8.0216	46.5819	5.8071
18	5.5599	0.1799	0.02193	45.5992	0.12193	8.2014	49.6395	6.0526
19	6.1159	0.1635	0.01955	51.1591	0.11955	8.3649	52.5827	6.2861
20	6.7275	0.1486	0.01746	57.2750	0.11746	8.5136	55.4069	6.5081
21	7.4002	0.1351	0.01562	64.0025	0.11562	8.6487	58.1095	6.7189
22	8.1403	0.1228	0.01401	71.4027	0.11401	8.7715	60.6893	6.9189
23	8.9543	0.1117	0.01257	79.5430	0.11257	8.8832	63.1462	7.1085
24	9.8497	0.1015	0.01130	88.4973	0.11130	8.9847	65.4813	7.2881
25	10.8347	0.0923	0.01017	98.3471	0.11017	9.0770	67.6964	7.4580
26	11.9182	0.0839	0.00916	109.1818	0.10916	9.1609	69.7940	7.6186
27	13.1100	0.0763	0.00826	121.0999	0.10826	9.2372	71.7773	7.7704
28	14.4210	0.0693	0.00745	134.2099	0.10745	9.3066	73.6495	7.9137
29	15.8631	0.0630	0.00673	148.6309	0.10673	9.3696	75.4146	8.0489
30	17.4494	0.0573	0.00608	164.4940	0.10608	9.4269	77.0766	8.1762
31	19.1943	0.0521	0.00550	181.9434	0.10550	9.4790	78.6395	8.2962
32	21.1138	0.0474	0.00497	201.1378	0.10497	9.5264	80.1078	8.4091
33	23.2252	0.0431	0.00450	222.2515	0.10450	9.5694	81.4856	8.5152
34	25.5477	0.0391	0.00407	245.4767	0.10407	9.6086	82.7773	8.6149
35	28.1024	0.0356	0.00369	271.0244	0.10369	9.6442	83.9872	8.7086
40	45.2593	0.0221	0.00226	442.5926	0.10226	9.7791	88.9525	9.0962
45	72.8905	0.0137	0.00139	718.9048	0.10139	9.8628	92.4544	9.3740
50	117.3909	0.0085	0.00086	1163.91	0.10086	9.9148	94.8889	9.5704
55	189.0591	0.0053	0.00053	1880.59	0.10053	9.9471	96.5619	9.7075
60	304.4816	0.0033	0.00033	3034.82	0.10033	9.9672	97.7010	9.8023
65	490.3707	0.0020	0.00020	4893.71	0.10020	9.9796	98.4705	9.8672
70	789.7470	0.0013	0.00013	7887.47	0.10013	9.9873	98.9870	9.9113
75	1271.90	0.0008	0.00008	12709	0.10008	9.9921	99.3317	9.9410
80	2048.40	0.0005	0.00005	20474	0.10005	9.9951	99.5606	9.9609
85	3298.97	0.0003	0.00003	32980	0.10003	9.9970	99.7120	9.9742
90	5313.02	0.0002	0.00002	53120	0.10002	9.9981	99.8118	9.9831
95	8556.68	0.0001	0.00001	85557	0.10001	9.9988	99.8773	9.9889
96	9412.34	0.0001	0.00001	94113	0.10001	9.9989	99.8874	9.9898
98	11389	0.0001	0.00001		0.10001	9.9991	99.9052	9.9914
100	13781	0.0001	0.00001		0.10001	9.9993	99.9202	9.9927