

# Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)



## VII SEMESTER B.TECH (COMMON TO ALL) END SEMESTER MAKE-UP EXAMINATION, JAN 2016

## SUBJECT: ESSENTIALS OF MANAGEMENT & ENGINEERING

### ECONOMICS [HSS 401]

#### **REVISED CREDIT SYSTEM**

Time: 3 Hours

MAX. MARKS: 50

#### Instructions to Candidates:

- ✤ Answer ANY FIVE FULL questions.
- **\* INTEREST TABLE** is provided in the last page (else use formula).
- ✤ Missing data may be suitably assumed.
- **1A)** Explain Maslow's hierarchy of needs theory of motivation with a neat (04) sketch and highlight its importance in the modern business environment.
- **1B)** Explain the following principles of management briefly with relevant (03) examples: Fair remuneration, Stability of tenure, and Espirit De' Corps.
- **1C)** What is MBO? What are the benefits of MBO? (03)
- **2A)** Explain the leadership styles based on the use of authority. (04)
- **2B)** Explain job description and job specification with relevant examples. (03)
- **2C)** Explain the three types of Control with relevant examples. (03)
- 3A) Assume that a car manufacturing company has recently launched its (04) Electrical Vehicle (EV) products in India. Perform a SWOT analysis for the same.
- **3B)** What is oral communication and written communication? Explain briefly (03) with examples.
- **3C)** What is delegation? Explain the process of delegation. (03)
- 4A) What is the amount that needs to be deposited now if \$40,000 per year (02) can be withdrawn starting from 12<sup>th</sup> year at an interest rate of 12% per year?

- **4B)** Two manufacturers supply MRI systems for medical imaging. St Jude's (04) hospital wishes to replace its current MRI equipment that was purchased eight years ago with the newer technology and clarity of the state of art system. System K will have a first cost of \$16,00,000, an operating cost of \$70,000 per year and a salvage value of \$4,00,000 after its four year service life. System L will have first cost of \$21,00,000, an operating cost of \$50,000 for the first year with an expected increase of \$3,000 per year thereafter, and no salvage value after its eight years life. Which system should be selected on the basis of future worth analysis at an interest rate of 12% per year?
- **4C)** A three year old machine purchased for \$130,000 is not able to meet (04) today's market demands. The machine can be sold to a sub-contracting company for \$40,000. The current machine will have an annual operating cost of \$85,000 and \$30,000 salvage value in three years. The new machine which will serve the company now and for at least eight years, will cost \$220,000. Its salvage value will be \$10,000 at the end of eight year. It will have an estimated operating cost of \$65,000 per year. You are required to perform a replacement analysis at 12% per year and decide on the best course of action.
- 5A) A contract between BF Goodrich and the steel workers union of America (03) called for the company to spend \$100 million in capital investment to keep the facilities competitive. The contract also required the company to lay off 400 workers. If the lay off cost per person is \$1,00,000 and the company is able to reduce costs by \$20 million per year, what rate of return will the company make over a 10 year period? Assume all the company's expenditure occur at time zero and the saving one year later.
- **5B)** The maintenance and operation cost (M&O) of front-end loaders working (03) under harsh environmental conditions tends to increase by a constant of \$1,200 per year for the first five years of operation. For a loader that has first cost of \$39,000 and first year M&O cost of \$17,000, compare the equivalent annual worth of a loader kept for four years with one kept for five years at an interest rate of 12% per year. The salvage value of the loader is \$23,000 after four years and \$18,000 after five years.
- **5C)** A cooling water pumping station at the LCRA plant costs \$600,000 to (04) construct, and it is projected to have 25 year life with an estimated salvage value of 15% of the construction cost, however the station will be book depreciate to zero over a recovery period of 30 years. Calculate the annual depreciation charge for the years 4,10 and 25 using Straight line method and Double declining balance method.

**6A)** A bio medical engineer wants to estimate the equivalent uniform revenue (04) for a semi annual period that is necessary to recover the investment, interest and annual costs, for the following cash estimates:

Installation costs	\$3 million
Annual Operating and maintenance costs	\$2,00,000
Expected life	5 years

Find the semi-annual revenue if,

- (a) 16% per year compounded semi annually?
- (b) 16% per year compounded monthly?
- **6B)** A machine that cost \$120,000 three years ago can be sold now for (03) \$54,000. Its market value for the next two years is expected to be \$40,000 and \$20,000 one year and two years from now respectively. Its operating cost was \$18,000 for the first three years of its life, but the M&O cost is expected to be \$23,000 for the next two years. A new improved machine that can be purchased for \$138,000 will have an economic life of five years, an operating cost of \$9,000 per year, and a salvage value of \$32,000 after five years. At an interest rate of 12% per year, determine if the presently owned machine should be replaced now, one year from now, or two years from now.

n (year)	A(\$)	B(\$)	C(\$)	
0	-1000	-1000	-2000	
1	900	600	900	
2	500	500	900	
3	100	500	900	
4	50	100	900	
Project IRR	Project IRR 34.67%		28.57%	

**6C)** Consider the cash flows for the investment projects given below:

Assume that the MARR is 12%. Suppose A, B and C are mutually exclusive projects, which project is to be selected on the basis of IRR criterion?

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(03)

7%								
n	F/P	P/F	A/F	A/P	F/A	P/A	A/G	P/G
1	1.070	.9346	1.0000	1.0700	1.000	0.935	0	0
2	1.145	.8734	.4831	.5531	2.070	1.808	0.483	0.873
3	1.225	.8163	.3111	.3811	3.215	2.624	0.955	2.506
4	1.311	.7629	.2252	.2952	4.440	3.387	1.416	4.795
5	1.403	.7130	.1739	.2439	5.751	4.100	1.865	7.647
6	1.501	.6663	.1398	.2098	7.153	4.767	2.303	10.978
7	1.606	.6227	.1156	.1856	8.654	5.389	2.730	14.715
8	1.718	.5820	.0975	.1675	10.260	5.971	3.147	18.789
9	1.838	.5439	.0835	.1535	11.978	6.515	3.552	23.140
10	1.967	.5083	.0724	.1424	13.810	7.024	3.946	27.716
8%								
1	1.080	.9259	1.0000	1.0800	1.000	0.926	0	0
2	1.166	.8573	.4808	.5608	2.080	1.783	0.481	0.857
3	1.260	.7938	.3080	.3880	3.246	2.577	0.949	2.445
4	1.500	.7330	.2219	2505	4.306	3,993	1.404	4.650
	1.507	.0000	.1765	.2505	5.007	5.775	2.076	10.522
0 7	1.587	.6302	.1363	.2163	7.336	4.623	2.276	10.523
8	1./14	.3833	.1121	.1921	8.925	5.200	2.094	14.024
9	1.999	.5002	.0801	.1601	12.488	6.247	3.491	21.808
10	2.159	.4632	.0690	.1490	14.487	6.710	3.871	25.977
130/	E/P	P/F	A/F	A/P	F/A	P/A	A/G	P/G
12%				, -	.,	. ,		
1	1.120	.8929	1.0000	1.1200	1.000	0.893	0	0
2	1.254	.7972	.4717	.5917	2.120	1.690	0.472	0.797
3	1.405	.7118	.2963	.4163	3.374	2.402	0.925	2.221
4	1.374	.0333	.2092	.3292	6 353	3.057	1.559	6 397
	1.762	50((	.1374	.2774	0.555	5.005	2.172	0.000
6 7	1.974	.5066	.1232	.2432	8.115	4.111	2.172	8.930
8	2.211	4325	.0991	2013	12 300	4.504	2.551	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
15%								
1	1 150	8606	1 0000	1 1500	1.000	0.870	0	0
2	1.322	.7561	.4651	.6151	2.150	1.626	0.465	0.756
3	1.521	.6575	.2880	.4380	3.472	2.283	0.907	2.071
4	1.749	.5718	.2003	.3503	4.993	2.855	1.326	3.786
5	2.011	.4972	.1483	.2983	6.742	3.352	1.723	5.775
6	2.313	.4323	.1142	.2642	8.754	3.784	2.097	7.937
7	2.660	.3759	.0904	.2404	11.067	4.160	2.450	10.192
8	3.059	.3269	.0729	.2229	13.727	4.487	2.781	12.481
9	3.518	.2843	.0596	.2096	16.786	4.772	3.092	14.755
10	4.046	.2472	.0493	.1993	20.304	5.019	3.383	16.979
20%	F/P	P/F	A/F	A/P	F/A	P/A	A/G	P/G
1	1.200	.8333	1.0000	1.2000	1.000	0.833	0	0
2	1.440	.6944	.4545	.6545	2.200	1.528	0.455	0.694
3	1.728	.5787	.2747	.4747	3.640	2.106	0.879	1.852
4	2.074	.4823	.1863	.3863	5.368	2.589	1.274	3.299
5	2.488	.4019	.1344	.3344	7.442	2.991	1.641	4.906
25%								
1	1.250	.8000	1.0000	1.2500	1.000	0.800	0	0
2	1.563	.6400	.4444	.6944	2.250	1.440	0.444	0.640
3	1.953	.5120	.2623	.5123	3.813	1.952	0.852	1.664
4	2.441	3277	.1754	.4254	5.700 8.207	2.302	1.225	2.893
300/	5.052	.5211	.1210	.5710	0.201	2.007	1.505	T.20T
3070	1.000	7.00	1.0000	1 2000	1 000	0.570	0	6
1	1.300	.7692	1.0000	1.3000	1.000	0.769	0 425	0
2	1.690	.5917	.4548	./348	2.300	1.301	0.435	0.592
3	2.197	3501	.2500	4616	5.990	2 166	1 178	2 552
5	3.713	.2693	.1106	.4106	9.043	2.436	1.490	3.630
L	-							