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**MANIPAL INSTITUTE OF TECHNOLOGY**  
Manipal University, Manipal – 576 104



**B.TECH END SEMESTER EXAMINATION (7<sup>th</sup> Semester)**  
**SUBJECT: ESSENTIALS OF MANAGEMENT & ENGINEERING ECONOMICS**  
**(HSS 401)**

**REVISED CREDIT SYSTEM**  
**(28/11/2014)**

Time: 3 Hour.

MAX.MARKS: 50

**Instructions to Candidates:**

- ❖ Answer **ANY FIVE FULL** questions.
- ❖ **INTEREST TABLE** is provided in the last page (else use formula).

**PART - A**

**1A)** Raju works as a Medical Representative for the city branch of a leading pharmaceutical company. He is hard working and has a very pleasing personality that impresses most of the doctors and customers that he meets. The company set the monthly targets for each medical representative in terms of the number of new customers and the total volume of sales to be achieved. Representatives who achieve the monthly targets are eligible for the special sales incentives, the only lucrative monetary benefit offered by the company. Raju was lagging behind his targets for the past seven months. Although Raju has achieved 97% of the target set this month, he knew that he would cut a sorry figure and the Regional Manager would not take him at face value. The last time round he had committed to the Regional Manager that he would ensure that the targets were met.

Mr. Pradeep Jain, Regional Manager, liked to be in total control of any situation. He considered himself to be very knowledgeable and does not entertain suggestions and ideas from his team members. He believed in issuing instructions to the subordinates and expected them to follow his instructions. He kept an eye on the performance of his 12-member team of sales representatives throughout the twelve-odd hours that they work. He expected his team members to keep him informed about their progress on any target on an hourly basis even when they were on the field. The targets, in terms of the volumes and number of contacts were scaled up consistently and were so high that achieving them seemed a difficult task.

After mailing the monthly reports, Raju went into Pradeep Jain's room only to be given a strong warning that if the achievement of targets for the month ahead was also below expectations, it would cost him his job. Most of his colleagues too had a similar experience to narrate after they had submitted their monthly report.

The next day Pradeep Jain called for a meeting, where he described in detail how he had worked when he was in their position such as carrying as many medical flashcards of the new products as possible and carrying most of the samples and so forth. The team members who had listen to the same strategies many times before, suggested some new ideas such as carrying a tablet pc that has all the information of medicines stored in different folders based on specializations so that they can quickly display the latest products based on the specialization and interest of the doctors and offering a sample dispenser box with the company logo to the doctors that can be placed on their table which will serve as a strong reminder of their products. However, as usual Pradeep Jain ignored these suggestions and went ahead with his strategies. The team felt demotivated and dejected after the meeting.

- i) Describe the basic leadership style that is followed by Mr. Pradeep Jain. (03)
- ii) Draw the Blake & Mouton's grid and identify Mr. Pradeep Jain's leadership style in the above case. (03)
- 1B) Explain any four Motivators and four Hygiene factors as given by Herzberg. (04)
- 2A) Compare and contrast formal with informal communications cite the same with relevant examples. (03)
- 2B) Explain the three types of control with suitable examples. (03)
- 2C) Explain any four drawbacks in budgeting. (04)
- 3A) Sketch the systems approach to Management indicating all the five functions of management. (03)
- 3B) Draw a TOWS Matrix used for strategy formulation. (03)
- 3C) Distinguish between scalar authority and functional authority. (02)
- 3D) Explain any four types of interviews. (02)

#### **PART - B**

- 4A) The XYZ Company owns a four year-old pump that originally cost Rs.15,000 with a life of eight years and an annual operating and maintenance cost of Rs.4,500 per year. The salvage value of this old pump at the end of its life is expected to be Rs.1,500. The company is currently planning to replace this old pump with a new pump. A salesman has offered a new pump for Rs.18,000 whose annual maintenance and operating cost is Rs.1,500 in the first year and then onwards increasing at a gradient of Rs.400. The life of this new pump is 10 years and the salvage value at the end of the life is Rs.2,500. The trade in value of the old pump is expected to be Rs.4,000. Assuming an interest rate of 10%,
  - i) Should the old pump be replaced with the new one?
  - ii) If the asset is being depreciated according to declining balance method; determine the sunk cost/capital gain, if the old pump is replaced.

- 4B)** A company is considering for the purchase of new equipment. The company representatives have agreed to use the average of the corporate MARR values, which results in  $MARR = 13.5\%$ . Use incremental ROR analysis to determine which equipment would be the best economic choice. **(05)**

	Machine 1	Machine 2	Machine 3
First Cost (in \$)	-5,000	-6,500	-15,000
Annual Operating Cost (in \$)	-3,500	-3,200	-1,400
Salvage Values (in \$)	+500	+900	+1,000
Life in Years	8	8	8

- 5A)** Sunbelt Corporation, an investment company, is considering building a 50-unit apartment complex in a growing area near Tucson, Arizona. Since the long-term growth potential of the town is excellent, it is believed that the company could average 85% full occupancy for the complex. If the following financial data are reasonably accurate estimates, determine the minimum monthly rent that should be charged if a 10% rate of return is desired: **(04)**
- Land investment cost = \$1,000,000
  - Building investment cost = \$2,500,000
  - Annual upkeep cost = \$150,000
  - Annual property taxes and insurance = 5% of total initial investment
  - Study Period = 25 years
  - Salvage Value = Only land cost can be recovered in full.
- 5B)** The XYZ company has an opportunity to replace the existing machine with another specialized one that will cost \$12,000. This machine has no salvage value, a useful life of 10 years, and operating costs of \$5,000 in the first year, with an annual increase of \$1,200 thereafter. Determine the economic life of the new machine if the interest rate is 10%. **(03)**
- 5C)** Jacki obtained a new credit card from a national bank, MBNA, with a stated rate of 10% per year, compounded monthly. For a \$1,000 balance at the beginning of the year, find the effective annual rate and the total amount owed to MBNA after one year, provided no payments are made during the year. **(03)**
- 6A)** A remotely located air sampling station can be powered by solar cells or by running an electric line to the site and using conventional power. Solar cells will cost \$12,600 to install and will have a useful life of four years with no salvage value. Annual costs for inspection, cleaning, and other costs are expected to be \$1,400. A new power line will cost \$11,000 to install, with power costs expected to be \$800 per year. Since the air sampling project will end in four years, the salvage value of the line is considered to be zero. At an interest rate of 10% per year, which alternative should be selected on the basis of a future worth analysis? **(03)**

**6B)** What amount should be deposited in your retirement account starting from now and continuing each year through year nine (i.e., 10 deposits) if you want to withdraw an amount of \$80,000 per year continuing forever beginning 30 years from now? Assume the account earns an interest rate of 10% per year. **(03)**

**6C)** Freeport Mining Company has purchased a computer-controlled gold ore grading unit for \$80,000. The unit has an anticipated life of 10 years and a salvage value of \$10,000. Use the straight line and double declining balance methods to compare the schedule of depreciation and book values for each year. **(04)**

10%		Compound Interest Factors							10%
n	Single Payment		Uniform Payment Series				Arithmetic Gradient		n
	Compound Amount Factor	Present Worth Factor	Sinking Fund Factor	Capital Recovery Factor	Compound Amount Factor	Present Worth Factor	Gradient Uniform Series	Gradient Present Worth	
	Find F Given P	Find P Given F	Find A Given F	Find A Given P	Find F Given A	Find P Given A	Find A Given G	Find P Given G	
	F/P	P/F	A/F	A/P	F/A	P/A	A/G	P/G	
1	1.100	.9091	1.0000	1.1000	1.000	0.909	0	0	1
2	1.210	.8264	.4762	.5762	2.100	1.736	0.476	0.826	2
3	1.331	.7513	.3021	.4021	3.310	2.487	0.937	2.329	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
8	2.144	.4665	.0874	.1874	11.436	5.335	3.004	16.029	8
9	2.358	.4241	.0736	.1736	13.579	5.759	3.372	19.421	9
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	4.064	26.396	11
12	3.138	.3186	.0468	.1468	21.384	6.814	4.388	29.901	12
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
18	5.560	.1799	.0219	.1219	45.599	8.201	6.053	49.640	18
19	6.116	.1635	.0195	.1195	51.159	8.365	6.286	52.583	19
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	65.481	24
25	10.835	.0923	.0102	.1102	98.347	9.077	7.458	67.696	25

15%		Compound Interest Factors							15%
n	Single Payment		Uniform Payment Series				Arithmetic Gradient		n
	Compound Amount Factor	Present Worth Factor	Sinking Fund Factor	Capital Recovery Factor	Compound Amount Factor	Present Worth Factor	Gradient Uniform Series	Gradient Present Worth	
	Find F Given P	Find P Given F	Find A Given F	Find A Given P	Find F Given A	Find P Given A	Find A Given G	Find P Given G	
	F/P	P/F	A/F	A/P	F/A	P/A	A/G	P/G	
1	1.150	.8696	1.0000	1.1500	1.000	0.870	0	0	1
2	1.322	.7561	.4651	.6151	2.150	1.626	0.465	0.756	2
3	1.521	.6575	.2880	.4380	3.472	2.283	0.907	2.071	3
4	1.749	.5718	.2003	.3503	4.993	2.855	1.326	3.786	4
5	2.011	.4972	.1483	.2983	6.742	3.352	1.723	5.775	5
6	2.313	.4323	.1142	.2642	8.754	3.784	2.097	7.937	6
7	2.660	.3759	.0904	.2404	11.067	4.160	2.450	10.192	7
8	3.059	.3269	.0729	.2229	13.727	4.487	2.781	12.481	8
9	3.518	.2843	.0596	.2096	16.786	4.772	3.092	14.755	9
10	4.046	.2472	.0493	.1993	20.304	5.019	3.383	16.979	10
11	4.652	.2149	.0411	.1911	24.349	5.234	3.655	19.129	11
12	5.350	.1869	.0345	.1845	29.002	5.421	3.908	21.185	12
13	6.153	.1625	.0291	.1791	34.352	5.583	4.144	23.135	13
14	7.076	.1413	.0247	.1747	40.505	5.724	4.362	24.972	14
15	8.137	.1229	.0210	.1710	47.580	5.847	4.565	26.693	15
16	9.358	.1069	.0179	.1679	55.717	5.954	4.752	28.296	16
17	10.761	.0929	.0154	.1654	65.075	6.047	4.925	29.783	17
18	12.375	.0808	.0132	.1632	75.836	6.128	5.084	31.156	18
19	14.232	.0703	.0113	.1613	88.212	6.198	5.231	32.421	19
20	16.367	.0611	.00976	.1598	102.444	6.259	5.365	33.582	20