Reg.No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University, Manipal – 576 104

END SEMESTER MAKE-UP EXAMINATION
SUBJECT: ESSENTIALS OF MANAGEMENT & ENGINEERING ECONOMICS
(HSS 302) REVISED CREDIT SYSTEM (09/07/2014)

Time: 3 Hour. MAX.MARKS:50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitably assumed.

PART A

1A) Sketch and Explain steps in planning. (05)

1B) What are the factors that influence wider span and narrow span? (03)

1C) List and evaluate external factors affecting staffing. Which ones are most critical today? Explain? (02)

2A) Explain Maslow's Hierarchy of motivation with a sketch. Explain its relevance in today's context. (05)

2B) Does authority and responsibility coexist? Explain this with a suitable example. (03)

2C) List the Critical control points and explain any two of them. (02)

3A) Draw a communication process diagram and explain its features. (05)

3B) Select a branded company product and apply the 'Porters Generic Model' and justify your strategic choice made to achieve competitive advantage over others. (03)

3C) Differentiate between planning and controlling. (02)

PART-B

4A) State the Law of Demand and explain the various factors that affect demand for a commodity. (03)

4B) Five annual deposits in the amounts of $1,200, $1,000, $800, $600, and $400 are made into a fund that pays interest at a rate of 9% compounded annually. Determine the amount in the fund immediately after the fifth deposit. (03)

4C) Mr. X deposits $5000 in a savings account that pays 6% interest, compounded monthly. Three years later he deposits $4000. Two years later the $4000 deposit, he makes another deposit of $2500. Four years after the $2500 deposit, half of the accumulated fund is transferred to a fund that pays 8% interest, compounded quarterly. How much money will be in each account 6 years after the transfer? (04)

5A) Consider the following two projects. Assume interest rate of 12% and select the best alternative using present worth method. (03)

Year	Project A (Rs)	Project B (Rs)
0	-4500	-2900
1	2610	1210
2	2930	1720
3	2300	1500

5B) A newly constructed water treatment facility costs Rs.20, 00,000. It is estimated that the facility will need renovation every 30 years at a cost of Rs.10, 00,000. Annual repairs and maintenance costs are expected to be Rs.1, 00,000 per year for first 10 years and Rs.3, 00,000 thereafter. Determine the capitalized cost of the facility. Assume i=12%. (03)

5C) The cash flows for two mutually exclusive alternatives are given as follows: (04)

n	**B-1**	**B-2**
0	-$3000	-$12000
1	$1350	$4200
2	$1800	$6225
3	$1500	$6330
IRR	25%	17.43%

With the knowledge that both alternatives are revenue projects, which project should be selected at MARR = l0%?

6A) A construction company has purchased a piece of construction equipment three years ago at a cost of Rs.400000. The estimated life and salvage value at the time of purchase were 12 years and Rs.850000 respectively. The annual operating and maintenance cost was Rs.150000. The construction company is now considering replacement of existing equipment with a new model available in the market. (03)

Due to depreciation the current book value of the existing equipment is Rs.3055000. The current market value of the existing equipment is Rs.2950000. The revised estimate of salvage value and remaining life are Rs.650000 and 8 years respectively. The annual operating and maintenance cost are same as earlier.

The initial cost of the new model is Rs.3500000. The estimated life, salvage value and annual operating cost are 8 years, Rs.900000 and Rs.125000 respectively. If the company's MARR is 10%, should it retain the old equipment or buy the new one?

6B) An asset was purchased for Rs.2,50,000 . It has an expected life of 10 years and a salvage value of Rs.50000 at the end of 10th year. What will be the undepreciated amount of capital remaining in the asset at the end of 6th year? If the asset is being depreciated according to the declining balance method. Also calculate the depreciation charge for the 8th year. (03)

6C) Three years ago a chemical processing plant installed a system at a cost of $20,000 to remove pollutants from waste water that is discharged into a nearby river. The present system has no present salvage value and will cost $14500 to operate next year, with the operating cost expected to increase at the rate of $500 per year thereafter. (04)

A new system has been designed to replace the existing system at a cost of $10000. The new system is expected to have first year operating of $9000 with these costs increasing at the rate of $1000 per year. The new system is estimated to have a useful life of 12years. The salvage values of both the system at any future time are expected to be zero. If the interest rate is 12% conduct replacement analysis based on the economic life of the asset.

6% Compound Interest Factors 6%

	Single Payment		Uniform Payment Series				Arithmetic Gradient		
	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*	
n	*F/P*	*P/F*	*A/F*	*A/P*	*F/A*	*P/A*	*A/G*	*P/G*	*n*
1	1.060	.9434	1.0000	1.0600	1.000	0.943	0	0	1
2	1.124	.8900	.4854	.5454	2.060	1.833	0.485	0.890	2
3	1.191	.8396	.3141	.3741	3.184	2.673	0.961	2.569	3
4	1.262	.7921	.2286	.2886	4.375	3.465	1.427	4.945	4
5	1.338	.7473	.1774	.2374	5.637	4.212	1.884	7.934	5
6	1.419	.7050	.1434	.2034	6.975	4.917	2.330	11.459	6
7	1.504	.6651	.1191	.1791	8.394	5.582	2.768	15.450	7
8	1.594	.6274	.1010	.1610	9.897	6.210	3.195	19.841	8
9	1.689	.5919	.0870	.1470	11.491	6.802	3.613	24.577	9
10	1.791	.5584	.0759	.1359	13.181	7.360	4.022	29.602	10

8% Compound Interest Factors 8%

	Single Payment		Uniform Payment Series				Arithmetic Gradient		
	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*	
n	*F/P*	*P/F*	*A/F*	*A/P*	*F/A*	*P/A*	*A/G*	*P/G*	*n*
1	1.080	.9259	1.0000	1.0800	1.000	0.926	0	0	1
2	1.166	.8573	.4808	.5608	2.080	1.783	0.481	0.857	2
3	1.260	.7938	.3080	.3880	3.246	2.577	0.949	2.445	3
4	1.360	.7350	.2219	.3019	4.506	3.312	1.404	4.650	4
5	1.469	.6806	.1705	.2505	5.867	3.993	1.846	7.372	5
6	1.587	.6302	.1363	.2163	7.336	4.623	2.276	10.523	6
7	1.714	.5835	.1121	.1921	8.923	5.206	2.694	14.024	7
8	1.851	.5403	.0940	.1740	10.637	5.747	3.099	17.806	8
9	1.999	.5002	.0801	.1601	12.488	6.247	3.491	21.808	9
10	2.159	.4632	.0690	.1490	14.487	6.710	3.871	25.977	10

10% Compound Interest Factors 10%

n	Single Payment: Compound Amount Factor — Find F Given P F/P	Single Payment: Present Worth Factor — Find P Given F P/F	Uniform Payment Series: Sinking Fund Factor — Find A Given F A/F	Uniform Payment Series: Capital Recovery Factor — Find A Given P A/P	Uniform Payment Series: Compound Amount Factor — Find F Given A F/A	Uniform Payment Series: Present Worth Factor — Find P Given A P/A	Arithmetic Gradient: Gradient Uniform Series — Find A Given G A/G	Arithmetic Gradient: Gradient Present Worth — Find P Given G P/G	n
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

12% Compound Interest Factors 12%

n	Single Payment: Compound Amount Factor — Find F Given P F/P	Single Payment: Present Worth Factor — Find P Given F P/F	Uniform Payment Series: Sinking Fund Factor — Find A Given F A/F	Uniform Payment Series: Capital Recovery Factor — Find A Given P A/P	Uniform Payment Series: Compound Amount Factor — Find F Given A F/A	Uniform Payment Series: Present Worth Factor — Find P Given A P/A	Arithmetic Gradient: Gradient Uniform Series — Find A Given G A/G	Arithmetic Gradient: Gradient Present Worth — Find P Given G P/G	n
1	1.120	.8929	1.0000	1.1200	1.000	0.893	0	0	1
2	1.254	.7972	.4717	.5917	2.120	1.690	0.472	0.797	2
3	1.405	.7118	.2963	.4163	3.374	2.402	0.925	2.221	3
4	1.574	.6355	.2092	.3292	4.779	3.037	1.359	4.127	4
5	1.762	.5674	.1574	.2774	6.353	3.605	1.775	6.397	5
6	1.974	.5066	.1232	.2432	8.115	4.111	2.172	8.930	6
7	2.211	.4523	.0991	.2191	10.089	4.564	2.551	11.644	7
8	2.476	.4039	.0813	.2013	12.300	4.968	2.913	14.471	8
9	2.773	.3606	.0677	.1877	14.776	5.328	3.257	17.356	9
10	3.106	.3220	.0570	.1770	17.549	5.650	3.585	20.254	10

15% Compound Interest Factors 15%

n	Single Payment: Compound Amount Factor — Find F Given P F/P	Single Payment: Present Worth Factor — Find P Given F P/F	Uniform Payment Series: Sinking Fund Factor — Find A Given F A/F	Uniform Payment Series: Capital Recovery Factor — Find A Given P A/P	Uniform Payment Series: Compound Amount Factor — Find F Given A F/A	Uniform Payment Series: Present Worth Factor — Find P Given A P/A	Arithmetic Gradient: Gradient Uniform Series — Find A Given G A/G	Arithmetic Gradient: Gradient Present Worth — Find P Given G P/G	n
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