Reg. No.						



VI SEMESTER B.TECH. (COMMON TO ALL)

END SEMESTER EXAMINATIONS- MAY 2022

SUBJECT: ENGINEERING ECONOMICS & FINANCIAL MANAGEMENT

[HUM 3051]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Interest factor table are provided, for others use formulae
- Missing data may be suitably assumed.
- 1A) An engineer has received two bids for an elevator to be installed in a (04) new building. The bids, plus his evaluation of the elevators are shown in table below.

	Bid1:Westing home	Bid2: Itis
Installed Cost	\$45,000	\$54,000
Service Life (years)	10	15
Annual operating cost, Including repairs	\$2700/year	\$2850/year
Salvage Value at End of Service Life	\$3000	\$4500

The engineer will make a Present worth analysis using a 10% interest rate. Prepare the analysis and determine which bid should be accepted.

1B) The cash flows for one cycle of a capitalized cost project is given below. (03) Calculate the Capitalized cost of this project at 5% interest rate if the initial investment is \$100,000.

Year	1	2	3	4	5
Amount(\$)	10000	10000	10000	11000	11000

- 1C) Two different companies are offering a punch press for sale. Company (03) 'A' charges \$250,000 to deliver and install the device. Company A has estimated that the machine will have maintenance and operating costs of \$4000 per year and will provide an annual benefit of \$89,000. Company 'B' charges \$205,000 to deliver and install the device. Company B has estimated maintenance and operating costs of the press at \$4300 per year, with an annual benefit of \$86,000. Both machines will last for 5 years and both can be sold for \$15,000 each for the scrap metal. Using an interest rate of 12%, which machine should your company purchase, based on Present worth method?
- **2A)** The maintenance foreman of a plant in reviewing his records found that **(03)** a large press had the following maintenance cost record:

5 years ago	\$ 600
4 years ago	\$ 700
3 years ago	\$ 800
2 years ago	\$ 900
Last year	\$ 1000

After consulting with a lubrication specialist, he changed the preventive maintenance schedule. He believes that this year maintenance will be \$900 and will decrease \$100 a year in each of the following 4 years. If his estimate of the future is correct, what will be the equivalent uniform annual maintenance cost for the 10-year period? Assume interest at 8%.

2B) Kersey Manufacturing Co., a small fabricator of plastics, needs to (03) purchase an extrusion molding machine for \$120,000. Kersey will borrow money from a bank at an interest rate of 10% over five years. Kersey expects its product sales to be slow during the first year, but to (HUM 3051)

increase subsequently. Kersey therefore arranges with the bank to pay off the loan such that the lowest payment happens at the end of the first year and each subsequent payment being \$10,000 additionally over the previous one. Determine the five annual payments.

2C) Consider the accompanying cash flow diagram, which represents three **(04)** different interest rates applicable over the five-year time span shown.



- a. Calculate the equivalent amount P at the present time.
- b. Calculate the single payment equivalent to F at n=5
- 3A) A metal plating company is considering four different methods for (04) recovering byproduct heavy metals from a manufacturing site's liquid waste. The investment costs and incomes associated with each method have been estimated. All methods have an 8-year life. The MARR is 10 % per year. If the methods are mutually exclusive, determine which one method should be selected. Use Incremental ROR evaluation method for the analysis purpose.

Method	First	Salvage	Annual
	Cost,	Value, Rs	Income,
	Rs		Rs/Year
А	-30,000	+1,000	+4,000
В	-36,000	+2,000	+7,000
С	-41,000	+500	+8,000

3B) A firm is about to begin pilot plant operation on a process it has (03) developed. One item of optional equipment that could be obtained is a heat exchanger unit. The company finds that a unit now available for \$30,000 could be used in other company operations. It is estimated that the heat exchanger unit will be worth \$35,000 at the end of 8 years.

(HUM 3051)

This seemingly high salvage value is due primarily to the fact that the \$30,000 purchase price is really a rare bargain. If the firm believes 15% is an appropriate rate of return, what annual benefit is needed to justify the purchase of the heat exchanger unit?

3C) The manager of Erie Pvt. Ltd. is involved in a production planning **(03)** process and wishes to perform a risk assessment using worst case scenario, based on the company's current estimated levels. Based on the following information about Erie Ltd, you must conduct a break-even analysis under these scenarios.

Current Scenario:

The fixed costs of the assets are currently around Indian Rupees (INR) 40,00,000, the variable cost of producing the product is INR. 150 per unit, and the product can be sold for INR. 400 per unit.

Worst-Case Scenario

The company assumes a worst-case risk scenario for its costs and intends to be prepared, for which it seeks to estimate the additional units of sales it must meet in comparison to the break-even sales under the current (most likely) scenario. Due to global supply chain disruptions, it expects variable costs to reach around \$300 per unit. What are those additional units of sales required under this worst-case?

- 4A) Prepare the depreciation schedule of a new Electric car (Model A) (03) bought with an initial price of Rs. 15,35,000 with an economic lives of 5 years. Assume the annual depreciation rate to be 20 percent.
- **4B)** You are required to perform an economic comparison of two models of **(04)** car an **Electric Car** versus a **Petrol Car**, in an Indian Market. The information on the same are provided below.

Model A: Electric Car

The on-road price of Electric car (Model A) is Rs. 15,35,000 without considering insurance charges and its registration fees are exempted. Assume the salvage value of the car after 5 years to be its Book value considering the annual depreciation rate of 20% (refer question 4A). The car has a ARAI-certified range of 312 km on a full charge. For a full charge, the car consumes 20 units of electricity and consider an

average cost of Rs. 7 per unit of electricity. As these cars doesn't have any complex mechanical components its maintenance cost is on lower side. Further, details of cost involved in EV ownership is provided below in Table 1:

-	Table	1: The	cost de	etails o	of an I	Electric	Car	(Model	A) are	provid	ed
belo	SW:										

	1 st	2 nd	3 rd	4 th	5 th
	year	year	year	year	year
Insurance Cost	65000	61000	57000	53000	49000
(Rs)					
Maintenance Cost	4000	5000	6000	7000	8000
(Rs)					

Model B: Petrol Car

The on-road price of a Petrol Car (Model B) is Rs. 8,60,000 including the registration charges without considering the insurance charges. The salvage value of petrol car can be assumed to be 50% of the initial on-road price. The ARAI-certified fuel efficiency of 17 kmpl and the average cost of petrol is Rs. 100 per liter. Further, details of cost involved in ownership of Petrol car is provided below in Table 2:

Table 2: The cost details of a Petrol Car	(Model B) are	provided below:
---	---------------	-----------------

		1 st	2 nd	3 rd	4 th	5 th
		year	year	year	year	year
Insurance	Cost	40000	36000	32000	28000	24000
(Rs)						
Maintenance	Cost	8000	10000	12000	14000	16000
(Rs)						

- a) You are required to compute the number of Kilometers you need to drive in a year which makes both the car models equivalent. Consider the economic service lives of the two cars to be five years and the interest rate of money at 10%.
- b) For an annual usage of 25,000 kms. Which model is better?

- 4C) The ABC company has a tower crane that has an estimated remaining (03) life of 10 years. The crane can be sold for Rs. 60,000. If the crane is kept in service it must have a major repair immediately at a cost of Rs. 30,000. Operating and maintenance costs will be Rs. 20,000/yr after the crane is repaired. After being repaired, the crane will have a zero salvage value at the end of the 10 year period. A new crane will cost Rs. 160,000, will last for 10 years, and will have Rs. 30,000 salvage value at that time. Operating and maintenance costs are Rs. 10,000 for the new crane. The company uses a MARR of 10% in evaluating investment alternatives. Should the company buy the new crane? Compare the annual equivalents using the Outsider's Viewpoint/Opportunity cost method.
- 5A) A piece of machinery costs \$7500 and has no salvage value after it is (05) installed. The manufacturer's warranty will pay the first year's maintenance and repair costs. In the second year, maintenance costs will be \$900, and this item will increase on a \$900 arithmetic gradient in subsequent years. Also, operating expenses for the machinery will be \$500 in the first year and will increase on a \$400 arithmetic gradient in the following years. If interest is 8%, what is the economic service life for this machine?
- **5B)** State the significance of Interest coverage ratio and Inventory turnover **(02)** ratio.

Liabilities	Rs.	Assets	Rs.
Equity share capital	2,00,000	Goodwill	70,000
8% Preference share	2,00,000	Land and	4,40,000
capital		Buildings	
16% of 15 years	80,000	Plant and	2,00,000
Debentures		Machinery	
15% Term Loans	40,000	Furniture	60,000
Reserves	3,00,000	Investments	40,000
Creditors	1,20,000	Debtors	1,40,000
Bank Overdraft	80,000	Prepaid Insurance	20,000
Outstanding Rent	14,000	Stock	60,000
Provision for Tax	40,000	Cash in Hand	14,000
Outstanding Rent Provision for Tax	14,000 40,000	Stock Cash in Hand	60,000 14,000

5C) Following is the Balance sheet of JBL Ltd. as on 31st March, 2020 (03)

Proposed Dividend	20,000	Cash at Bank	70,000		
Net Profit After Tax	40,000	Preliminary	20,000		
		Expenses			
	11,34,000		11,34,000		
Note: Totals Asset for previous year was Rs. 10,00,000					

You are required to calculate the following ratios:

- a) Current ratio
- b) Quick Ratio
- c) Debt to Equity Ratio

ENGINEERING ECONOMICS AND FINANCIAL MANAGEMENT (HUM 3151)

Discrete Compounding Formulas with Discrete Payments:

Single Payment Series	Compound Amount, (F/P, i, n)	$F = P(1+i)^n$		
	Present Worth, (P/F, i, n)	$P = F(1+i)^{-n}$		
Equal Payment Series	Compound Amount, (F/A, i, n)	$F = A \left[\frac{(1+i)^n - 1}{i} \right]$		
	Sinking Fund, (A/F, i, n)	$A = F\left[\frac{i}{\left(1+i\right)^n - 1}\right]$		
	Present Worth, (P/A, i, n)	$P = A \left[\frac{\left(1+i\right)^n - 1}{i\left(1+i\right)^n} \right]$		
	Capital Recovery, (A/P, i, n)	$A = P\left[\frac{i(1+i)^{n}}{(1+i)^{n}-1}\right]$		
Gradient Series	Conversion factor, (A/G, i, n)	$A = G\left[\frac{(1+i)^{n} - in - 1}{i(1+i)^{n} - i}\right]$		

Nominal and Effective Interest Rates:

Effective interest rate per period	m = Number of compounding periods per year
$i = \frac{r}{m}$	r = Interest rate
Effective annual interest rate $i_{eff} = (1 + \frac{r}{m})^c - 1$	 m = Number of compounding periods per year c = Number of compounding period per payment period r = Interest rate
Capitalized Cost (CC)	A = Annual worth
$CC = \frac{A}{I}$	I = interest rate

(HUM 3051)

	I = Purchase price of the machine
Capital Recovery (CR)	S = Salvage value of the machine at the end of machine life
$CR = (I - S) \times \left(\frac{P}{P}, i, n\right) + S * i$	n = Life of the machine in years, and
	i = Interest rate, compounded annually
Economic Life of an Asset	Capital Recovery expenses + EUAC of operating and maintenance expenses

Depreciation	
i. Straight Line Depreciation Annual Depreciation = $D_n = \frac{Purchase\ Price-Salvage\ Value}{Years\ of\ useful\ life}$ Book Value = $I - (n * D_n)$	$D_n =$ Annual depreciation amount I = Purchase price of the equipment n = Number of Years
The depreciation rate (α) is given by $\alpha = 1 - \left(\frac{B_n}{I}\right)^{\frac{1}{n}}$ The depreciation charge for any year 'n' is given by, $D_n = \alpha I (1 - \alpha)^{n-1}$. The book value is given by, $B_n = I (1 - \alpha)^n$.	 a = Annual rate of Depreciation (%) B_n = Book value of the equipment I = Purchase price of the equipment n = Number of Years D_n = Depreciation charge for any year "n".
<i>iii.</i> Double Decline Balance Depreciation Annual rate of depreciation is, $\propto = 2$ / years of useful life or $\propto = \frac{2}{n}$	∝ = Annual rate of Depreciation (%) n = Number of Years

Ratio Analysis Types of Financial Ratios *I. Liquidity Ratios*

Current Ratio

Current Ratio= Current assets/current liabilities

Acid test ratio (quick ratio)

Acid test ratio (quick ratio) = (current assets - inventories)/ liabilities

II. Financial Leverage Ratio

Structural Ratio

Debt to equity ratios

Debt to equity ratios = total debt or long term debt/shareholder's equity

Debt to total asset

Debt to total asset = total debt/ total asset

Coverage ratio

Interest coverage ratio

Interest coverage ratio = Earnings before Interest & Taxes/ Interest Expense

III. <u>Turnover Ratios</u>

1. Inventory turnover

Inventory turnover = Cost of goods sold /Average inventory

Costs of goods sold = Opening stock + Manufacturing cost including purchases -

Closing stock

Or cost of goods sold= (100- %gross profit) sales

Avg. Inventory = Avg. of monthly inventory for calendar year considered

= (opening stock + closing stock)/2

In the absence of data, inventory turnover = Sales/ Closing Inventory

2. Debtor's turnover ratio

Debtors turnover = Net Credit sales/ (Avg. accounts receivable (or avg. debtors)

Average debtors= (opening balance debtors + closing balance debtors)/ 2

Closing balance= Current assets - Inventories - Cash

In the absence of data, Debtors turnover = Total sales/ (debtors + bills receivable)

Average collection period

Another method of measuring liquidity of firm's debtors is average collection period.

(HUM 3051)

Page 10 of 14

Avg. accounts receivable/avg. daily credit sales

OR (Avg. debtor's /credit sales) x 360 days

SIMILARLY, THERE IS CREDITORS TURNOVER RATIO

3. Asset Turnover

Fixed Asset Turnover = costs of goods sold/ avg. fixed assets

Total Asset Turnover = costs of goods sold/ avg. total assets

IV. Profitability Ratios

Profit margin ratio

Indication of relationship between profits and sales.

Two types,

- 1. Gross profit margin = (gross profit /sales) x100
- 2. Net profit margin
 - a. Net profit margin (before tax) = (EBIT /Sales)
 - b. Net profit margin (after tax) = EAT/ Sales

Return on Investment

Profits of firm to its investment

Return on Assets

Return on Assets	= Net profit af	ter tax/Avg. total assets
------------------	-----------------	---------------------------

= (EAT + Interest - Tax Advantage on Interest)/ Assets

Return on equity

Return on equity = Net profit after tax/ avg. total shareholders' equity

10%				Compound I	nterest Factors			
	Single Pa	yment		Uniform Pa	yment Series		Arithmeti	c Gradient
n	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
1	1.100	.9091	1.0000	1.1000	1.000	0.909	0	0
2	1.210	.8264	.4762	.5762	2.100	1.736	0.476	0.826
3	1.331	.7513	.3021	.4021	3.310	2.487	0.937	2.329
4	1.464	.6830	.2155	.3155	4.641	3.170	1.381	4.378
5	1.611	.6209	.1638	.2638	6.105	3.791	1.810	6.862
6	1.772	.5645	.1296	.2296	7.716	4.355	2.224	9.684
7	1.949	.5132	.1054	.2054	9.487	4.868	2.622	12.763
8	2.144	.4665	.0874	.1874	11.436	5.335	3.004	16.029
9	2.358	.4241	.0736	.1736	13.579	5.759	3.372	19.421
10	2.594	.3855	.0627	.1627	15.937	6.145	3.725	22.891
11	2.853	.3505	.0540	.1540	18.531	6.495	4.064	26.396
12	3.138	.3186	.0468	.1468	21.384	6.814	4.388	29.901
13	3.452	.2897	.0408	.1408	24.523	7.103	4.699	33.377
14	3.797	.2633	.0357	.1357	27.975	7.367	4.996	36.801
15	4.177	.2394	.0315	.1315	31.772	7.606	5.279	40.152
16	4.595	.2176	.0278	.1278	35.950	7.824	5.549	43.416
17	5.054	.1978	.0247	.1247	40.545	8.022	5.807	46.582
18	5.560	.1799	.0219	.1219	45.599	8.201	6.053	49.640
19	6.116	.1635	.0195	.1195	51.159	8.365	6.286	52.583
20	6.728	.1486	.0175	.1175	57.275	8.514	6.508	55.407
21	7.400	.1351	.0156	.1156	64.003	8.649	6.719	58.110
22	8.140	.1228	.0140	.1140	71.403	8.772	6.919	60.689
23	8.954	.1117	.0126	.1126	79.543	8.883	7.108	63.146
24	9.850	.1015	.0113	.1113	88.497	8.985	7.288	65.481
25	10.835	.0923	.0102	.1102	98.347	9.077	7.458	67.696
26	11.918	.0839	.00916	.1092	109.182	9.161	7.619	69.794
27	13.110	.0763	.00826	.1083	121.100	9.237	7.770	71.777
28	14.421	.0693	.00745	.1075	134.210	9.307	7.914	73.650
29	15.863	.0630	.00673	.1067	148.631	9.370	8.049	75.415
30	17.449	.0573	.00608	.1061	164.494	9.427	8.176	77.077
31	19.194	.0521	.00550	.1055	181.944	9.479	8.296	78.640
32	21.114	.0474	.00497	.1050	201.138	9.526	8,409	80.108
33	23.225	.0431	.00450	.1045	222.252	9.569	8.515	81.486

5%	Compound Interest Factors										
	Single Pa	yment		Uniform Pa	yment Series		Arithmeti				
n	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			
1	1.050	.9524	1.0000	1.0500	1.000	0.952	0	0	1		
2	1.102	.9070	.4878	.5378	2.050	1.859	0.488	0.907	2		
3	1.158	.8638	.3172	.3672	3.152	2.723	0.967	2.635	3		
4	1.216	.8227	.2320	.2820	4.310	3.546	1.439	5.103	4		
5	1.276	.7835	.1810	.2310	5.526	4.329	1.902	8.237	5		
6	1.340	.7462	.1470	.1970	6.802	5.076	2.358	11.968	6		
7	1.407	.7107	.1228	.1728	8.142	5.786	2.805	16.232	7		
8	1.477	.6768	.1047	.1547	9.549	6.463	3.244	20.970	8		
9	1.551	.6446	.0907	.1407	11.027	7.108	3.676	26.127	9		
10	1.629	.6139	.0795	.1295	12.578	7.722	4.099	31.652	10		
11	1.710	.5847	.0704	.1204	14.207	8.306	4.514	37.499	11		
12	1.796	.5568	.0628	.1128	15.917	8.863	4.922	43.624	12		
13	1.886	.5303	.0565	.1065	17.713	9.394	5.321	49.988	13		

12%				Compound I	nterest Factors			
3	Single Pa	yment	and the set	Untform Pa	yment Serles		Arithmeti	ic Gradient
n	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
1	1,120	.8929	1.0000	1,1200	1.000	0.893	0	0
234	1.254 1.405 1.574	.7972 .7118 .6355	4717 2963 2092	.5917 .4163 .3292	2.120 3.374 4.779	1.690 2.402 3.037	0.472 0.925 1.359	0.797 2.221 4.127
	1.762	36/4	.1574	.2114	6.333	3.605	1.775	6.597
67	1.974 2.211	.5066 .4523	.1232	.2432 .2191	8.115 10.089	4.111 4.564	2.172 2.551	8.930 11.644
8 9 10	2.476 2.773 3.106	.4039 .3606 .3220	.0813 .0677 .0570	.2013 .1877 .1770	12.300 14.776 17.549	4.968 5.328 5.650	2.913 3.257 3.585	14.471 17.356 20.254
11	3.479	2875	.0484	.1684	20.655	5.938	3.895	23.129
12 13	3.896 4.363	2567 2292	.0414 .0357	.1614 .1557	24.133 28.029	6.194 6.424	4.190 4.468	25.952 28.702
14	4.887 5.474	.2046	.0309	.1509	32.393 37.280	6.628 6.811	4.732 4.980	31.362 33.920
16 17 18	6.130 6.866 7.690	.1631 .1456 .1300	.0234 .0205 .0179	.1434 .1405 .1379	42.753 48.884 55.750	6.974 7.120 7.250	5.215 5.435 5.643	36.367 38.697 40.908

896	Compound Interest Factors										
	Single Payment		-	Uniform Pa		Arithmetic 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			
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	1.360	.7350	.2219	_3019	4.506	3.312	1.404	4.650			
5	1.469	.6806	.1705	.2505	5.867	3.993	1.846	7.372			
6	1.587	.6302	.1363	.2163	7.336	4.623	2.276	10.523			
7	1.714	.5835	.1121	.1921	8.923	5.206	2.694	14.024			
8	1.851	.5403	.0940	.1740	10.637	5.747	3.099	17.806			
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			
11	2.332	.4289	.0601	.1401	16.645	7.139	4.240	30.266			
12	2.518	.3971	.0527	.1327	18.977	7.536	4.596	34.634			
13	2.720	_3677	.0465	.1265	21.495	7.904	4.940	39.046			
14	2.937	.3405	.0413	.1213	24.215	8.244	5.273	43.472			
15	3.172	.3152	.0368	.1168	27.152	8.559	5.594	47.886			
16	3.426	.2919	.0330	.1130	30.324	8.851	5.905	52.264			
17	3.700	.2703	.0296	.1096	33,750	9.122	6.204	56.588			
18	3.996	.2502	.0267	.1067	37.450	9.372	6.492	60.843			
19	4.316	.2317	.0241	.1041	41.446	9.604	6.770	65.013			
20	4.661	.2145	.0219	.1019	45.762	9.818	7.037	69.090			
21	5.034	.1987	.0198	.0998	50.423	10.017	7.294	73.063			
22	5.437	.1839	.0180	.0980	55.457	10.201	7.541	76.926			
23	5.871	.1703	.0164	.0964	60.893	10.371	7.779	80.673			
24	6.341	.1577	.0150	.0950	66.765	10.529	8.007	84.300			
25	6.848	.1460	.0137	.0937	73.106	10.675	8.225	87.804			

15%				Compound I	nterest Factors				15%
	Single Pa	yment		Uniform Pa	yment Series		Arithmeti	c Gradient	
n	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	1.150	.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