

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENGAJIAN POLITEKNIK
KEMENTERIAN PENDIDIKAN MALAYSIA**

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI 2 : 2016/2017

BCT 6193: ENGINEERING ECONOMICS

TARIKH : 09 JUN 2017

MASA : 9.00 AM – 12.00 PM (3 JAM)

Kertas ini mengandungi **TIGA BELAS (13)** halaman bercetak.

JAWAB SEMUA SOALAN

Dokumen sokongan yang disertakan : Lampiran

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi EMPAT (4) soalan berstruktur. Jawab semua soalan.

QUESTION 1**SOALAN 1**

CLO1
C2

- (a) Discuss the importance of identifying alternatives in the engineering economic process?

Bincangkan kepentingan mengenalpasti alternatif di dalam proses ekonomi kejuruteraan?

[5 marks]

[5 markah]

CLO1
C3

- (b) The following table shows the demand and supply schedules for the market for brooms during a month. Sketch a demand and supply graph to represent the data from the table. On your graphs, show the equilibrium price equates the quantity demanded and the quantity supplied in a market.

Jadual berikut menunjukkan permintaan dan penawaran untuk pasaran penyapu dalam sebulan. Lakarkan graf permintaan dan penawaran untuk mewakili data dari jadual. Pada graf anda, tunjukkan keseimbangan harga yang menyamakan kuantiti yang diminta dan kuantiti yang dibekalkan di pasaran.

Price / Harga (RM/ Broom)	Quantity Demanded/ Kuantiti Permintaan (per month)	Quantity Supplied / Kuantiti Dibekalkan (per month)
6	10	70
5	20	60
4	30	50
3	40	40
2	50	30
1	60	20

[8 marks]

[8 markah]

CLO1
C4

- (c) Indira Industries is a major producer of dampers used in the Air Handling Unit (AHU) industry to divert a flow of gas from one outlet to another, thus improving the indoor quality to acceptable levels for human environments. Normal production level is 36 units damper systems per month, but due to significantly improved economic conditions in Asia, production is at 50 units per month. The following information is available:

Fixed costs (FC) = RM 180 000 per month

Variable cost (VC) per unit= RM 3,000

Total Revenue (TR) per unit= RM 8,000

Contrast the production level of 50 units and 36 units per month with the current breakeven point and determine the current profit level per month for the damper?

Perusahaan Indira adalah pengeluar utama damper yang digunakan di dalam Unit Pengendalian Udara (AHU) untuk mengalihkan aliran gas dari satu outlet ke bahagian lain, sekali gus meningkatkan kualiti udara dalaman dalam tahap yang boleh diterima bagi persekitaran manusia. Tahap pengeluaran biasa ialah 36 unit damper sebulan, tetapi disebabkan oleh keadaan ekonomi bertambah baik di Asia, pengeluaran adalah pada 50 unit setiap bulan. Maklumat berikut boleh didapati:

Kos Tetap (FC) = RM 180 000 / bulan

Kos Pelbagai (VC) /unit= RM 3,000

Jumlah Pendapatan (TR) / unit= RM 8,000

Bezakan tahap pengeluaran 50 dan 36 unit sebulan dengan titik pulang modal semasa dan tentukan tahap keuntungan semasa sebulan bagi peredam tersebut?

[12 marks]

[12 markah]

QUESTION 2
SOALAN 2CLO2
C3

- (a) i. A solid waste disposal company borrowed money at an interest rate of 10% compounded annually to purchase new haulers and other equipment needed at the company owned landfill site. If the company got the loan 2 years ago and paid it off with a single payment of RM 460,000, what was the principal amount, P of the loan?

Sebuah syarikat pelupusan sisa pepejal meminjam wang pada kadar faedah 10% kompaunan tahunan untuk membeli penarik baru dan peralatan lain yang diperlukan di syarikat milik tapak pelupusan. Jika syarikat itu mendapat pinjaman 2 tahun yang lalu dan dibayar dengan pembayaran tunggal sebanyak RM 460,000, apakah jumlah asal, P pinjaman tersebut?

[5 marks]

[5 markah]

- ii. You are considering investing RM 1,000 at an interest rate of 6% compounded quarterly for five years or investing the RM 1,000 at 8% per year simple interest for five years. Compare the amount earned after five years and which option is better?

Anda sedang mempertimbangkan untuk melabur RM 1,000 pada kadar faedah 6% kompaunan sukuan selama lima tahun atau melabur RM 1,000 pada 8% faedah mudah setiap tahun selama lima tahun. Bandingkan jumlah yang diperolehi selepas lima tahun dan pilihan manakah yang lebih baik?

[6 marks]

[6 markah]

CLO2
C4

- (b) Use the interest and annuity tables for discrete compounding to answer the problems below. Show your calculation in your answer.

Guna jadual guna faktor faedah kompaun bagi aliran tunai diskret bagi menjawab permasalahan di bawah. Tunjukkan jalan pengiraan di dalam jawapan anda.

- i) Berjaya Malaysian Cement factory will require an investment of RM 200 million to construct. Delays beyond the anticipated implementation year of 2017 will require additional money to construct the factory. Assuming with annual compounded interest rate at 10%, construct a cash flow diagram and determine the following for the board of directors of the Berjaya Company that plans to develop the plant:

CLO2
C5

- a) The equivalent investment needed if the plant is built in 2020.
- b) The equivalent investment needed if the plant had been constructed in the year 2013.

Berjaya kilang simen Malaysia akan memerlukan pelaburan sebanyak RM 200 juta untuk penubuhannya. Kelewatan selepas tahun jangkaan pelaksanaan 2017 akan memerlukan wang tambahan untuk membina kilang. Dengan kadar faedah 10% kompaunan tahunan, bina gambarajah aliran tunai dan tentukan yang berikut untuk lembaga pengarah syarikat Berjaya merancang membangunkan kilang tersebut:

- a) *Pelaburan setara yang diperlukan jika kilang itu dibina pada tahun 2020.*
- b) *Pelaburan setara yang diperlukan jika kilang telah dibina pada tahun 2013.*

[6 marks]

[6 markah]

- (ii) Referring to question 2b(i), with investment of RM 200 million, Berjaya Malaysian Cement factory can generate RM 50 million per year in revenue for 5 years starting at end of year 1 with interest rate of 10% per year. You have been asked by the director of the company to evaluate the following situations:

CLO2
C6

- a) The equivalent future worth of the estimated revenues after 5 years at an interest rate of 10% per year?
- b) Assume that, due to the economic downturn, the director predicts that the company will earn only 5% per year on its money, not the previously anticipated 10% per year. What is the required amount of the annual revenue over the 5 years period to be economically equivalent to the amount calculated in a)?

Merujuk kepada soalan 2b (i), dengan pelaburan sebanyak RM 200 juta, Berjaya kilang simen Malaysia boleh menjana RM 50 juta setiap tahun untuk pendapatan selama 5 tahun bermula pada akhir tahun pertama dengan kadar faedah 10% setahun. Anda telah diminta oleh pengarah syarikat itu untuk menilai keadaan seperti berikut:

- a) Nilai setara masa depan daripada jangkaan pendapatan selepas 5 tahun pada kadar faedah 10% setahun?*
- b) Andaikan bahawa, disebabkan kelembapan ekonomi, pengarah meramalkan bahawa syarikat itu akan mendapat hanya 5% setahun ke atas wang, tidak seperti sebelum ini dijangka 10% setahun. Apakah jumlah pendapatan tahunan yang diperlukan sepanjang tempoh 5 tahun untuk menjadikan ekonomi setara dengan jumlah yang dikira dalam a)?*

[8 marks]

[8 markah]

QUESTION 3
SOALAN 3

Ekawarna Company Sdn Bhd is planning a hydroelectric project for Cameron Highland. Besides producing electric power, this project will also provide flood control, irrigation and recreationnal benefits. Using an interest rate of 10% per year and project life for 30 years.

Syarikat Ekawarna Sdn Bhd merancang projek hidroelektrik untuk Bandaraya Ipoh. Selain menghasilkan tenaga elektrik, projek ini akan menyediakan kawalan banjir, pengairan dan faedah rekreasi. Menggunakan kadar faedah 10% setahun dan jangka hayat empangan ialah 30 tahun,

Information / Maklumat	Alternative P Alternatif P	Alternative Q Alternatif Q
Initial Cost / Kos Permulaan	RM 2 mil	RM 1.6 mil
Annual Maintenance Cost / Kos Penyelenggaraan Tahunan	RM 63,000	RM 55,000
Annual Consumer Benefit / Faedah Pengguna Tahunan	RM 345,650	RM 400,000
Minor Repair / Pengubahsuaian Kecil	Every 5 years	Every 10 years
Minor Repair Cost / Kos Pengubahsuaian Kecil	RM200,000	RM180,000
Salvage / Nilai baki selepas 30 tahun	RM 500,000	RM 400,000

CLO2
C4

- a) Analyze the best alternative using the NPV method. [7 marks]
Analisa alternative terbaik dengan kaedah NPV. [7 markah]

CLO2
C4

- b) Determine whether the dam would benefit the community by using the conventional B/C ratio. [8 marks]
Tentukan sama ada pembinaan empangan ini menguntungkan masyarakat atau tidak dengan menggunakan kaedah nisbah B/C konvensional [8markah]

- c) Dr Aishah is considering whether to maintain using the existing car (Defender) or to replace it with a new one (Challenger) that is more productive. Use the cash flow method for replacement analysis to evaluate whether the existing car needs to be replaced with new car based on an interest rate at 4% per annum. The relevant cost information for both the equipment is given as follows :

Dr. Aishah membuat kajian sama ada perlu mengekalkan penggunaan kereta sedia ada (Defender) atau perlu menggantikannya dengan kereta baru (Challenger) yang lebih produktif. Gunakan kaedah aliran tunai bagi analisis penggantian untuk menentukan sama ada kereta sedia ada perlu diganti dengan kereta baru menggunakan kadar faedah 4% setahun. Maklumat kos yang relevan bagi kedua-dua peralatan tersebut diberi seperti berikut:

Details/ Butiran	Defender	Challenger
Initial cost, RM / Kos permulaan, RM	-	80,000
Trade in value, RM/ Nilai tukar beli, RM	-	40 000
Annual operating cost, RM/ Kos kendalian tahunan, RM	7 000	2 000
Insurans / Insuran	2000	1800
Useful life, year/ Jangka hayat, tahun	7	7
Salvage value/ Nilai sisa	0	30 000

[10 marks]

[10 markah]

QUESTION 4
SOALAN 4CLO1
C2

- (a) Explain **THREE (3)** effects of inflation in economy.

*Huraikan **TIGA (3)** kesan inflasi terhadap ekonomi.*

[6 marks]

[6 markah]

CLO1
C4

- (b) On April 1, 2010, Ismail Company purchased a vehicle at the cost of RM150,000. This vehicle is estimated to have 6 year useful life. At the end of the sixth year, the salvage value (residual value) is estimated to be RM28,000. Compare the annual depreciation, accumulated depreciation and book value in a simple table for six years by using straight line method.

Pada 1 April, 2010, Syarikat Ismail telah membeli sebuah kenderaan pada kos RM150,000. Kenderaan ini dianggarkan dapat digunakan sehingga enam tahun.. Pada akhir tahun ke enam, nilai sisa (nilai akhir) yang dianggarkan adalah RM28,000. Bezakan susut nilai tahunan, susut nilai terkumpul dan nilai buku dalam jadual untuk tempoh enam tahun dengan kaedah susut nilai garis lurus.

[7 marks]

[7 markah]

CLO1
C5

- c) Construct a table for a 3-year project to find the After Tax Cash Flow (ATCF) and calculate the Present Worth (PW) of ATCF using the details below :

- Purchase price RM 600 000
- Re-sale (salvage) RM 200 000
- Income/Year RM 400 000
- Expenses/Year RM 100 000
- Asset is declining balance type, with depreciation rate of 20%.
- Tax rate 40%
- MARR (after tax) 8.0%

Give your opinion on the PW of ATCF final result at the end of the third year.

Sediakan jadual bagi pengiraan Aliran Tunai Selepas Cukai (ATSC) untuk tempoh tiga tahun dan kira Nilai Semasa (PW) bagi ATSC menggunakan maklumat berikut:-

- *Harga belian RM 600 000*
- *Jualan Semula (nilai akhir) RM 200 000*
- *Pendapatan/setahun RM 400 000*
- *Perbelanjaan/setahun RM 100 000*
- *Aset dinilai menggunakan kaedah baki berkurangan pada kadar susut nilai 20% setahun.*
- *Kadar cukai 40%*
- *MARR (selepas cukai) 8.0%*

Berikan pendapat anda terhadap keputusan akhir Nilai Semasa (PW) ATSC pada tahun ketiga.

[12 marks]

[12 markah]

APPENDIX 1: COMPOUND INTEREST TABLES

4% Compound Interest Factors 4%									
n	Single Payment		Uniform Payment Series				Arithmetic Gradient		n
	Compound Amount Factor Find F Given P	Present Worth Factor Find P Given F	Sinking Fund Factor Find A Given F	Capital Recovery Factor Find F Given A	Compound Amount Factor Find F Given A	Present Worth Factor Find P Given A	Gradient Uniform Series Find A Given G	Gradient Present Worth Find P Given G	
	F/P	P/F	A/F	A/P	F/A	P/A	A/G	P/G	
1	1.040	.9615	1.0000	1.0400	1.000	0.962	0	0	1
2	1.082	.9246	.4902	.5302	2.040	1.886	0.490	0.925	2
3	1.125	.8890	.3203	.3603	3.122	2.775	0.974	2.702	3
4	1.170	.8548	.2355	.2755	4.246	3.630	1.451	5.267	4
5	1.217	.8219	.1846	.2246	5.416	4.452	1.922	8.555	5
6	1.265	.7903	.1508	.1908	6.633	5.242	2.386	12.506	6
7	1.316	.7599	.1266	.1666	7.898	6.002	2.843	17.066	7
8	1.369	.7307	.1085	.1485	9.214	6.733	3.294	22.180	8
9	1.423	.7026	.0945	.1345	10.583	7.435	3.739	27.801	9
10	1.480	.6756	.0833	.1233	12.006	8.111	4.177	33.881	10
11	1.539	.6496	.0741	.1141	13.486	8.760	4.609	40.377	11
12	1.601	.6246	.0666	.1066	15.026	9.385	5.034	47.248	12
13	1.665	.6006	.0601	.1001	16.627	9.986	5.453	54.454	13
14	1.732	.5775	.0547	.0947	18.292	10.563	5.866	61.962	14
15	1.801	.5553	.0499	.0899	20.024	11.118	6.272	69.735	15
16	1.873	.5339	.0458	.0858	21.825	11.652	6.672	77.744	16
17	1.948	.5134	.0422	.0822	23.697	12.166	7.066	85.958	17
18	2.026	.4936	.0390	.0790	25.645	12.659	7.453	94.350	18
19	2.107	.4746	.0361	.0761	27.671	13.134	7.834	102.893	19
20	2.191	.4564	.0336	.0736	29.778	13.590	8.209	111.564	20
21	2.279	.4388	.0313	.0713	31.969	14.029	8.578	120.341	21
22	2.370	.4220	.0292	.0692	34.248	14.451	8.941	129.202	22
23	2.465	.4057	.0273	.0673	36.618	14.857	9.297	138.128	23
24	2.563	.3901	.0256	.0656	39.083	15.247	9.648	147.101	24
25	2.666	.3751	.0240	.0640	41.646	15.622	9.993	156.104	25
26	2.772	.3607	.0226	.0626	44.312	15.983	10.331	165.121	26
27	2.883	.3468	.0212	.0612	47.084	16.330	10.664	174.138	27
28	2.999	.3335	.0200	.0600	49.968	16.663	10.991	183.142	28
29	3.119	.3207	.0189	.0589	52.966	16.984	11.312	192.120	29
30	3.243	.3083	.0178	.0578	56.085	17.292	11.627	201.062	30
31	3.373	.2965	.0169	.0569	59.328	17.588	11.937	209.955	31
32	3.508	.2851	.0159	.0559	62.701	17.874	12.241	218.792	32
33	3.648	.2741	.0151	.0551	66.209	18.148	12.540	227.563	33
34	3.794	.2636	.0143	.0543	69.858	18.411	12.832	236.260	34
35	3.946	.2534	.0136	.0536	73.652	18.665	13.120	244.876	35
40	4.801	.2083	.0105	.0505	95.025	19.793	14.476	286.530	40
45	5.841	.1712	.00826	.0483	121.029	20.720	15.705	325.402	45
50	7.107	.1407	.00655	.0466	152.667	21.482	16.812	361.163	50
55	8.646	.1157	.00523	.0452	191.159	22.109	17.807	393.689	55
60	10.520	.0951	.00420	.0442	237.990	22.623	18.697	422.996	60
65	12.799	.0781	.00339	.0434	294.968	23.047	19.491	449.201	65
70	15.572	.0642	.00275	.0427	364.290	23.395	20.196	472.479	70
75	18.945	.0528	.00223	.0422	448.630	23.680	20.821	493.041	75
80	23.050	.0434	.00181	.0418	551.244	23.915	21.372	511.116	80
85	28.044	.0357	.00148	.0415	676.089	24.109	21.857	526.938	85
90	34.119	.0293	.00121	.0412	827.981	24.267	22.283	540.737	90
95	41.511	.0241	.00099	.0410	1012.8	24.398	22.655	552.730	95
100	50.505	.0198	.00081	.0408	1237.6	24.505	22.980	563.125	100

Compound Interest Factors									
8%									
n	Single Payment		Uniform Payment Series				Arithmetic Gradient		n
	Compound	Present	Sinking	Capital	Compound	Present	Gradient	Gradient	
	Amount	Worth	Fund	Recovery	Amount	Worth	Uniform	Present	
	Factor Find F Given P F/P	Factor Find P Given F P/F	Factor Find A Given F A/F	Factor Find A Given P A/P	Factor Find F Given A F/A	Factor Find P Given A P/A	Series Find A Given G A/G	Worth Find P Given G P/G	
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
11	2.332	.4289	.0601	.1401	16.643	7.139	4.240	30.266	11
12	2.518	.3971	.0527	.1327	18.977	7.536	4.596	34.634	12
13	2.720	.3677	.0465	.1265	21.495	7.904	4.940	39.046	13
14	2.937	.3405	.0413	.1213	24.215	8.244	5.273	43.472	14
15	3.172	.3152	.0368	.1168	27.152	8.559	5.594	47.886	15
16	3.426	.2919	.0330	.1130	30.324	8.851	5.905	52.264	16
17	3.700	.2703	.0296	.1096	33.750	9.122	6.204	56.588	17
18	3.996	.2502	.0267	.1067	37.450	9.372	6.492	60.843	18
19	4.316	.2317	.0241	.1041	41.446	9.604	6.770	65.013	19
20	4.661	.2145	.0219	.1019	45.762	9.818	7.037	69.090	20
21	5.034	.1987	.0198	.0998	50.423	10.017	7.294	73.063	21
22	5.437	.1839	.0180	.0980	55.457	10.201	7.541	76.926	22
23	5.871	.1703	.0164	.0964	60.893	10.371	7.779	80.673	23
24	6.341	.1577	.0150	.0950	66.765	10.529	8.007	84.300	24
25	6.848	.1460	.0137	.0937	73.106	10.675	8.225	87.804	25
26	7.396	.1352	.0125	.0925	79.954	10.810	8.435	91.184	26
27	7.988	.1252	.0114	.0914	87.351	10.935	8.636	94.439	27
28	8.627	.1159	.0105	.0905	95.339	11.051	8.829	97.569	28
29	9.317	.1073	.00962	.0896	103.966	11.158	9.013	100.574	29
30	10.063	.0994	.00883	.0888	113.283	11.258	9.190	103.456	30
31	10.868	.0920	.00811	.0881	123.346	11.350	9.358	106.216	31
32	11.737	.0852	.00745	.0875	134.214	11.435	9.520	108.858	32
33	12.676	.0789	.00685	.0869	145.951	11.514	9.674	111.382	33
34	13.690	.0730	.00630	.0863	158.627	11.587	9.821	113.792	34
35	14.785	.0676	.00580	.0858	172.317	11.655	9.961	116.092	35
40	21.725	.0460	.00386	.0839	259.057	11.925	10.570	126.042	40
45	31.920	.0313	.00259	.0826	386.506	12.108	11.045	133.733	45
50	46.902	.0213	.00174	.0817	573.771	12.233	11.411	139.593	50
55	68.914	.0145	.00118	.0812	848.925	12.319	11.690	144.006	55
60	101.257	.00988	.00080	.0808	1253.2	12.377	11.902	147.300	60
65	148.780	.00672	.00054	.0805	1847.3	12.416	12.060	149.739	65
70	218.607	.00457	.00037	.0804	2720.1	12.443	12.178	151.533	70
75	321.205	.00311	.00025	.0802	4002.6	12.461	12.266	152.845	75
80	471.956	.00212	.00017	.0802	5887.0	12.474	12.330	153.800	80
85	693.458	.00144	.00012	.0801	8655.7	12.482	12.377	154.492	85
90	1018.9	.00098	.00008	.0801	12724.0	12.488	12.412	154.993	90
95	1497.1	.00067	.00005	.0801	18701.6	12.492	12.437	155.352	95
100	2199.8	.00045	.00004	.0800	27484.6	12.494	12.455	155.611	100

10% Compound Interest Factors 10%									
n	Single Payment		Uniform Payment Series				Arithmetic 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	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
26	11.918	.0839	.00916	.1092	109.182	9.161	7.619	69.794	26
27	13.110	.0763	.00826	.1083	121.100	9.237	7.770	71.777	27
28	14.421	.0693	.00745	.1075	134.210	9.307	7.914	73.650	28
29	15.863	.0630	.00673	.1067	148.631	9.370	8.049	75.415	29
30	17.449	.0573	.00608	.1061	164.494	9.427	8.176	77.077	30
31	19.194	.0521	.00550	.1055	181.944	9.479	8.296	78.640	31
32	21.114	.0474	.00497	.1050	201.138	9.526	8.409	80.108	32
33	23.225	.0431	.00450	.1045	222.252	9.569	8.515	81.486	33
34	25.548	.0391	.00407	.1041	245.477	9.609	8.615	82.777	34
35	28.102	.0356	.00369	.1037	271.025	9.644	8.709	83.987	35
40	45.259	.0221	.00226	.1023	442.593	9.779	9.096	88.953	40
45	72.891	.0137	.00139	.1014	718.905	9.863	9.374	92.454	45
50	117.391	.00852	.00086	.1009	1163.9	9.915	9.570	94.889	50
55	189.059	.00529	.00053	.1005	1880.6	9.947	9.708	96.562	55
60	304.482	.00328	.00033	.1003	3034.8	9.967	9.802	97.701	60
65	490.371	.00204	.00020	.1002	4893.7	9.980	9.867	98.471	65
70	789.748	.00127	.00013	.1001	7887.5	9.987	9.911	98.987	70
75	1271.9	.00079	.00008	.1001	12709.0	9.992	9.941	99.332	75
80	2048.4	.00049	.00005	.1000	20474.0	9.995	9.961	99.561	80
85	3299.0	.00030	.00003	.1000	32979.7	9.997	9.974	99.712	85
90	5313.0	.00019	.00002	.1000	53120.3	9.998	9.983	99.812	90
95	8556.7	.00012	.00001	.1000	85556.9	9.999	9.989	99.877	95
100	13780.6	.00007	.00001	.1000	137796.3	9.999	9.993	99.920	100