

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

Title of Paper: Project Evaluation

Course Code: Econ 305

Time Allowed: Three (3) Hours

Instructions:

1. Answer Four (4) Questions. Two From Section A and Two from Section B
2. All Questions Carry Equal Marks of 25 Each.
3. The Relevant Annuity Tables are supplied

Do Not Open This Question Paper Until The Invigilator has Granted Permission.

SECTION A

Question 1

- a) What arguments would you advance against the suggestion that the government should be risk neutral when considering investments? [10 marks]
- b) Outline the Arrow-Lind theory on risk spreading? [8 marks]
- c) What criticisms are advanced against the Arrow-Lind theory on risk spreading? [7 marks]

Question 2

- a) On the basis of its characteristics, define a project. [7 marks]
- b) Outline the steps involved in a project life cycle. [8 marks]
- c) What are the sources of information on possible projects, and what information is required for project identification? [10 marks]

Question 3

Write explanatory notes on any five of the following

- a) Hicks- Kaldor compensation variation principle
- b) Advantages of the payback period method
- c) Problems associated with the Internal Rate of Return
- d) Scitovsky's paradox
- e) Scenario Planning
- f) Formative and Summative evaluation
- g) Unilateral and reciprocal externality

[5 marks each]

Question 4

a) Why are undiscounted measures of project worth considered deficient in informing project appraisal and selection? [5 marks]

b) Cobb-Web Investments is considering making an investment which has the following cash flows:

<u>Year</u>	<u>Casflow (E)</u>
0	(9120)
1	1000
2	5000
3	10000

You have decided to use the net present value approach to ascertain the desirability of the investment. You have also been informed that the company's cost of capital is 10%

i) is the investment viable? Show your workings clearly. [8 marks]

ii) How much in excess of the indicated cost of the investment could the company afford to pay for the investment and be no worse off financially? [4 marks]

c) A company is interested in an investment which would require a capital outlay of E6000 immediately and is expected to produce net cash inflows of E15 000 a year for the first four years and E3000 in the fifth year. Also assume that the management of the company has an 8% acceptable rate of return investment criteria. Would you advise the company to invest in the project? [8 marks]

SECTION B

Question 5

a) Briefly describe four adjustments to market prices that are necessary to derive social values. [4 marks]

b) "More often than not, market prices do not reflect the true scarcity values or marginal productivity of resources. Therefore, one can conclude

that market prices are useless” Do you agree with this statement? Why or why not? [4 marks]

c) “If total benefits to whomsoever they accrue exceed, by some suitable margin, total costs upon whomsoever they fall, then a project is deemed worthwhile”. What two basic objections would you forward against this philosophy? [5 marks]

d) Explain the “Scitovsky Paradox”. [4 marks]

e) Explain four possible justifications for disregarding distribution effects of costs and benefits in project appraisal. [8 marks]

Question 6

a) What are the major aims of evaluation? [5 marks]

b) What is the Critical Path Method (CPM)? Outline the major steps involved in the construction of a network diagram [10 marks]

c) Consider a project for an integrated computer program that constitutes the following activities, their precedence, and their completion times:

ACTIVITY	DESCRIPTION	REQUIRED PREDECESSOR	DURATION
A	Product Design	none	5 months
B	Market Research	none	1
C	Product Analysis	A	2
D	Product Model	A	3
E	Sales Brochure	A	2
F	Cost Analysis	C	3
G	Product Testing	D	4
H	Sales Training	B, E	2
I	Pricing	H	1
J	Project Report	F, G, I	1

Construct the network diagram for this project. Identify all possible paths and indicate the critical path and its duration. [10 marks]

Question 7

- a) One way of incorporating risk in project analysis is through sensitivity analysis. Explain the concept, outlining clearly how it is applied. [8 marks]
- b) Discuss any four areas to which projects are normally sensitive. [8 marks]
- c) What are the weaknesses of this technique? [4 marks]
- d) Would sensitivity analysis guide decision making with regard to acceptability or otherwise of a project? explain. [5 marks]

Question 8

- a) Compare and contrast the approach of UNIDO with that of OECD approach to project evaluation in developing economies. [12 marks]
- b) Describe the four methods of valuing life and health which E.J Mishan considers objectionable and inappropriate. Indicate grounds on which each method is deemed inappropriate. [13 marks]

TABLES

Table I
Compound Interest Table
 $Y = (1 + i)^n$

Amount at End of Year	Interest Rate						
	1%	4%	4.5%	5%	6%	8%	10%
1	1.0100	1.0400	1.0450	1.0500	1.0600	1.0800	1.1000
2	1.0201	1.0816	1.0920	1.1025	1.1236	1.1664	1.2100
3	1.0303	1.1249	1.1411	1.1576	1.1910	1.2597	1.3310
4	1.0406	1.1699	1.1925	1.2155	1.2625	1.3605	1.4641
5	1.0510	1.2166	1.2462	1.2763	1.3382	1.4693	1.6105
6	1.0615	1.2653	1.3023	1.3401	1.4185	1.5869	1.7716
7	1.0721	1.3159	1.3609	1.4071	1.5036	1.7138	1.9487
8	1.0829	1.3686	1.4221	1.4775	1.5938	1.8509	2.1436
9	1.0937	1.4233	1.4861	1.5513	1.6895	1.9990	2.3580
10	1.1046	1.4802	1.5530	1.6289	1.7908	2.1589	2.5937
11	1.1157	1.5394	1.6228	1.7103	1.8983	2.3316	2.8531
12	1.1268	1.6010	1.6959	1.7959	2.0122	2.5182	3.1384
13	1.1381	1.6651	1.7722	1.8856	2.1329	2.7196	3.4523
14	1.1495	1.7317	1.8519	1.9799	2.2609	2.9372	3.7975
15	1.1601	1.8009	1.9353	2.0789	2.3966	3.1722	4.1772
16	1.1726	1.8730	2.0224	2.1829	2.5404	3.4259	4.5950
17	1.1843	1.9479	2.1134	2.2920	2.6928	3.7000	5.0545
18	1.1961	2.0258	2.2085	2.4066	2.8543	3.9960	5.5599
19	1.2081	2.1068	2.3079	2.5270	3.0256	4.3157	6.1159
20	1.2202	2.1911	2.4117	2.6533	3.2071	4.6610	6.7275

Table II
Present Value of \$1
(1+r)⁻ⁿ

Year (n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264	0.8116	0.7972	0.7831	0.7695
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513	0.7312	0.7118	0.6931	0.6750
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830	0.6587	0.6355	0.6133	0.5921
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209	0.5935	0.5674	0.5428	0.5194
6	0.9420	0.8880	0.8375	0.7903	0.746	0.7050	0.6663	0.6302	0.5963	0.5645	0.5346	0.5066	0.4803	0.4556
7	0.9327	0.8706	0.8131	0.7599	0.7107	0.6651	0.6228	0.5835	0.5470	0.5132	0.4817	0.4523	0.4251	0.3996
8	0.9235	0.8535	0.7894	0.7307	0.676	0.6274	0.5820	0.5403	0.5019	0.4655	0.4339	0.4039	0.3762	0.3506
9	0.9143	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241	0.3909	0.3606	0.3329	0.3075
10	0.9053	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855	0.3522	0.3220	0.2946	0.2697
11	0.8963	0.8043	0.7224	0.6496	0.5847	0.5268	0.4751	0.4289	0.3875	0.3505	0.3173	0.2875	0.2607	0.2366
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3186	0.2858	0.2567	0.2307	0.2076
13	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897	0.2575	0.2292	0.2042	0.1821
14	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633	0.2320	0.2046	0.1807	0.1597
15	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2394	0.2090	0.1827	0.1599	0.1401
16	0.8528	0.7284	0.6232	0.5339	0.4581	0.3936	0.3387	0.2919	0.2519	0.2176	0.1883	0.1631	0.1415	0.1229
17	0.8444	0.7142	0.6050	0.5134	0.4363	0.3714	0.3166	0.2703	0.2311	0.1978	0.1696	0.1456	0.1252	0.1078
18	0.8360	0.7002	0.5874	0.4936	0.4155	0.3503	0.2959	0.2502	0.2120	0.1799	0.1528	0.1300	0.1108	0.0946
19	0.8277	0.6864	0.5703	0.4746	0.3957	0.3305	0.2765	0.2317	0.1945	0.1635	0.1377	0.1161	0.0981	0.0829
20	0.8195	0.6730	0.5537	0.4564	0.3769	0.3118	0.2584	0.2145	0.1784	0.1486	0.1240	0.1037	0.0868	0.0728
21	0.8114	0.6598	0.5375	0.4388	0.3589	0.2942	0.2415	0.1987	0.1637	0.1351	0.1117	0.0926	0.0768	0.0638
22	0.8034	0.6468	0.5219	0.4220	0.3418	0.2775	0.2257	0.1839	0.1502	0.1228	0.1007	0.0826	0.0680	0.0560
23	0.7954	0.6342	0.5067	0.4057	0.3256	0.2618	0.2109	0.1703	0.1378	0.1117	0.0907	0.0738	0.0601	0.0491
24	0.7876	0.6217	0.4919	0.3901	0.3101	0.2470	0.1971	0.1577	0.1264	0.1015	0.0817	0.0659	0.0532	0.0431
25	0.7798	0.6095	0.4776	0.3751	0.2953	0.2330	0.1842	0.1460	0.1160	0.0923	0.0736	0.0588	0.0471	0.0378
26	0.7720	0.5976	0.4637	0.3607	0.2812	0.2198	0.1722	0.1352	0.1064	0.0839	0.0663	0.0525	0.0417	0.0331
27	0.7644	0.5859	0.4502	0.3468	0.2678	0.2074	0.1609	0.1252	0.0976	0.0763	0.0597	0.0469	0.0369	0.0291
28	0.7568	0.5744	0.4371	0.3335	0.2551	0.1956	0.1504	0.1159	0.0895	0.0693	0.0538	0.0419	0.0326	0.0255
29	0.7493	0.5631	0.4243	0.3207	0.2429	0.1846	0.1406	0.1073	0.0822	0.0630	0.0485	0.0374	0.0289	0.0224
30	0.7419	0.5521	0.4120	0.3083	0.2314	0.1741	0.1314	0.0994	0.0754	0.0573	0.0437	0.0334	0.0256	0.0196
35	0.7059	0.5000	0.3554	0.2534	0.1813	0.1301	0.0937	0.0676	0.0490	0.0356	0.0259	0.0189	0.0139	0.0102
40	0.6717	0.4529	0.3066	0.2083	0.1420	0.0972	0.0668	0.0460	0.0318	0.0221	0.0154	0.0107	0.0075	0.0053
45	0.6391	0.4102	0.2644	0.1712	0.1113	0.0727	0.0476	0.0313	0.0207	0.0137	0.0091	0.0061	0.0041	0.0027
50	0.6080	0.3715	0.2281	0.1407	0.0872	0.0543	0.0339	0.0213	0.0134	0.0085	0.0054	0.0035	0.0022	0.0014

Prepared by R. B. How, Department of Agricultural Economics, Cornell University.

9

Table II
(Continued)

Year (n)	29%	30%	35%	40%	45%	50%
1	0.7752	0.7692	0.7407	0.7143	0.6897	0.6667
2	0.6009	0.5917	0.5487	0.5102	0.4756	0.4444
3	0.4658	0.4552	0.4064	0.3644	0.3280	0.2963
4	0.3611	0.3501	0.3011	0.2603	0.2262	0.1975
5	0.2799	0.2693	0.2230	0.1859	0.1560	0.1317
6	0.2170	0.2072	0.1672	0.1328	0.1076	0.0878
7	0.1682	0.1594	0.1224	0.0949	0.0742	0.0585
8	0.1304	0.1226	0.0906	0.0678	0.0512	0.0390
9	0.1011	0.0943	0.0671	0.0484	0.0353	0.0260
10	0.0784	0.0725	0.0497	0.0346	0.0243	0.0173
11	0.0607	0.0558	0.0368	0.0247	0.0168	0.0116
12	0.0471	0.0429	0.0273	0.0176	0.0116	0.0077
13	0.0365	0.0330	0.0202	0.0126	0.0080	0.0051
14	0.0283	0.0253	0.0150	0.0090	0.0055	0.0034
15	0.0219	0.0195	0.0111	0.0064	0.0038	0.0023
16	0.0170	0.0150	0.0082	0.0046	0.0026	0.0015
17	0.0132	0.0116	0.0061	0.0033	0.0018	0.0010
18	0.0102	0.0089	0.0045	0.0023	0.0012	0.0007
19	0.0079	0.0068	0.0033	0.0017	0.0009	0.0005
20	0.0061	0.0053	0.0025	0.0012	0.0006	0.0003
21	0.0048	0.0040	0.0018	0.0009	0.0004	0.0002
22	0.0037	0.0031	0.0014	0.0006	0.0003	0.0001
23	0.0029	0.0024	0.0010	0.0004	0.0002	0.0001
24	0.0022	0.0018	0.0007	0.0003	0.0001	0.0001
25	0.0017	0.0014	0.0006	0.0002	0.0001	0.0000
26	0.0013	0.0011	0.0004	0.0002	0.0001	0.0000
27	0.0010	0.0008	0.0003	0.0001	0.0000	
28	0.0008	0.0006	0.0002	0.0001		
29	0.0006	0.0005	0.0002	0.0001		
30	0.0005	0.0004	0.0001	0.0000		
35	0.0001	0.0001	0.0000			
40	0.0000	0.0000				
45						
50						

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Table III
Present Value of \$1 Received Annually at the End of Each Year for n Years¹

Year (n)	$\frac{1 - (1 + r)^{-n}}{r}$						
	1%	2%	3%	4%	5%	6%	7%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236
11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987
12	11.2551	10.5753	10.9540	9.3851	8.8633	8.3838	7.9427
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3576
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.4466
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.7632
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940
21	18.8570	17.0112	15.4150	14.0292	12.8212	11.7641	10.8355
22	19.6604	17.6580	15.9369	14.4511	13.1630	12.0416	11.0612
23	20.4558	18.2922	16.4436	14.8568	13.4886	12.3034	11.2722
24	21.2434	18.9139	16.9355	15.2470	13.7986	12.5504	11.4693
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536
26	22.7952	20.1210	17.8768	15.9828	14.3752	13.0032	11.8258
27	23.5596	20.7069	18.3270	16.3296	14.6430	13.2105	11.9867
28	24.3164	21.2813	18.7641	16.6631	14.8981	13.4062	12.1371
29	25.0658	21.8444	19.1885	16.9837	15.1411	13.5907	12.2777
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090
31	26.5423	22.9377	20.0004	17.5885	15.5928	13.9291	12.5318
32	27.2696	23.4683	20.3888	17.8736	15.8027	14.0840	12.6466
33	27.9897	23.9886	20.7658	18.1476	16.0025	14.2302	12.7538
34	28.7027	24.4986	21.1318	18.4112	16.1929	14.3681	12.8540
35	29.4086	24.9986	21.4872	18.6646	16.3742	14.4982	12.9477
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317
45	36.0945	29.4902	24.5187	20.7200	17.7741	15.4558	13.6055
50	39.1961	31.4236	25.7298	21.4822	18.2559	15.7619	13.8007

¹Prepared by R. B. How, Department of Agricultural Economics, Cornell University.

Table III (Continued)

n	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	21%
1	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8547	0.8475	0.8403	0.8333	0.8264
2	1.7833	1.7591	1.7355	1.7125	1.6901	1.6681	1.6467	1.6257	1.6052	1.5852	1.5656	1.5465	1.5278	1.5095
3	2.5771	2.5313	2.4869	2.4437	2.4018	2.3612	2.3216	2.2832	2.2459	2.2096	2.1743	2.1399	2.1065	2.0739
4	3.3121	3.2397	3.1699	3.1024	3.0374	2.9745	2.9137	2.8550	2.7982	2.7432	2.6901	2.6386	2.5887	2.5404
5	3.9927	3.8897	3.7908	3.6959	3.6048	3.5172	3.4331	3.3522	3.2743	3.1993	3.1272	3.0576	2.9906	2.9260
6	4.6229	4.4859	4.3553	4.2305	4.1114	3.9976	3.8887	3.7845	3.6847	3.5892	3.4976	3.4098	3.3255	3.2446
7	5.2064	5.0330	4.8684	4.7122	4.5638	4.4226	4.2883	4.1604	4.0386	3.9224	3.8115	3.7057	3.6046	3.5080
8	5.7466	5.5348	5.3349	5.1461	4.9676	4.7988	4.6389	4.4873	4.3436	4.2072	4.0776	3.9544	3.8372	3.7256
9	6.2469	5.9952	5.7590	5.5370	5.3282	5.1317	4.9464	4.7716	4.6065	4.4506	4.3030	4.1633	4.0310	3.9054
10	6.7101	6.4177	6.1446	5.8892	5.6502	5.4262	5.2161	5.0188	4.8332	4.6586	4.4941	4.3389	4.1925	4.0541
11	7.1390	6.8052	6.4951	6.2065	5.9377	5.6869	5.4527	5.2337	5.0286	4.8364	4.6560	4.4865	4.3271	4.1769
12	7.5361	7.1607	6.8137	6.4924	6.1944	5.9176	5.6603	5.4206	5.1971	4.9884	4.7932	4.6105	4.4392	4.2784
13	7.9038	7.4869	7.1034	6.7499	6.4236	6.1218	5.8424	5.5831	5.3423	5.1189	4.9095	4.7147	4.5327	4.3624
14	8.2442	7.7862	7.3667	6.9819	6.6282	6.3025	6.0021	5.7245	5.4675	5.2293	5.0081	4.8023	4.6106	4.4317
15	8.5595	8.0607	7.6061	7.1909	6.8109	6.4624	6.1422	5.8474	5.5755	5.3242	5.0916	4.8759	4.6755	4.4890
16	8.8514	8.3126	7.8237	7.3792	6.9740	6.6039	6.2651	5.9542	5.6685	5.4058	5.1624	4.9377	4.7296	4.5364
17	9.1216	8.5436	8.0216	7.5488	7.1196	6.7291	6.3729	6.0472	5.7487	5.4746	5.2223	4.9897	4.7746	4.5755
18	9.3719	8.7556	8.2014	7.7016	7.2497	6.8399	6.4674	6.1280	5.8178	5.5333	5.2732	5.0333	4.8122	4.6079
19	9.6036	8.9501	8.3649	7.8393	7.3658	6.9380	6.5504	6.1982	5.8775	5.5845	5.3162	5.0700	4.8435	4.6346
20	9.8181	9.1286	8.5136	7.9633	7.4694	7.0248	6.6231	6.2593	5.9288	5.6278	5.3528	5.1009	4.8696	4.6567
21	10.0168	9.2922	8.6487	8.0751	7.5620	7.1016	6.6870	6.3125	5.9731	5.6648	5.3837	5.1268	4.8913	4.6750
22	10.2007	9.4424	8.7715	8.1757	7.6446	7.1695	6.7429	6.3587	6.0113	5.6964	5.4099	5.1486	4.9094	4.6900
23	10.3711	9.5802	8.8832	8.2664	7.7184	7.2297	6.7921	6.3988	6.0442	5.7234	5.4321	5.1668	4.9245	4.7025
24	10.5288	9.7066	8.9847	8.3481	7.7843	7.2829	6.8351	6.4338	6.0726	5.7465	5.4510	5.1822	4.9371	4.7128
25	10.6748	9.8226	9.0770	8.4217	7.8431	7.3300	6.8729	6.4642	6.0971	5.7662	5.4669	5.1952	4.9476	4.7213
26	10.8100	9.9290	9.1610	8.4881	7.8957	7.3717	6.9061	6.4906	6.1182	5.7831	5.4804	5.2060	4.9563	4.7284
27	10.9352	10.0266	9.2372	8.5478	7.9426	7.4086	6.9352	6.5135	6.1364	5.7975	5.4919	5.2151	4.9636	4.7342
28	11.0511	10.1161	9.3066	8.6016	7.9844	7.4412	6.9607	6.5335	6.1520	5.8099	5.5016	5.2228	4.9697	4.7390
29	11.1584	10.1983	9.3696	8.6501	8.0218	7.4701	6.9830	6.5509	6.1656	5.8204	5.5090	5.2292	4.9747	4.7430
30	11.2578	10.2737	9.4269	8.6938	8.0552	7.4957	7.0027	6.5660	6.1772	5.8294	5.5168	5.2347	4.9789	4.7463
31	11.3498	10.3428	9.4790	8.7332	8.0850	7.5183	7.0199	6.5791	6.1872	5.8371	5.5227	5.2392	4.9824	4.7490
32	11.4350	10.4062	9.5264	8.7686	8.1116	7.5383	7.0350	6.5905	6.1959	5.8437	5.5277	5.2430	4.9854	4.7512
33	11.5139	10.4644	9.5694	8.8005	8.1354	7.5560	7.0482	6.6005	6.2034	5.8493	5.5320	5.2462	4.9878	4.7531
34	11.5869	10.5178	9.6086	8.8293	8.1566	7.5717	7.0599	6.6091	6.2098	5.8541	5.5356	5.2490	4.9898	4.7546
35	11.6546	10.5668	9.6442	8.8552	8.1755	7.5856	7.0700	6.6166	6.2153	5.8582	5.5386	5.2512	4.9915	4.7559
40	11.9246	10.7574	9.7791	8.9511	8.2438	7.6344	7.1050	6.6418	6.2335	5.8713	5.5482	5.2582	4.9966	4.7596
45	12.1084	10.8812	9.8628	9.0079	8.2825	7.6609	7.1232	6.6543	6.2421	5.8773	5.5523	5.2611	4.9986	4.7610
50	12.2335	10.9617	9.9148	9.0417	8.3045	7.6752	7.1327	6.6605	6.2463	5.8801	5.5541	5.2623	4.9995	4.7616

Table III (Continued)

n	22%	23%	24%	25%	26%	27%	28%	29%	30%	35%	40%	45%	50%
1	0.8197	0.8130	0.8065	0.8000	0.7937	0.7874	0.7813	0.7752	0.7692	0.7407	0.7143	0.6897	0.6667
2	1.4915	1.4740	1.4568	1.4400	1.4235	1.4074	1.3916	1.3761	1.3610	1.2894	1.2245	1.1653	1.1111
3	2.0422	2.0114	1.9813	1.9520	1.9234	1.8956	1.8684	1.8420	1.8161	1.6959	1.5889	1.4933	1.4074
4	2.4936	2.4383	2.4043	2.3616	2.3202	2.2800	2.2410	2.2031	2.1662	1.9970	1.8192	1.7195	1.6049
5	2.8636	2.8035	2.7454	2.6893	2.6351	2.5827	2.5320	2.4830	2.4356	2.2200	2.0352	1.8755	1.7366
6	3.1669	3.0923	3.0205	2.9514	2.8850	2.8210	2.7594	2.7000	2.6424	2.3852	2.1680	1.9831	1.8244
7	3.4155	3.3270	3.2423	3.1611	3.0833	3.0087	2.9370	2.8682	2.8021	2.5075	2.2628	2.0573	1.8829
8	3.6193	3.5179	3.4212	3.3289	3.2407	3.1564	3.0758	2.9986	2.9247	2.5982	2.3306	2.1085	1.9220
9	3.7863	3.6731	3.5655	3.4631	3.3657	3.2728	3.1842	3.0997	3.0190	2.6653	2.3790	2.1438	1.9480
10	3.9232	3.7993	3.6819	3.5705	3.4648	3.3644	3.2689	3.1781	3.0915	2.7150	2.4136	2.1681	1.9653
11	4.0354	3.9018	3.7757	3.6564	3.5435	3.4365	3.3351	3.2388	3.1473	2.7519	2.4383	2.1849	1.9769
12	4.1274	3.9852	3.8514	3.7251	3.6060	3.4933	3.3868	3.2859	3.1903	2.7792	2.4559	2.1965	1.9846
13	4.2028	4.0530	3.9124	3.7801	3.6555	3.5381	3.4272	3.3224	3.2233	2.7994	2.4685	2.2045	1.9897
14	4.2646	4.1082	3.9616	3.8241	3.6949	3.5733	3.4587	3.3507	3.2487	2.8144	2.4775	2.2100	1.9932
15	4.3152	4.1530	4.0013	3.8593	3.7261	3.6010	3.4834	3.3726	3.2682	2.8255	2.4839	2.2138	1.9954
16	4.3567	4.1894	4.0333	3.8874	3.7509	3.6228	3.5026	3.3896	3.2832	2.8337	2.4885	2.2161	1.9970
17	4.3908	4.2190	4.0591	3.9099	3.7705	3.6400	3.5177	3.4028	3.2948	2.8398	2.4918	2.2182	1.9980
18	4.4187	4.2431	4.0799	3.9279	3.7861	3.6536	3.5294	3.4130	3.3037	2.8443	2.4941	2.2195	1.9986
19	4.4415	4.2627	4.0967	3.9424	3.7985	3.6642	3.5386	3.4210	3.3105	2.8476	2.4958	2.2203	1.9991
20	4.4603	4.2786	4.1103	3.9539	3.8083	3.6726	3.5458	3.4271	3.3158	2.8501	2.4970	2.2209	1.9994
21	4.4756	4.2916	4.1212	3.9631	3.8162	3.6792	3.5514	3.4319	3.3198	2.8519	2.4979	2.2213	1.9996
22	4.4882	4.3021	4.1300	3.9705	3.8223	3.6844	3.5558	3.4356	3.3230	2.8533	2.4985	2.2216	1.9997
23	4.4985	4.3106	4.1371	3.9764	3.8273	3.6885	3.5592	3.4384	3.3254	2.8543	2.4989	2.2218	1.9998
24	4.5070	4.3176	4.1428	3.9811	3.8312	3.6918	3.5619	3.4406	3.3272	2.8550	2.4992	2.2219	1.9999
25	4.5139	4.3232	4.1474	3.9849	3.8342	3.6943	3.5640	3.4424	3.3286	2.8556	2.4994	2.2220	1.9999
26	4.5196	4.3278	4.1512	3.9879	3.8367	3.6963	3.5656	3.4437	3.3297	2.8560	2.4996	2.2221	2.0000
27	4.5243	4.3316	4.1542	3.9903	3.8387	3.6979	3.5669	3.4447	3.3305	2.8563	2.4997	2.2221	2.0000
28	4.5281	4.3346	4.1566	3.9923	3.8402	3.6991	3.5679	3.4455	3.3312	2.8565	2.4998	2.2222	2.0000
29	4.5312	4.3371	4.1585	3.9938	3.8414	3.7001	3.5687	3.4461	3.3316	2.8567	2.4999	2.2222	2.0000
30	4.5338	4.3391	4.1601	3.9950	3.8424	3.7009	3.5693	3.4466	3.3321	2.8568	2.4999	2.2222	2.0000
31	4.5359	4.3407	4.1614	3.9960	3.8432	3.7015	3.5697	3.4470	3.3324	2.8569	2.4999	2.2222	2.0000
32	4.5376	4.3421	4.1624	3.9968	3.8438	3.7019	3.5701	3.4473	3.3326	2.8570	2.5000	2.2222	2.0000
33	4.5390	4.3431	4.1632	3.9975	3.8443	3.7023	3.5704	3.4475	3.3328	2.8570	2.5000	2.2222	2.0000
34	4.5402	4.3440	4.1639	3.9980	3.8447	3.7026	3.5706	3.4477	3.3329	2.8570	2.5000	2.2222	2.0000
35	4.5411	4.3447	4.1644	3.9984	3.8450	3.7028	3.5708	3.4478	3.3330	2.8571	2.5000	2.2222	2.0000
40	4.5439	4.3467	4.1659	3.9995	3.8458	3.7034	3.5712	3.4482	3.3332	2.8571	2.5000	2.2222	2.0000
45	4.5449	4.3474	4.1664	3.9998	3.8460	3.7036	3.5714	3.4482	3.3333	2.8571	2.5000	2.2222	2.0000
50	4.5452	4.3477	4.1666	3.9999	3.8461	3.7037	3.5714	3.4483	3.3333	2.8571	2.5000	2.2222	2.0000