

UNIVERSITY OF LONDON
IMPERIAL COLLEGE OF SCIENCE, TECHNOLOGY AND MEDICINE

EXAMINATIONS 1999

BEng Honours Degree in Computing Part III
for Internal Students of the Imperial College of Science, Technology and Medicine

*This paper is also taken for the relevant examinations for the
Associateship of the City and Guilds of London Institute*

PAPER 3.55

MANAGEMENT – ORGANISATION AND FINANCE

Tuesday, May 4th 1999, 10.00 – 12.00

Answer THREE questions

For admin. only:
paper contains 4 questions

Section A (*Use a separate answer book for this Section*)

- 1a Discuss why it might be useful to have some understanding of team dynamics and development, and the different roles that team members might adopt in team working. Illustrate your answer with reference to appropriate models and practical examples.
- b Describe three different types of teams using examples taken from the Rover, Levi Strauss and Oticon cases. How do these particular teams aid the achievement of organisational objectives?

The two parts carry, respectively, 65% and 35% of the marks

- 2 Briefly discuss *two* ideas emerging from the *classical approach* to management.

In general, all three branches of the classical approach had similar views of the worker. Discuss what these views were.

In your view, how has management's attitude to the worker changed since Taylor, Fayol and Weber etc. first introduced their ideas? Reinforce your answer with reference to any theories or practical examples you think appropriate.

Section B (*Use a separate answer book for this Section*)

- 3 Empire Industries is considering whether to proceed with the full-scale production of a new product.

A new machine would have to be purchased especially for the manufacture of the product at a cost of £350,000 payable immediately; it is expected to last eight years and to have a residual value of £30,000 at the end of this period.

Each unit of the product would require materials costing £26, 6 labour hours at a wage rate of £5 per hour and other costs amounting to £16 per unit.

It is expected that once production has started, sales would be 5000 units per annum and remain at that level for eight years.

Sales revenue and production costs can be assumed to arise at the end of each of the eight years. The Company has estimated its cost of capital to be 10% pa.

- a Calculate the price that must be charged per unit of the product if total sales revenue is to be just sufficient to cover total production costs (i.e. both fixed and variable costs).
- b If the price of the product was fixed at £82 per unit, how many units of the product would have to be sold per annum so that the Company would just break-even (production costs remaining unchanged)?
- c Calculate the approximate rate of return that the Company would be earning from this venture if sales volume was fixed at 4500 units per annum and sale price was fixed at £87 per unit (production costs remaining unchanged).
- d Discuss how the results obtained for (a) and (b) would be altered if sales revenue and production costs were to arise uniformly during each year.

Ignore taxation.

Turn Over....

4 On 10 December 1998 it was reported that

"Greenalls, the pub and hotel operator, is to return about £100m to shareholders from the sale of (1,241) pubs. The loss on disposal, net of goodwill previously written off, will be £1.3 million. Reorganisation costs will mean a further provision of £11 million."

- a Explain what shares are and what is meant by "returning" £100 million to shareholders.
- b Discuss how the pub buildings, equipment and goodwill would normally be accounted for and where the relevant entries would be found in the accounts.
- c Explain what "providing" for "reorganisation" costs means and what kinds of expenditure are likely to be involved.
- d Explain why an "impairment" review of Greenalls' remaining assets might be needed and what would be involved.

End of Paper

P R E S E N T V A L U E

A N D

A N N U I T Y T A B L E S

The Present Value of fl

Year	Percentage									
	1	2	3	4	5	6	7	8	9	10
1	0.990099	0.980392	0.970874	0.961538	0.952381	0.943396	0.934579	0.925926	0.917431	0.909091
2	0.980296	0.961169	0.942596	0.924556	0.907029	0.889996	0.873439	0.857339	0.841680	0.826446
3	0.970590	0.942322	0.915142	0.888996	0.863838	0.839619	0.816298	0.793832	0.772183	0.751315
4	0.960980	0.923845	0.888487	0.854804	0.822702	0.792094	0.762895	0.735030	0.708425	0.683013
5	0.951466	0.905731	0.862609	0.821927	0.783526	0.747258	0.712986	0.680583	0.649931	0.620921
6	0.942045	0.887971	0.837484	0.790315	0.746215	0.704961	0.666342	0.630170	0.596267	0.564474
7	0.932718	0.870560	0.813092	0.759918	0.710681	0.665057	0.622750	0.583490	0.547034	0.513158
8	0.923483	0.853490	0.789409	0.730690	0.676839	0.627412	0.582009	0.540269	0.501866	0.466507
9	0.914340	0.836755	0.766417	0.702587	0.644609	0.591898	0.543934	0.500249	0.460428	0.424098
10	0.905287	0.820348	0.744094	0.675564	0.613913	0.558395	0.508349	0.463193	0.422411	0.385543
11	0.896324	0.804263	0.722421	0.649581	0.584679	0.526788	0.475093	0.428883	0.387533	0.350494
12	0.887449	0.788493	0.701380	0.624597	0.555837	0.496969	0.444012	0.397114	0.355535	0.318631
13	0.878663	0.773033	0.680951	0.600574	0.530321	0.468839	0.414964	0.367698	0.326179	0.289664
14	0.869963	0.757875	0.661118	0.577475	0.505068	0.442301	0.387817	0.340461	0.299246	0.263331
15	0.861349	0.743015	0.641852	0.555265	0.481017	0.417265	0.362446	0.315242	0.274538	0.239392
16	0.852821	0.728446	0.623167	0.533908	0.458112	0.393646	0.338735	0.291890	0.251870	0.217629
17	0.844377	0.714163	0.605016	0.513373	0.436297	0.371364	0.316574	0.270269	0.231073	0.197845
18	0.835017	0.700159	0.587395	0.493628	0.415521	0.350344	0.295864	0.250249	0.211994	0.179859
19	0.827740	0.686431	0.570286	0.474642	0.395734	0.330513	0.276508	0.231712	0.194490	0.163508
20	0.819544	0.672971	0.553676	0.456387	0.376889	0.311805	0.258419	0.214548	0.178431	0.148644
21	0.811430	0.659776	0.537549	0.438834	0.358942	0.294155	0.241513	0.198656	0.163698	0.135131
22	0.803396	0.646839	0.521893	0.421955	0.341850	0.277505	0.225713	0.183941	0.150182	0.122846
23	0.795442	0.634156	0.506692	0.405726	0.325571	0.261797	0.210947	0.170315	0.137781	0.111678
24	0.787566	0.621721	0.491934	0.390121	0.310068	0.246979	0.197147	0.157699	0.126405	0.101526
25	0.779768	0.609531	0.477606	0.375117	0.295303	0.232999	0.184249	0.146018	0.115968	0.092296
26	0.772048	0.597579	0.463695	0.360689	0.281241	0.219810	0.172195	0.135202	0.106393	0.083905
27	0.764404	0.585862	0.450189	0.346817	0.267848	0.207368	0.160930	0.125187	0.097608	0.076278
28	0.756836	0.574375	0.437077	0.333477	0.255094	0.195630	0.150402	0.115914	0.089548	0.069343
29	0.749342	0.563112	0.424346	0.320651	0.242946	0.184557	0.140563	0.107328	0.082155	0.063039
30	0.741923	0.552071	0.411987	0.308319	0.231377	0.174110	0.131367	0.099377	0.075371	0.057309
31	0.734577	0.541246	0.399987	0.296460	0.220359	0.164255	0.122773	0.092016	0.069148	0.052099
32	0.727304	0.530633	0.388337	0.285058	0.209866	0.154957	0.114741	0.085200	0.063438	0.047362
33	0.720103	0.520229	0.377026	0.274094	0.199873	0.146186	0.107235	0.078889	0.058200	0.043057
34	0.712973	0.510028	0.366045	0.263552	0.190355	0.137912	0.100219	0.073045	0.053395	0.039143
35	0.705914	0.500028	0.355383	0.253415	0.181290	0.130105	0.093663	0.067635	0.048986	0.035584
36	0.698925	0.490223	0.345032	0.243669	0.172657	0.122741	0.087535	0.062625	0.044941	0.032349
37	0.692005	0.480611	0.334983	0.234297	0.164436	0.115793	0.081809	0.057986	0.041231	0.029408
38	0.685153	0.471187	0.325226	0.225285	0.156605	0.109239	0.076457	0.053690	0.037826	0.026735
39	0.678370	0.461948	0.315754	0.216621	0.149148	0.103056	0.071455	0.049713	0.034703	0.024304
40	0.671653	0.452890	0.306557	0.208289	0.142046	0.097222	0.066780	0.046031	0.031838	0.022095
41	0.665003	0.444010	0.297628	0.200278	0.135282	0.091719	0.062412	0.042621	0.029209	0.020086
42	0.658419	0.435304	0.288959	0.192575	0.128840	0.086527	0.058329	0.039464	0.026797	0.018260
43	0.651900	0.426769	0.280543	0.185168	0.122704	0.081630	0.054513	0.036541	0.024584	0.016600
44	0.645445	0.418401	0.272372	0.178046	0.116861	0.077009	0.050946	0.033834	0.022555	0.015091
45	0.639055	0.410197	0.264439	0.171198	0.111297	0.072650	0.047613	0.031328	0.020692	0.013719
46	0.632728	0.402154	0.256737	0.164614	0.105997	0.068538	0.044499	0.029007	0.018984	0.012472
47	0.626463	0.394268	0.249259	0.158283	0.100949	0.064658	0.041587	0.026859	0.017416	0.011338
48	0.620260	0.386538	0.241999	0.152195	0.096142	0.060998	0.038867	0.024869	0.015978	0.010307
49	0.614119	0.378958	0.234950	0.146341	0.091564	0.057546	0.036324	0.023027	0.014659	0.009370
50	0.608039	0.371528	0.228107	0.140713	0.087204	0.054288	0.033948	0.021321	0.013449	0.008519

The Present Value of £1

Year	Percentage									
	11	12	13	14	15	16	17	18	19	20
1	0-900901	0-892857	0-884956	0-877193	0-869565	0-862069	0-854701	0-847458	0-840336	0-833333
2	0-811622	0-797194	0-783147	0-769468	0-756144	0-743163	0-730514	0-718184	0-706165	0-694444
3	0-731191	0-711780	0-693050	0-674972	0-657516	0-640658	0-624371	0-608631	0-593416	0-578704
4	0-658731	0-635518	0-613319	0-592080	0-571753	0-552291	0-533650	0-515789	0-498669	0-482253
5	0-593451	0-567427	0-542760	0-519369	0-497177	0-476113	0-456111	0-437109	0-419049	0-401878
6	0-534641	0-506631	0-480319	0-455587	0-432328	0-410442	0-389839	0-370432	0-352142	0-334898
7	0-481658	0-452349	0-425061	0-399637	0-375937	0-353830	0-333195	0-313925	0-295918	0-279082
8	0-433926	0-403883	0-376160	0-350559	0-326902	0-305025	0-284782	0-266038	0-248671	0-232568
9	0-390725	0-360610	0-332885	0-307508	0-284262	0-262953	0-243404	0-225456	0-208967	0-193807
10	0-352184	0-321973	0-294588	0-269744	0-247185	0-226684	0-208037	0-191064	0-175602	0-161506
11	0-317283	0-287476	0-260698	0-236617	0-214943	0-195417	0-177810	0-161919	0-147565	0-134588
12	0-285841	0-256675	0-230706	0-207559	0-186907	0-168463	0-151974	0-137220	0-124004	0-112157
13	0-257514	0-229174	0-204165	0-182069	0-162528	0-145227	0-129892	0-116288	0-104205	0-093464
14	0-231995	0-204620	0-180677	0-159710	0-141329	0-125195	0-111019	0-098549	0-087567	0-077887
15	0-209004	0-182696	0-159891	0-140096	0-122894	0-107927	0-094888	0-083516	0-073586	0-064905
16	0-188292	0-163122	0-141496	0-122892	0-106865	0-093041	0-081101	0-070776	0-061837	0-054088
17	0-169633	0-145644	0-125218	0-107800	0-092926	0-080207	0-069317	0-059980	0-051964	0-045073
18	0-152822	0-130040	0-110812	0-094561	0-080805	0-069144	0-059245	0-050830	0-043667	0-037561
19	0-137678	0-116107	0-098054	0-082948	0-070265	0-059607	0-050637	0-043077	0-036695	0-031301
20	0-124034	0-103667	0-086782	0-072762	0-061100	0-051385	0-043280	0-036506	0-030836	0-026084
21	0-111742	0-092560	0-076798	0-063826	0-053131	0-044298	0-036991	0-030937	0-025913	0-021737
22	0-100669	0-082643	0-067963	0-055988	0-046201	0-038188	0-031616	0-026218	0-021775	0-018114
23	0-090693	0-073788	0-060144	0-049112	0-040174	0-032920	0-027022	0-022218	0-018299	0-015095
24	0-081705	0-065882	0-053225	0-043081	0-034934	0-028380	0-023096	0-018829	0-015377	0-012579
25	0-073608	0-058823	0-047102	0-037790	0-030378	0-024465	0-019740	0-015957	0-012922	0-010483
26	0-066314	0-052521	0-041683	0-033149	0-026415	0-021091	0-016872	0-013523	0-010859	0-008735
27	0-059742	0-046894	0-036888	0-029078	0-022970	0-018182	0-014421	0-011460	0-009125	0-007280
28	0-053822	0-041869	0-032644	0-025507	0-019974	0-015674	0-012325	0-009712	0-007668	0-006066
29	0-048488	0-037383	0-028889	0-022375	0-017369	0-013512	0-010534	0-008230	0-006444	0-005055
30	0-043683	0-033378	0-025565	0-019627	0-015103	0-011648	0-009004	0-006975	0-005415	0-004213
31	0-039354	0-029802	0-022624	0-017217	0-013133	0-010042	0-007696	0-005911	0-004550	0-003511
32	0-035454	0-026609	0-020021	0-015102	0-011420	0-008657	0-006577	0-005009	0-003824	0-002926
33	0-031940	0-023758	0-017718	0-013248	0-009931	0-007463	0-005622	0-004245	0-003213	0-002438
34	0-028775	0-021212	0-015680	0-011621	0-008635	0-006433	0-004805	0-003598	0-002700	0-002032
35	0-025924	0-018940	0-013876	0-010194	0-007509	0-005546	0-004107	0-003049	0-002269	0-001693
36	0-023355	0-016910	0-012279	0-008942	0-006529	0-004781	0-003510	0-002584	0-001907	0-001411
37	0-021040	0-015098	0-010867	0-007844	0-005678	0-004121	0-003000	0-002190	0-001602	0-001176
38	0-018955	0-013481	0-009617	0-006880	0-004937	0-003553	0-002564	0-001856	0-001347	0-000980
39	0-017077	0-012036	0-008510	0-006035	0-004293	0-003063	0-002192	0-001573	0-001132	0-000816
40	0-015384	0-010747	0-007531	0-005294	0-003733	0-002640	0-001873	0-001333	0-000951	0-000680
41	0-013850	0-009595	0-006665	0-004644	0-003246	0-002276	0-001601	0-001129	0-000799	0-000576
42	0-012486	0-008567	0-005898	0-004074	0-002823	0-001962	0-001368	0-000957	0-000671	0-000472
43	0-011249	0-007649	0-005219	0-003573	0-002455	0-001692	0-001170	0-000811	0-000564	0-000394
44	0-010134	0-006830	0-004619	0-003135	0-002134	0-001458	0-001000	0-000687	0-000474	0-000328
45	0-009130	0-006098	0-004088	0-002750	0-001856	0-001257	0-000854	0-000583	0-000398	0-000273
46	0-008225	0-005445	0-003617	0-002412	0-001614	0-001084	0-000730	0-000494	0-000335	0-000228
47	0-007410	0-004861	0-003201	0-002116	0-001403	0-000934	0-000624	0-000418	0-000281	0-000190
48	0-006676	0-004340	0-002833	0-001856	0-001220	0-000805	0-000533	0-000355	0-000236	0-000158
49	0-006014	0-003875	0-002507	0-001628	0-001061	0-000694	0-000456	0-000300	0-000199	0-000132
50	0-005418	0-003460	0-002219	0-001428	0-000923	0-000599	0-000390	0-000255	0-000167	0-000110

The Present Value of £1

Year	Percentage									
	21	22	23	24	25	26	27	28	29	30
1	0.826446	0.819672	0.813008	0.806452	0.800000	0.793651	0.787402	0.781250	0.775194	0.769231
2	0.683013	0.671862	0.660982	0.650354	0.640000	0.629882	0.620001	0.610352	0.600925	0.591716
3	0.554474	0.550707	0.537384	0.524187	0.512000	0.499906	0.488190	0.476837	0.465834	0.455166
4	0.465507	0.451399	0.436897	0.422974	0.409600	0.396751	0.384402	0.372529	0.361111	0.350128
5	0.385543	0.369999	0.355201	0.341108	0.327680	0.314882	0.302678	0.291038	0.279931	0.269329
6	0.318631	0.303278	0.288781	0.275087	0.262144	0.249906	0.238329	0.227374	0.217001	0.207176
7	0.263331	0.248589	0.234782	0.221844	0.209715	0.198338	0.187661	0.177636	0.168218	0.159366
8	0.217629	0.203761	0.190879	0.178907	0.167772	0.157411	0.147765	0.138778	0.130401	0.122589
9	0.179859	0.167017	0.155187	0.144280	0.134218	0.124930	0.116350	0.108420	0.101086	0.094300
10	0.148644	0.136899	0.126168	0.116354	0.107374	0.099150	0.091614	0.084703	0.078362	0.072538
11	0.122846	0.112213	0.102576	0.093834	0.085899	0.078691	0.072137	0.066174	0.060745	0.055799
12	0.101526	0.091978	0.083395	0.075673	0.068719	0.062453	0.056801	0.051699	0.047089	0.042922
13	0.083905	0.075391	0.067801	0.061026	0.054976	0.049566	0.044725	0.040390	0.036503	0.033017
14	0.069343	0.061796	0.055122	0.049215	0.043980	0.039338	0.035217	0.031554	0.028297	0.025398
15	0.057309	0.050653	0.044815	0.039689	0.035184	0.031221	0.027730	0.024652	0.021936	0.019537
16	0.047362	0.041519	0.036435	0.032008	0.028147	0.024778	0.021834	0.019259	0.017005	0.015028
17	0.039143	0.034032	0.029622	0.025813	0.022518	0.019665	0.017192	0.015046	0.013182	0.011560
18	0.032349	0.027895	0.024083	0.020817	0.018014	0.015607	0.013537	0.011755	0.010218	0.008892
19	0.025735	0.022865	0.019580	0.016788	0.014412	0.012387	0.010659	0.009184	0.007921	0.006840
20	0.022095	0.018741	0.015918	0.013538	0.011529	0.009831	0.008393	0.007175	0.006141	0.005262
21	0.018260	0.015362	0.012942	0.010918	0.009223	0.007802	0.006609	0.005605	0.004760	0.004048
22	0.015091	0.012592	0.010522	0.008805	0.007379	0.006192	0.005204	0.004379	0.003690	0.003113
23	0.012472	0.010321	0.008554	0.007101	0.005903	0.004914	0.004097	0.003421	0.002860	0.002395
24	0.010307	0.008460	0.006955	0.005726	0.004722	0.003900	0.003226	0.002673	0.002217	0.001842
25	0.008519	0.006934	0.005654	0.004618	0.003778	0.003096	0.002540	0.002068	0.001719	0.001417
26	0.007040	0.005684	0.004597	0.003724	0.003022	0.002457	0.002000	0.001631	0.001333	0.001090
27	0.005818	0.004659	0.003737	0.003003	0.002418	0.001950	0.001575	0.001274	0.001033	0.000839
28	0.004809	0.003819	0.003038	0.002422	0.001934	0.001547	0.001240	0.000996	0.000801	0.000645
29	0.003974	0.003130	0.002470	0.001953	0.001547	0.001228	0.000977	0.000778	0.000621	0.000496
30	0.003284	0.002566	0.002008	0.001575	0.001238	0.000975	0.000769	0.000608	0.000481	0.000382
31	0.002714	0.002103	0.001633	0.001270	0.000990	0.000774	0.000605	0.000475	0.000373	0.000294
32	0.002243	0.001724	0.001328	0.001024	0.000792	0.000614	0.000477	0.000371	0.000289	0.000226
33	0.001854	0.001413	0.001079	0.000826	0.000634	0.000487	0.000375	0.000290	0.000224	0.000174
34	0.001532	0.001158	0.000877	0.000666	0.000507	0.000387	0.000296	0.000226	0.000174	0.000134
35	0.001266	0.000949	0.000713	0.000537	0.000406	0.000307	0.000233	0.000177	0.000135	0.000103
36	0.001046	0.000778	0.000580	0.000433	0.000325	0.000244	0.000183	0.000138	0.000104	0.791 4*
37	0.000865	0.000638	0.000472	0.000349	0.000260	0.000193	0.000144	0.000108	0.809 4*	0.608 4
38	0.000715	0.000523	0.000383	0.000282	0.000208	0.000153	0.000114	0.843 4*	0.627 4	0.468 4
39	0.000591	0.000429	0.000312	0.000227	0.000166	0.000122	0.895 4*	0.659 4	0.486 4	0.360 4
40	0.000488	0.000351	0.000253	0.000183	0.000133	0.966 4*	0.704 4	0.515 4	0.377 4	0.277 4
41	0.000403	0.000288	0.000206	0.000148	0.000106	0.767 4	0.555 4	0.402 4	0.292 4	0.213 4
42	0.000333	0.000236	0.000167	0.000119	0.851 4*	0.609 4	0.437 4	0.314 4	0.227 4	0.164 4
43	0.000276	0.000193	0.000136	0.961 4*	0.681 4	0.483 4	0.344 4	0.245 4	0.176 4	0.126 4
44	0.000228	0.000159	0.000111	0.775 4	0.544 4	0.383 4	0.271 4	0.192 4	0.136 4	0.969 5
45	0.000188	0.000130	0.900 4*	0.625 4	0.436 4	0.304 4	0.213 4	0.150 4	0.106 4	0.746 5
46	0.000156	0.000107	0.732 4	0.504 4	0.348 4	0.242 4	0.168 4	0.117 4	0.818 5	0.574 5
47	0.000129	0.873 4*	0.595 4	0.407 4	0.279 4	0.192 4	0.132 4	0.914 5	0.634 5	0.441 5
48	0.000106	0.716 4	0.484 4	0.328 4	0.223 4	0.152 4	0.104 4	0.714 5	0.492 5	0.339 5
49	0.878 4*	0.587 4	0.393 4	0.264 4	0.178 4	0.121 4	0.820 5	0.558 5	0.381 5	0.261 5
50	0.726 4	0.481 4	0.320 4	0.213 4	0.143 4	0.958 5	0.645 5	0.436 5	0.295 5	0.201 5

* The final digit is the power of 10 by which the given tabular value has to be divided.

The Present Value of £1 per annum

Year	Percentage									
	1	2	3	4	5	6	7	8	9	10
1	0.990099	0.980392	0.970374	0.961538	0.952381	0.943396	0.934579	0.925926	0.917431	0.909091
2	1.97040	1.94156	1.91347	1.88609	1.85941	1.83339	1.80802	1.78326	1.75911	1.73554
3	2.94099	2.88398	2.82861	2.77509	2.72325	2.67301	2.62432	2.57710	2.53129	2.48685
4	3.90197	3.80773	3.71710	3.62990	3.54595	3.46511	3.38721	3.31213	3.23972	3.16987
5	4.85343	4.71346	4.57971	4.45182	4.32948	4.21236	4.10020	3.99271	3.88965	3.79079
6	5.79548	5.60143	5.41719	5.24214	5.07569	4.91732	4.76654	4.62288	4.48592	4.35526
7	6.72819	6.47199	6.23028	6.00205	5.78637	5.58238	5.38929	5.20637	5.03295	4.86842
8	7.65168	7.32548	7.01969	6.73274	6.46321	6.20979	5.97130	5.74664	5.53482	5.33493
9	8.56602	8.16224	7.78611	7.43533	7.10782	6.80169	6.51523	6.24689	5.99525	5.75902
10	9.47130	8.98259	8.53020	8.11090	7.72173	7.36009	7.02358	6.71008	6.41766	6.14457
11	10.3676	9.78685	9.25262	8.76048	8.30641	7.88687	7.49867	7.13896	6.80519	6.49506
12	11.2551	10.5753	9.95400	9.38507	8.86325	8.38384	7.94269	7.53608	7.16073	6.81369
13	12.1337	11.3484	10.6350	9.98565	9.39357	8.85268	8.35765	7.90378	7.48690	7.10336
14	13.0037	12.1062	11.2961	10.5631	9.89864	9.29498	8.74547	8.24424	7.78615	7.36669
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.71225	9.10791	8.55948	8.06069	7.60608
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.44665	8.85137	8.31256	7.82371
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.76322	9.12164	8.54363	8.02155
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.37189	8.75563	8.20141
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356	9.60360	8.95011	8.36492
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940	9.81815	9.12855	8.51356
21	18.8570	17.0112	15.4150	14.0292	12.8212	11.7641	10.8355	10.0168	9.29224	8.64869
22	19.6604	17.6580	15.9369	14.4511	13.1630	12.0416	11.0612	10.2007	9.44243	8.77154
23	20.4558	18.2922	16.4436	14.8568	13.4886	12.3034	11.2722	10.3711	9.58021	8.88322
24	21.2434	18.9139	16.9355	15.2470	13.7986	12.5504	11.4693	10.5288	9.70661	8.98474
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.82258	9.07704
26	22.7952	20.1210	17.8768	15.9828	14.3752	13.0032	11.8258	10.8100	9.92897	9.16095
27	23.5596	20.7059	18.3270	16.3296	14.6430	13.2105	11.9867	10.9352	10.0266	9.23722
28	24.3164	21.2813	18.7641	16.6631	14.8981	13.4062	12.1371	11.0511	10.1161	9.30657
29	25.0658	21.8444	19.1885	16.9837	15.1411	13.5907	12.2777	11.1584	10.1983	9.36961
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	10.2737	9.42691
31	26.5423	22.9377	20.0004	17.5885	15.5928	13.9291	12.5318	11.3498	10.3428	9.47901
32	27.2696	23.4683	20.3888	17.8736	15.8027	14.0840	12.6466	11.4350	10.4062	9.52638
33	27.9897	23.9886	20.7658	18.1476	16.0025	14.2302	12.7538	11.5139	10.4644	9.56943
34	28.7027	24.4986	21.1318	18.4112	16.1929	14.3681	12.8540	11.5869	10.5178	9.60857
35	29.4086	24.9986	21.4872	18.6646	16.3742	14.4982	12.9477	11.6546	10.5668	9.64416
36	30.1075	25.4888	21.8323	18.9083	16.5469	14.6210	13.0352	11.7172	10.6118	9.67651
37	30.7995	25.9695	22.1672	19.1426	16.7113	14.7368	13.1170	11.7752	10.6530	9.70592
38	31.4847	26.4406	22.4925	19.3679	16.8679	14.8460	13.1935	11.8289	10.6908	9.73265
39	32.1630	26.9026	22.8082	19.5845	17.0170	14.9491	13.2649	11.8786	10.7255	9.75696
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	10.7574	9.77905
41	33.4997	27.7995	23.4124	19.9931	17.2944	15.1380	13.3941	11.9672	10.7866	9.79914
42	34.1581	28.2348	23.7014	20.1856	17.4232	15.2245	13.4524	12.0067	10.8134	9.81740
43	34.8100	28.6616	23.9819	20.3708	17.5459	15.3062	13.5070	12.0432	10.8380	9.83400
44	35.4555	29.0800	24.2543	20.5488	17.6628	15.3832	13.5579	12.0771	10.8605	9.84909
45	36.0945	29.4902	24.5187	20.7200	17.7741	15.4558	13.6055	12.1084	10.8812	9.86281
46	36.7272	29.8923	24.7754	20.8847	17.8801	15.5244	13.6500	12.1374	10.9002	9.87528
47	37.3537	30.2866	25.0247	21.0429	17.9810	15.5890	13.6916	12.1643	10.9176	9.88662
48	37.9740	30.6731	25.2667	21.1951	18.0772	15.6500	13.7305	12.1891	10.9336	9.89693
49	38.5881	31.0521	25.5017	21.3415	18.1687	15.7076	13.7668	12.2122	10.9482	9.90630
50	39.1961	31.4236	25.7298	21.4822	18.2559	15.7619	13.8007	12.2335	10.9617	9.91481

The Present Value of fl per annum

Year	Percentage									
	11	12	13	14	15	16	17	18	19	20
1	0.900901	0.892857	0.884956	0.877193	0.869565	0.862069	0.854701	0.847458	0.840336	0.833333
2	1.71252	1.69005	1.66810	1.64666	1.62571	1.60523	1.58521	1.56564	1.54650	1.52778
3	2.44371	2.40183	2.36115	2.32163	2.28323	2.24589	2.20958	2.17427	2.13992	2.10648
4	3.10245	3.03735	2.97447	2.91371	2.85498	2.79818	2.74324	2.69006	2.63859	2.58873
5	3.69590	3.60478	3.51723	3.43308	3.35216	3.27429	3.19935	3.12717	3.05763	2.99061
6	4.23054	4.11141	3.99755	3.88867	3.78448	3.68474	3.58918	3.49760	3.40978	3.32551
7	4.71220	4.56376	4.42261	4.28830	4.16042	4.03857	3.92238	3.81153	3.70570	3.60459
8	5.14612	4.96764	4.79877	4.63886	4.48732	4.34359	4.20716	4.07757	3.95437	3.83716
9	5.53705	5.32825	5.13166	4.94637	4.77158	4.60654	4.45057	4.30302	4.16333	4.03097
10	5.88923	5.65022	5.42624	5.21612	5.01877	4.83323	4.65860	4.49409	4.33893	4.19247
11	6.20552	5.93770	5.68694	5.45273	5.23371	5.02864	4.83641	4.65601	4.48650	4.32706
12	6.49236	6.19437	5.91765	5.66029	5.42062	5.19711	4.98839	4.79322	4.61050	4.43922
13	6.74987	6.42355	6.12181	5.84236	5.58315	5.34233	5.11828	4.90951	4.71471	4.53268
14	6.98187	6.62817	6.30249	6.00207	5.72448	5.46753	5.22930	5.00806	4.80228	4.61057
15	7.19087	6.81086	6.46238	6.14217	5.84737	5.57546	5.32419	5.09158	4.87586	4.67547
16	7.37916	6.97399	6.60388	6.26506	5.95423	5.66850	5.40529	5.16235	4.93770	4.72956
17	7.54879	7.11963	6.72909	6.37286	6.04716	5.74870	5.47461	5.22233	4.98966	4.77463
18	7.70162	7.24967	6.83991	6.46742	6.12797	5.81785	5.53385	5.27316	5.03333	4.81219
19	7.83929	7.36578	6.93797	6.55037	6.19823	5.87746	5.58449	5.31624	5.07003	4.84350
20	7.96333	7.46944	7.02475	6.62313	6.25933	5.92884	5.62777	5.35275	5.10086	4.86958
21	8.07507	7.56200	7.10155	6.68696	6.31246	5.97314	5.66476	5.38368	5.12677	4.89132
22	8.17574	7.64465	7.16951	6.74294	6.35866	6.01133	5.69637	5.40990	5.14855	4.90943
23	8.26643	7.71843	7.22966	6.79206	6.39884	6.04425	5.72340	5.43212	5.16685	4.92453
24	8.34814	7.78432	7.28288	6.83514	6.43377	6.07263	5.74649	5.45095	5.18223	4.93710
25	8.42174	7.84314	7.32998	6.87293	6.46415	6.09709	5.76623	5.46691	5.19515	4.94759
26	8.48806	7.89566	7.37167	6.90608	6.49056	6.11818	5.78311	5.48043	5.20601	4.95632
27	8.54780	7.94255	7.40856	6.93515	6.51353	6.13636	5.79753	5.49189	5.21513	4.96360
28	8.60162	7.98442	7.44120	6.96066	6.53351	6.15204	5.80985	5.50160	5.22280	4.96967
29	8.65011	8.02181	7.47009	6.98304	6.55088	6.16555	5.82039	5.50983	5.22924	4.97472
30	8.69379	8.05518	7.49565	7.00266	6.56598	6.17720	5.82939	5.51681	5.23466	4.97894
31	8.73315	8.08499	7.51828	7.01988	6.57911	6.18724	5.83709	5.52272	5.23921	4.98245
32	8.76860	8.11159	7.53830	7.03498	6.59053	6.19590	5.84366	5.52773	5.24303	4.98537
33	8.80054	8.13535	7.55602	7.04823	6.60046	6.20336	5.84928	5.53197	5.24625	4.98781
34	8.82932	8.15656	7.57170	7.05985	6.60910	6.20979	5.85409	5.53557	5.24895	4.98984
35	8.85524	8.17550	7.58557	7.07005	6.61661	6.21534	5.85820	5.53862	5.25122	4.99154
36	8.87859	8.19241	7.59785	7.07899	6.62314	6.22012	5.86171	5.54120	5.25312	4.99295
37	8.89963	8.20751	7.60872	7.08683	6.62881	6.22424	5.86471	5.54339	5.25472	4.99412
38	8.91859	8.22099	7.61833	7.09371	6.63375	6.22779	5.86727	5.54525	5.25607	4.99510
39	8.93567	8.23303	7.62684	7.09975	6.63805	6.23086	5.86946	5.54682	5.25720	4.99592
40	8.95105	8.24378	7.63438	7.10504	6.64178	6.23350	5.87133	5.54815	5.25815	4.99660
41	8.96491	8.25337	7.64104	7.10969	6.64502	6.23577	5.87294	5.54928	5.25895	4.99717
42	8.97740	8.26194	7.64694	7.11376	6.64785	6.23774	5.87430	5.55024	5.25962	4.99764
43	8.98865	8.26959	7.65216	7.11733	6.65030	6.23943	5.87547	5.55105	5.26019	4.99803
44	8.99878	8.27642	7.65678	7.12047	6.65244	6.24089	5.87647	5.55174	5.26066	4.99836
45	9.00791	8.28252	7.66086	7.12322	6.65429	6.24214	5.87733	5.55232	5.26106	4.99863
46	9.01614	8.28796	7.66448	7.12563	6.65591	6.24323	5.87806	5.55281	5.26140	4.99886
47	9.02355	8.29282	7.66768	7.12774	6.65731	6.24416	5.87868	5.55323	5.26168	4.99905
48	9.03022	8.29716	7.67052	7.12960	6.65853	6.24497	5.87922	5.55359	5.26191	4.99921
49	9.03624	8.30104	7.67302	7.13123	6.65959	6.24566	5.87967	5.55389	5.26211	4.99934
50	9.04165	8.30450	7.67524	7.13266	6.66051	6.24626	5.88006	5.55414	5.26228	4.99945

The Present Value of fl per annum

Year	Percentage									
	21	22	23	24	25	26	27	28	29	30
1	0.826446	0.819672	0.813008	0.806452	0.800000	0.793651	0.787402	0.781250	0.775194	0.769231
2	1.50946	1.49153	1.47399	1.45682	1.44000	1.42353	1.40740	1.39160	1.37612	1.36095
3	2.07393	2.04224	2.01137	1.98130	1.95200	1.92344	1.89559	1.86844	1.84195	1.81611
4	2.54044	2.49364	2.44827	2.40428	2.36160	2.32019	2.27999	2.24097	2.20306	2.16624
5	2.92598	2.86364	2.80347	2.74538	2.68928	2.63507	2.58267	2.53201	2.48300	2.43557
6	3.24462	3.16692	3.09225	3.02047	2.95142	2.88498	2.82100	2.75938	2.70000	2.64275
7	3.50795	3.41551	3.32704	3.24232	3.16114	3.08331	3.00866	2.93702	2.86821	2.80211
8	3.72558	3.61927	3.51792	3.42122	3.32891	3.24073	3.15643	3.07579	2.99862	2.92470
9	3.90543	3.78628	3.67310	3.56550	3.46313	3.36566	3.27278	3.18421	3.09970	3.01900
10	4.05403	3.92318	3.79927	3.68186	3.57050	3.46481	3.36439	3.26892	3.17806	3.09154
11	4.17692	4.03540	3.90185	3.77569	3.65640	3.54350	3.43653	3.33509	3.23881	3.14734
12	4.27845	4.12737	3.98524	3.85136	3.72512	3.60595	3.49333	3.38679	3.28590	3.19026
13	4.36235	4.20277	4.05304	3.91239	3.78010	3.65552	3.53806	3.42718	3.32240	3.22328
14	4.43170	4.26456	4.10816	3.96160	3.82408	3.69485	3.57327	3.45873	3.35070	3.24867
15	4.48901	4.31522	4.15298	4.00129	3.85926	3.72607	3.60100	3.48339	3.37264	3.26821
16	4.53637	4.35673	4.18941	4.03330	3.88741	3.75085	3.62284	3.50265	3.38964	3.28324
17	4.57551	4.39077	4.21904	4.05911	3.90993	3.77052	3.64003	3.51769	3.40282	3.29480
18	4.60786	4.41866	4.24312	4.07993	3.92794	3.78613	3.65357	3.52945	3.41304	3.30369
19	4.63460	4.44152	4.26270	4.09672	3.94235	3.79851	3.66422	3.53863	3.42096	3.31053
20	4.65669	4.46027	4.27862	4.11026	3.95388	3.80834	3.67262	3.54580	3.42710	3.31579
21	4.67495	4.47563	4.29156	4.12117	3.96311	3.81615	3.67923	3.55141	3.43186	3.31984
22	4.69004	4.48822	4.30208	4.12998	3.97049	3.82234	3.68443	3.55579	3.43555	3.32296
23	4.70251	4.49854	4.31063	4.13708	3.97639	3.82725	3.68853	3.55921	3.43841	3.32535
24	4.71282	4.50700	4.31759	4.14281	3.98111	3.83115	3.69175	3.56188	3.44063	3.32719
25	4.72134	4.51393	4.32324	4.14742	3.98489	3.83425	3.69429	3.56397	3.44235	3.32861
26	4.72838	4.51962	4.32784	4.15115	3.98791	3.83670	3.69630	3.56560	3.44368	3.32970
27	4.73420	4.52428	4.33158	4.15415	3.99033	3.83865	3.69787	3.56688	3.44471	3.33054
28	4.73901	4.52810	4.33462	4.15657	3.99226	3.84020	3.69911	3.56787	3.44551	3.33118
29	4.74298	4.53123	4.33709	4.15853	3.99381	3.84143	3.70009	3.56865	3.44614	3.33168
30	4.74627	4.53379	4.33909	4.16010	3.99505	3.84240	3.70086	3.56926	3.44662	3.33206
31	4.74898	4.53590	4.34073	4.16137	3.99604	3.84318	3.70146	3.56973	3.44699	3.33235
32	4.75122	4.53762	4.34205	4.16240	3.99683	3.84379	3.70194	3.57010	3.44728	3.33258
33	4.75308	4.53903	4.34313	4.16322	3.99746	3.84428	3.70231	3.57039	3.44750	3.33275
34	4.75461	4.54019	4.34401	4.16389	3.99797	3.84467	3.70261	3.57062	3.44768	3.33289
35	4.75588	4.54114	4.34472	4.16443	3.99838	3.84497	3.70284	3.57080	3.44781	3.33299
36	4.75692	4.54192	4.34530	4.16486	3.99870	3.84522	3.70302	3.57094	3.44792	3.33307
37	4.75779	4.54256	4.34578	4.16521	3.99896	3.84541	3.70317	3.57104	3.44800	3.33313
38	4.75850	4.54308	4.34616	4.16549	3.99917	3.84556	3.70328	3.57113	3.44806	3.33318
39	4.75909	4.54351	4.34647	4.16572	3.99934	3.84569	3.70337	3.57119	3.44811	3.33321
40	4.75958	4.54386	4.34672	4.16590	3.99947	3.84578	3.70344	3.57124	3.44815	3.33324
41	4.75998	4.54415	4.34693	4.16605	3.99957	3.84586	3.70350	3.57128	3.44818	3.33326
42	4.76032	4.54438	4.34710	4.16617	3.99966	3.84592	3.70354	3.57132	3.44820	3.33328
43	4.76059	4.54458	4.34723	4.16627	3.99973	3.84597	3.70358	3.57134	3.44822	3.33329
44	4.76082	4.54473	4.34734	4.16634	3.99978	3.84601	3.70360	3.57136	3.44823	3.33330
45	4.76101	4.54486	4.34743	4.16641	3.99983	3.84604	3.70362	3.57138	3.44824	3.33331
46	4.76116	4.54497	4.34751	4.16646	3.99986	3.84606	3.70364	3.57139	3.44825	3.33331
47	4.76129	4.54506	4.34757	4.16650	3.99989	3.84608	3.70365	3.57140	3.44825	3.33332
48	4.76140	4.54513	4.34762	4.16653	3.99991	3.84610	3.70367	3.57140	3.44826	3.33332
49	4.76149	4.54519	4.34766	4.16656	3.99993	3.84611	3.70367	3.57141	3.44826	3.33332
50	4.76156	4.54524	4.34769	4.16658	3.99994	3.84612	3.70368	3.57141	3.44827	3.33333