

UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Kedua
Sidang Akademik 1996/97

April 1997

SBW 314 - Demografi dan Pembangunan Tenaga Manusia

Masa: [3 jam]

Sila pastikan bahawa kertas peperiksaan ini mengandungi EMPAT muka surat yang bercetak sebelum anda memulakan peperiksaan ini.

Semua soalan wajib dijawab di dalam Bahasa Malaysia, kecuali pelajar Luar Negara yang boleh menjawab dalam Bahasa Inggeris.

Jawab TIGA (3) soalan

Answer THREE (3) questions

1. Huraikan faktor-faktor yang mempengaruhi pendedahan kepada perhubungan jenis seperti yang ditentukan dalam pembolehubah perantaraan. Bagaimanakah faktor-faktor tersebut berupaya mempengaruhi kesuburan?

Discuss the factors affecting exposure to intercourse in the intermediate variables and how these factors can influence the fertility?

[100 markah]

2. Bagaimanakah pertimbangan demografi dapat digunakan dalam perancangan ekonomi? Bincangkan.

Explain how demographic consideration can be used in economic planning.

[100 markah]

3. Apakah kesan pertumbuhan penduduk yang cepat terhadap penawaran tenaga buruh dan peluang-peluang pekerjaan di negara sedang membangun?

What is the effect of rapid population growth on the supply of labour force and job opportunities in less developed countries?

[100 markah]

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4. Diberi;

Radix = 100,000	q_0 = 0.02239
l_2 = 97,584	T_0 = 6,791,451
l_3 = 97,467	T_1 = 6,693,018
	T_2 = 6,595,363

Kirakan dan terangkan maksud;

- a) e°_0
- b) l_1
- c) d_1
- d) L_0
- e) L_1

Given;

Radix = 100,000

l_2 = 97,584	T_0 = 6,791,451
l_3 = 97,467	T_1 = 6,693,018
q_0 = 0.02239	T_2 = 6,595,363

Calculate and give the meaning of;

- a) e°_0
- b) l_1
- c) d_1
- d) L_0
- e) L_1

[100 markah]

5.a) Satu kependudukan stabil yang disokong oleh 8,000 kelahiran setahun dan mengalami mortaliti seperti Jadual Hayat A^{M81} .

A stationary population is supported by 8,000 births per annum and experiences A^{M81} mortality.

- i) Jika 30% daripada penduduk berumur 17 hingga 22 tahun didapati tidak layak untuk menyertai perkhidmatan ketenteraan, anggarkan jumlah penduduk yang berumur 17 hingga 22 tahun yang didapati tidak layak menyertai perkhidmatan ketenteraan tersebut.

If 30% of persons aged from 17 to 22 are medically unfit for military service, estimate the number aged 17 to 22 in the population who are unfit for military service.

...3/-

- ii) Jika 20% daripada penduduk berumur 60 hingga 65 tahun telah bersara daripada pasaran buruh, kirakan jumlah mereka yang bersara dalam kependudukan tersebut.

If 20% of persons aged 60 to 65 are retired estimate the number of retired persons in this age group in this population.

5. (b) Satu kependudukan yang disokong oleh 10,000 kelahiran setahun dan mengalami mortaliti seperti Jadual hayat A^{M81} . Jika umur penduduk yang berkerja dianggarkan semua penduduk berumur 20 hingga 65 tahun;
- i) Berapakah jumlah penduduk yang dikategorikan dalam umur bekerja?
 - ii) Berapakan jumlah kematian setiap tahun dalam kalangan penduduk yang berada dalam umur bekerja?
 - iii) Berapakah purata kematian bagi kumpulan umur tersebut?

A stationary population is supported by 10,000 birth per annum and experiences A^{M81} mortality, If we consider the working population to be all persons age 20 to 65;

- i) *What is the number of working age?*
- ii) *How many deaths occur each year of persons of working age?*
- iii) *What is the average death rate for this particular group?*

[100 markah]

6. a) Sebuah syarikat telah membuat persetujuan dengan 3,000 lelaki berumur 30 tahun untuk membayar RM100 setaip tahun atau sebahagian daripadanya mengikut tahun yang dia hidup kepada waris terdekat bagi mereka yang mati sebelum 34 tahun. Berapakah jumlah dijangka perlu dibayar oleh syarikat tersebut?

A company has entered into an arrangement with 3,000 males aged 30 to pay the next of kin of each one who dies before age 34 an amount of RM100 for each year or fraction of a year that he lives. How much would the company expect to pay?

- b) Bentukkan ruang l_x , q_x , d_x , dan p_x , bagi jadual hayat bermula daripada umur 40 kepada 45 berdasarkan maklumat di bawah;
Probiliti jangka hidup sejak lahir ke umur 40 = 0.86

$$\begin{aligned} l_0 &= 100,000 \\ q_{40} &= .003 \\ q_{41} &= .00 \\ q_{42} &= .004 \end{aligned}$$

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$$\begin{aligned}q_{43} &= .004 \\q_{44} &= .005 \\q_{45} &= .005\end{aligned}$$

Set out the l_x , q_x , d_x and p_x columns of a life table from age 40 to 45, given the following information.

The probability at birth of living to age 40 = 0.86

$$\begin{aligned}l_0 &= 100,000 \\q_{40} &= .003 \\q_{41} &= .003 \\q_{42} &= .004 \\q_{43} &= .004 \\q_{44} &= .005 \\q_{45} &= .005\end{aligned}$$

[100 markah]

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Australian Males Life Table (1980-82) - A^{M81}

SBW 314-1

X	l_x	d_x	q_x	L_x	T_x	e_x
51	90,818	638	0.00702	90,499.0	2,204,964.5	24.28
52	90,180	702	0.00778	89,829.0	2,114,465.5	23.45
53	89,478	769	0.00859	89,093.5	2,024,636.5	22.63
54	88,709	840	0.00947	88,289.0	1,935,543.0	21.82
55	87,869	916	0.01043	87,411.0	1,847,254.0	21.02
56	86,953	996	0.01146	86,455.0	1,759,843.0	20.24
57	85,957	1,081	0.01258	85,416.5	1,673,388.0	19.47
58	84,876	1,172	0.01381	84,290.0	1,587,971.5	18.71
59	83,704	1,269	0.01516	83,069.5	1,503,681.5	17.96
60	82,435	1,372	0.01664	81,749.0	1,420,612.0	17.23
61	81,063	1,482	0.01828	80,322.0	1,338,863.0	16.52
62	79,581	1,600	0.02010	78,781.0	1,258,541.0	15.81
63	77,981	1,723	0.02210	77,119.5	1,179,760.0	15.13
64	76,258	1,853	0.02430	75,331.5	1,102,640.5	14.46
65	74,405	1,987	0.02671	73,411.5	1,027,309.0	13.81
66	72,418	2,126	0.02936	71,355.0	953,897.5	13.17
67	70,292	2,267	0.03225	69,158.5	882,542.5	12.56
68	68,025	2,410	0.03543	66,820.0	813,384.0	11.96
69	65,615	2,552	0.03889	64,339.0	746,564.0	11.38
70	63,063	2,690	0.04265	61,718.0	682,225.0	10.82
71	60,373	2,821	0.04673	58,962.5	620,507.0	10.28
72	57,552	2,943	0.05114	56,080.5	561,544.5	9.76
73	54,609	3,054	0.05592	53,082.0	505,464.0	9.26
74	51,555	3,148	0.06106	49,981.0	452,382.0	8.77
75	48,407	3,223	0.06658	46,795.5	402,401.0	8.31
76	45,184	3,275	0.07249	43,546.5	355,605.5	7.87
77	41,909	3,303	0.07881	40,257.5	312,059.0	7.45
78	38,606	3,304	0.08558	36,954.0	271,801.5	7.04
79	35,302	3,278	0.09285	33,663.0	234,847.5	6.65
80	32,024	3,222	0.10062	30,413.0	201,184.5	6.28
81	28,802	3,138	0.10896	27,233.0	170,771.5	5.93
82	25,664	3,026	0.11789	24,151.0	143,538.5	5.59
83	22,638	2,885	0.12744	21,195.5	119,387.5	5.27
84	19,753	2,718	0.13762	18,394.0	98,192.0	4.97
85	17,035	2,529	0.14848	15,770.5	79,798.0	4.68
86	14,506	2,321	0.16002	13,345.5	64,027.5	4.41
87	12,185	2,099	0.17224	11,135.5	50,682.0	4.16
88	10,086	1,868	0.18519	9,152.0	39,546.5	3.92
89	8,218	1,634	0.19880	7,401.0	30,394.5	3.70
90	6,584	1,402	0.21296	5,883.0	22,293.5	3.49
91	5,182	1,179	0.22749	4,592.5	17,110.5	3.30
92	4,003	970	0.24224	3,518.0	12,518.0	3.13
93	3,033	780	0.25705	2,643.0	9,000.0	2.97
94	2,253	612	0.27181	1,947.0	6,357.0	2.82
95	1,641	470	0.28638	1,406.0	4,410.0	2.69
96	1,171	352	0.30063	995.0	3,004.0	2.57
97	819	258	0.31448	690.0	2,009.0	2.45
98	561	184	0.32781	469.0	1,319.0	2.35
99	377	128	0.34055	313.0	850.0	2.25

x	l_x	d_x	q_x	L_x	T_x	e_x
0	100,000	1,147	0.01147	99,197.0	7,123,096.0	71.23
1	98,853	92	0.00093	98,798.0	7,023,899.0	71.05
2	98,761	71	0.00072	98,725.5	6,925,101.0	70.12
3	98,690	55	0.00056	98,662.5	6,826,375.5	69.17
4	98,635	46	0.00047	98,612.0	6,727,713.0	68.21
5	98,589	39	0.00040	98,569.5	6,629,101.0	67.24
6	98,550	34	0.00035	98,533.0	6,530,531.5	66.27
7	98,516	32	0.00032	98,500.0	6,431,998.5	65.29
8	98,484	30	0.00030	98,469.0	6,333,498.5	64.31
9	98,454	29	0.00029	98,439.5	6,235,029.5	63.33
10	98,425	28	0.00028	98,411.0	6,136,590.0	62.35
11	98,397	28	0.00028	98,383.0	6,038,179.0	61.37
12	98,369	30	0.00030	98,354.0	5,939,796.0	60.38
13	98,339	33	0.00034	98,322.5	5,841,442.0	59.40
14	98,306	41	0.00042	98,285.5	5,743,119.5	58.42
15	98,265	56	0.00057	98,237.0	5,644,834.0	57.45
16	98,209	83	0.00085	98,167.5	5,546,597.0	56.48
17	98,126	125	0.00127	98,063.5	5,448,429.5	55.52
18	98,001	163	0.00166	97,919.5	5,350,366.0	54.60
19	97,838	177	0.00181	97,749.5	5,252,446.5	53.69
20	97,661	175	0.00179	97,573.5	5,154,697.0	52.78
21	97,486	163	0.00167	97,404.5	5,057,123.5	51.88
22	97,323	155	0.00159	97,245.5	4,959,719.0	50.96
23	97,168	150	0.00154	97,093.0	4,862,473.5	50.04
24	97,018	146	0.00150	96,945.0	4,765,380.5	49.12
25	96,872	141	0.00146	96,801.5	4,668,435.5	48.19
26	96,731	137	0.00142	96,662.5	4,571,634.0	47.26
27	96,594	133	0.00138	96,527.5	4,474,971.5	46.33
28	96,461	129	0.00134	96,396.5	4,378,444.0	45.39
29	96,332	125	0.00130	96,269.5	4,282,047.5	44.45
30	96,207	121	0.00126	96,146.5	4,185,778.0	43.51
31	96,086	120	0.00125	96,026.0	4,089,631.5	42.56
32	95,966	120	0.00125	95,906.0	3,993,605.5	41.61
33	95,846	122	0.00127	95,785.0	3,897,699.5	40.67
34	95,724	126	0.00132	95,661.0	3,801,914.5	39.72
35	95,598	133	0.00139	95,531.5	3,706,253.5	38.77
36	95,465	142	0.00149	95,394.0	3,610,722.0	37.82
37	95,323	153	0.00161	95,246.5	3,515,328.0	36.88
38	95,170	167	0.00176	95,086.5	3,420,081.5	35.94
39	95,003	183	0.00193	94,911.5	3,324,995.0	35.00
40	94,820	203	0.00214	94,718.5	3,230,083.5	34.07
41	94,617	225	0.00238	94,504.5	3,135,365.0	33.14
42	94,392	251	0.00266	94,266.5	3,040,860.5	32.22
43	94,141	279	0.00296	94,001.5	2,946,594.0	31.30
44	93,862	311	0.00331	93,706.5	2,852,592.5	30.39
45	93,551	346	0.00370	93,378.0	2,758,886.0	29.49
46	93,205	385	0.00413	93,012.5	2,665,508.0	28.60
47	92,820	426	0.00459	92,607.0	2,572,495.5	27.71
48	92,394	473	0.00512	92,157.5	2,479,888.5	26.84
49	91,921	524	0.00570	91,659.0	2,387,731.0	25.98
50	91,397	579	0.00634	91,107.5	2,296,072.0	25.12

Australian Females Life Table (1980-82) - A⁰¹

SBU311-3

x	l_x	d_x	q_x	L_x	T_x	e_x
0	100,000	905	0.00905	99,366.5	7,827,516.5	78.28
1	99,095	84	0.00085	99,044.5	7,728,150.0	77.99
2	99,011	49	0.00049	98,986.5	7,629,105.5	77.05
3	98,962	33	0.00033	98,945.5	7,530,119.0	76.09
4	98,929	27	0.00027	98,915.5	7,431,173.5	75.12
5	98,902	23	0.00023	98,890.5	7,332,258.0	74.14
6	98,879	20	0.00020	98,869.0	7,233,367.5	73.15
7	98,859	19	0.00019	98,849.5	7,134,498.5	72.17
8	98,840	19	0.00019	98,830.5	7,035,649.0	71.18
9	98,821	18	0.00018	98,812.0	6,936,818.5	70.20
10	98,803	18	0.00018	98,794.0	6,838,006.5	69.21
11	98,785	18	0.00018	98,776.0	6,739,212.5	68.22
12	98,767	19	0.00019	98,757.5	6,640,436.5	67.23
13	98,748	21	0.00021	98,737.5	6,541,679.0	66.25
14	98,727	25	0.00025	98,714.5	6,442,941.5	65.26
15	98,702	31	0.00031	98,686.5	6,344,227.0	64.28
16	98,671	37	0.00038	98,652.5	6,245,540.5	63.30
17	98,634	44	0.00045	98,612.0	6,146,888.0	62.32
18	98,590	47	0.00048	98,566.5	6,048,276.0	61.35
19	98,543	48	0.00049	98,519.0	5,949,709.5	60.38
20	98,495	48	0.00049	98,471.0	5,851,190.5	59.41
21	98,447	48	0.00049	98,423.0	5,752,719.5	58.43
22	98,399	48	0.00049	98,375.0	5,654,296.5	57.46
23	98,351	48	0.00049	98,327.0	5,555,921.5	56.49
24	98,303	48	0.00049	98,279.0	5,457,594.5	55.52
25	98,255	48	0.00049	98,231.0	5,359,315.5	54.54
26	98,207	49	0.00050	98,182.5	5,261,084.5	53.57
27	98,158	49	0.00050	98,133.5	5,162,902.0	52.60
28	98,109	49	0.00050	98,084.5	5,064,768.5	51.62
29	98,060	50	0.00051	98,035.0	4,966,684.0	50.65
30	98,010	51	0.00052	97,984.5	4,868,649.0	49.68
31	97,959	54	0.00055	97,932.0	4,770,664.5	48.70
32	97,905	57	0.00058	97,876.5	4,672,732.5	47.73
33	97,848	61	0.00062	97,817.5	4,574,856.0	46.75
34	97,787	66	0.00067	97,754.0	4,477,038.5	45.78
35	97,721	71	0.00073	97,685.5	4,379,284.5	44.81
36	97,650	78	0.00080	97,611.0	4,281,599.0	43.85
37	97,572	87	0.00089	97,528.5	4,183,988.0	42.88
38	97,485	97	0.00099	97,436.5	4,086,459.5	41.92
39	97,388	107	0.00110	97,334.5	3,989,023.0	40.96
40	97,281	119	0.00122	97,221.5	3,891,688.5	40.00
41	97,162	132	0.00136	97,096.0	3,794,467.0	39.05
42	97,030	147	0.00151	96,956.5	3,697,371.0	38.11
43	96,883	163	0.00168	96,801.5	3,600,414.5	37.16
44	96,720	181	0.00187	96,629.5	3,503,618.0	36.22
45	96,539	200	0.00207	96,439.0	3,406,983.5	35.29
46	96,339	220	0.00228	96,229.0	3,310,544.5	34.36
47	96,119	242	0.00252	95,998.0	3,214,315.5	33.44
48	95,877	266	0.00277	95,744.0	3,118,317.5	32.52
49	95,611	292	0.00305	95,465.0	3,022,573.5	31.61
50	95,319	318	0.00334	95,160.0	2,927,108.5	30.71

X	l_x	d_x	q_x	L_x	T_x	e_x
51	95,001	347	0.00365	94,827.5	2,831,948.5	29.81
52	94,654	377	0.00398	94,465.5	2,737,121.0	28.92
53	94,277	410	0.00435	94,072.0	2,642,655.5	28.03
54	93,867	446	0.00475	93,644.0	2,548,583.5	27.15
55	93,421	484	0.00518	93,179.0	2,454,939.5	26.28
56	92,937	527	0.00567	92,673.5	2,361,760.5	25.41
57	92,410	572	0.00619	92,124.0	2,269,087.0	24.55
58	91,838	622	0.00677	91,527.0	2,176,963.0	23.70
59	91,216	675	0.00740	90,878.5	2,085,436.0	22.86
60	90,541	732	0.00809	90,175.0	1,994,557.5	22.03
61	89,809	796	0.00886	89,411.0	1,904,382.5	21.20
62	89,013	863	0.00970	88,581.5	1,814,971.5	20.39
63	88,150	937	0.01063	87,681.5	1,726,390.0	19.58
64	87,213	1,018	0.01167	86,704.0	1,638,708.5	18.79
65	86,195	1,067	0.01238	85,661.5	1,552,004.5	18.01
66	85,128	1,203	0.01413	84,526.5	1,466,343.0	17.23
67	83,925	1,308	0.01559	83,271.0	1,381,816.5	16.46
68	82,617	1,421	0.01720	81,906.5	1,298,545.5	15.72
69	81,196	1,542	0.01899	80,425.0	1,216,639.0	14.98
70	79,654	1,671	0.02098	78,818.5	1,136,214.0	14.26
71	77,983	1,807	0.02317	77,079.5	1,057,395.5	13.56
72	76,176	1,952	0.02563	75,200.0	980,316.0	12.87
73	74,224	2,110	0.02843	73,169.0	905,116.0	12.19
74	72,114	2,279	0.03160	70,974.5	831,947.0	11.54
75	69,835	2,459	0.03521	68,605.5	760,972.5	10.90
76	67,376	2,649	0.03932	66,051.5	692,367.0	10.28
77	64,727	2,847	0.04399	63,303.5	626,315.5	9.68
78	61,880	3,048	0.04925	60,356.0	563,012.0	9.10
79	58,832	3,246	0.05517	57,209.0	502,656.0	8.54
80	55,586	3,435	0.06179	53,868.5	445,447.0	8.01
81	52,151	3,606	0.06915	50,348.0	391,578.5	7.51
82	48,545	3,753	0.07730	46,668.5	341,230.5	7.03
83	44,792	3,864	0.08627	42,860.0	294,562.0	6.58
84	40,928	3,930	0.09603	38,963.0	251,702.0	6.15
85	36,998	3,943	0.10656	35,026.5	212,739.0	5.75
86	33,055	3,896	0.11785	31,107.0	177,712.5	5.38
87	29,159	3,786	0.12985	27,266.0	146,605.5	5.03
88	25,373	3,616	0.14253	23,565.0	119,339.5	4.70
89	21,757	3,391	0.15586	20,061.5	95,774.5	4.40
90	18,366	3,119	0.16982	16,806.5	75,713.0	4.12
91	15,247	2,811	0.18434	13,841.5	58,906.5	3.86
92	12,436	2,480	0.19942	11,196.0	45,065.0	3.62
93	9,956	2,140	0.21499	8,886.0	33,869.0	3.40
94	7,816	1,806	0.23102	6,913.0	24,983.0	3.20
95	6,010	1,487	0.24748	5,266.5	18,070.0	3.01
96	4,523	1,196	0.26432	3,925.0	12,803.5	2.83
97	3,327	936	0.28147	2,859.0	8,878.5	2.67
98	2,391	715	0.29893	2,033.5	6,019.5	2.52
99	1,676	531	0.31662	1,410.5	3,986.0	2.38