

INDEX NUMBER : \_\_\_\_\_

UNIVERSITI SAINS MALAYSIA

Second Semester Examination  
Academic Session 2004/2005

March 2005

**ACW271/ACP221/ACW221 – Management Accounting 2**  
***[Perakaunan Pengurusan 2]***

Duration: 3 hours  
*[Masa : 3 jam]*

Please check that this examination paper consists of SIXTEEN pages of printed material before you begin the examination.

*[Sila pastikan bahawa kertas peperiksaan ini mengandungi ENAM BELAS surat yang bercetak sebelum anda memulakan peperiksaan ini.]*

**Instruction:** Answer **ALL** questions.

**[Arahan:** Jawab **SEMUA** soalan].

**Question 1 (23 marks)**

Syarikat Permata produces a single product that requires a large amount of labour time. Overhead cost is applied on the basis of direct labour hours. The company's condensed flexible budget for manufacturing overhead is given below:

	Cost formula (per DLH)	Direct labour hours		
		24,000	30,000	36,000
Overhead costs		24,000	30,000	36,000
Variable overhead costs	RM2	RM48,000	RM60,000	RM72,000
Fixed overhead costs		180,000	180,000	180,000
Total overhead costs		<u>RM228,000</u>	<u>RM240,000</u>	<u>RM252,000</u>

The company's product requires 4 meter of direct material that has a standard cost of RM3 per meter. The product requires 1.5 hours of direct labour time. The standard labour rate is RM12 per hour.

During 2004 the company had planned to operate at a denominator level of activity of 30,000 direct labour hours and to produce 20,000 units of product. Actual activity and costs for 2004 were as follows:

Number of units produced	22,000
Actual direct labour-hours worked	35,000
Actual variable overhead cost incurred	RM63,000
Actual fixed overhead cost incurred	RM181,000

**Required:**

- (i) Compute the predetermined overhead rate for 2004. Break the rate down into variable and fixed elements. [ 3 marks ]
- (ii) Prepare a standard cost card for the company's product. Show the details for all manufacturing costs on your standard cost card. [ 4 marks ]
- (iii) (a) Compute the standard direct labour-hours allowed for production during 2004. [ 2 marks ]
- (b) Compute the following manufacturing overhead T-account for 2004:

Manufacturing overhead	
?	?
?	?

[ 3 marks ]

...3/-

- (iv) Determine the reasons for the under- or overapplied overhead from (iii) above by computing the variable overhead spending and efficiency variances and the fixed overhead budget and volume variances. [ 8 marks ]
- (v) Supposed the company had chosen 36,000 direct labour hours as the denominator level of activity rather than 30,000 hours. State which, if any, of the variances computed in (iv) above would have changed, and explain how the variance(s) would have changed. No computations are necessary. [ 3 marks ]

Soalan 1 (23 markah)

Syarikat Permata mengeluarkan satu produk yang memerlukan masa buruh yang banyak. Kos overhead diperuntukkan pada asas jam buruh langsung. Ringkasan belanjawan fleksibel overhead kilang adalah seperti berikut:

<i>Formula Kos (per buruh langsung)</i>	<i>Jam Buruh Langsung</i>		
	<i>24,000</i>	<i>30,000</i>	<i>36,000</i>
<i>Kos overhead</i>			
<i>Kos overhead berubah</i> RM2	RM48,000	RM60,000	RM72,000
<i>Kos overhead tetap</i>	180,000	180,000	180,000
<i>Jumlah kos overhead</i>	<u>RM228,000</u>	<u>RM240,000</u>	<u>RM252,000</u>

Produk syarikat memerlukan 4 meter bahan langsung di mana kos piawainya ialah RM3 semeter. Produk memerlukan 1.5 jam buruh langsung. Kadar piawai buruh ialah RM12 sejam.

Sepanjang tahun 2004, syarikat merancang untuk beroperasi pada tahap aktiviti pembawa 30,000 jam buruh langsung dan mengeluarkan 20,000 unit produk. Aktiviti dan kos sebenar untuk tahun 2004 adalah seperti berikut:

<i>Jumlah unit dikeluarkan</i>	<i>22,000</i>
<i>Kerja jam buruh langsung sebenar</i>	<i>35,000</i>
<i>Kos sebenar overhead berubah ditanggung</i>	<i>RM63,000</i>
<i>Kos sebenar overhead tetap ditanggung</i>	<i>RM181,000</i>

**Dikehendaki:**

- (i) Kirakan kadar overhead pra tentu untuk tahun 2004. Bahagikan kadar overhead tersebut kepada elemen berubah dan elemen tetap. [ 3 markah ]
- (ii) Sediakan kad kos piawai untuk produk syarikat. Tunjukkan semua perincian kos pembuatan di dalam kad kos piawai anda. [ 4 markah ]

(iii) (a) Kirakan jam buruh langsung piawai yang dibenarkan untuk pengeluaran tahun 2004.

[ 2 markah ]

(b) Kirakan akaun T overhed kilang untuk tahun 2004.

<b>Overhed Kilang</b>	
?	?
?	?

[ 3 markah ]

(iv) Tentukan sebab overhed terlebih atau terkurang diperuntukan di (iii) dengan mengira varians belanja dan kecekapan untuk overhed berubah dan bajet overhed tetap dan valum varians.

[ 8 markah ]

(v) Andaikan syarikat memilih 36,000 dan bukannya 30,000 jam buruh langsung sebagai aktiviti pembawah. Tentukan yang manakah di antara varians yang dikirakan di dalam (iv) akan berubah. Terangkan bagaimana varians tersebut akan berubah. Tiada pengiraan diperlukan.

[ 3 markah ]

### Question 2 (15 marks)

TTPermata, of Penang, Malaysia, is organised into two divisions. The company's segmented income statement for the last month is given below:

	<b>Divisions</b>		
	<b>Total company</b>	<b>Cloth</b>	<b>Leather</b>
Sales	RM3,500,000	RM2,000,000	RM1,500,000
Less variable expenses	1,721,000	960,000	761,000
Contribution margin	<u>1,779,000</u>	<u>1,040,000</u>	<u>739,000</u>
Less traceable fixed expenses:			
Advertising	612,000	300,000	312,000
Administration	427,000	210,000	217,000
Depreciation	229,000	115,000	114,000
Total traceable fixed expenses	<u>1,268,000</u>	<u>625,000</u>	<u>643,000</u>
Divisional segment margin	511,000	<u>RM415,000</u>	<u>RM96,000</u>
Less common fixed expenses	390,000		
Net operating income	<u>RM121,000</u>		

Top management can't understand why the leather division has such a low segment margin when its sales are only 25% less than sales in the Cloth Division. As one step in isolating the problem, management has directed that the Leather Division be further segmented into produce lines. The following information is available on the product lines in the Leather Division:

<b>Leather Division Product Lines</b>			
	<b>Garments</b>	<b>Shoes</b>	<b>Handbags</b>
Sales	RM500,000	RM700,000	RM300,000
Traceable fixed expenses:			
Advertising	80,000	112,000	120,000
Administration	30,000	35,000	42,000
Depreciation	25,000	56,000	33,000
Variable expenses as a Percentage of sales	65%	40%	52%

Analysis shows that RM110,000 of the Leather Division's administration expenses are common to the product lines.

**Required:**

- (i) Prepare a segmented income statement for the Leather Division with segment defines as product lines. Use the contribution approach. Show both Amount and Percent columns for the division in total and for each product line. Carry percentage figures to one decimal place.

[ 15 marks ]

**Soalan 2 (20 markah)**

*TTPermata, daripada Pulau Pinang, Malaysia, diatarkan kepada dua bahagian. Penyata untung rugi segmen untuk bulan lepas adalah seperti berikut:*

	<b>Bahagian</b>		
	<b>JUMLAH (Syarikat)</b>	<b>Cloth</b>	<b>Leather</b>
<i>Jualan</i>	<i>RM3,500,000</i>	<i>RM2,000,000</i>	<i>RM1,500,000</i>
<i>Tolak belanja berubah</i>	<u><i>1,721,000</i></u>	<u><i>960,000</i></u>	<u><i>761,000</i></u>
<i>Margin sumbangan</i>	<u><i>1,779,000</i></u>	<u><i>1,040,000</i></u>	<u><i>739,000</i></u>
<i>Tolak belanja tetap boleh dikesan:</i>			
<i>Pengiklanan</i>	<i>612,000</i>	<i>300,000</i>	<i>312,000</i>
<i>Pentadbiran</i>	<i>427,000</i>	<i>210,000</i>	<i>217,000</i>
<i>Susutnilai</i>	<u><i>229,000</i></u>	<u><i>115,000</i></u>	<u><i>114,000</i></u>
<i>Jumlah belanja tetap dikesan</i>	<i>1,268,000</i>	<u><i>625,000</i></u>	<u><i>643,000</i></u>
<i>Segmen margin bahagian</i>	<i>511,000</i>	<u><i>RM415,000</i></u>	<u><i>RM96,000</i></u>
<i>Tolak belanja tetap umum</i>	<u><i>390,000</i></u>		
<i>Pendapatan bersih operasi</i>	<u><i>RM121,000</i></u>		

*Pihak pengurusan kurang faham mengapa Bahagian Leather mempunyai segmen margin yang rendah memandangkan jualanannya adalah 25% kurang daripada jualan di Bahagian Cloth. Untuk mengenalpasti masalah tersebut, pihak pengurusan telah mengarah Bahagian Leather disegmenkan mengikut produk lini. Maklumat berikut adalah tersedia untuk produk lini bagi Bahagian Leather:*

...6/-

**Produk Lini Bahagian Leather**

	<b>Garments</b>	<b>Shoes</b>	<b>Handbags</b>
<i>Jualan</i>	RM500,000	RM700,000	RM300,000
<i>Belanja tetap dikesan:</i>			
<i>Pengiklanan</i>	80,000	112,000	120,000
<i>Pentadbiran</i>	30,000	35,000	42,000
<i>Susutnilai</i>	25,000	56,000	33,000
<i>Belanja berubah dalam</i>			
<i>Peratusan daripada jualan</i>	65%	40%	52%

*Analisis menunjukkan RM110,000 daripada belanja pentadbiran Bahagian Leather adalah umum kepada produk lininya.*

**Dikehendaki:**

- (i) *Sediakan penyata pendapatan segmen untuk bahagian dengan segmen yang didefinisikan sebagai produk lini. Gunakan pendekatan sumbangan. Tunjukkan kolum untuk amaun dan peratusan untuk bahagian secara keseluruhan dan untuk setiap produk lini. Budarkan kadar peratusan pada satu titik perpuluhan.*

[ 15 markah ]

**Question 3 (25 marks)**

Syarikat Asli Sdn Bhd. (SASB) has a single product called Zet. The company normally produces and sells 80,000 Zets each year at a selling price of RM40 per unit. The company's unit costs at this level of activity are given below:

Direct materials	RM9.50
Direct labour	10.00
Variable manufacturing overhead	2.80
Fixed manufacturing overhead	5.00 (RM400,00 total)
Variable selling expenses	1.70
Fixed selling expenses	4.50 (RM360,000 total)
Total cost per unit	<u>RM33.50</u>

A number of questions relating to the production and sale of Zets are given below. Each question is independent.

**Required:**

- (i) Assume that SASB has sufficient capacity to produce 100,000 Zets each year without any increase in fixed manufacturing overhead costs. The company could increase sales by 25% above the present 80,000 units each year if it were willing to increase the fixed selling expenses by RM1,500. Would the increased fixed expenses be justified?

[ 6 marks ]

...7/-

- (ii) Assume again that SASB has sufficient capacity to produce 100,000 Zets each year. The company has an opportunity to sell 20,000 units in an overseas market. Import duties, foreign permits, and other special costs associated with the order would total RM14,000. The only selling costs that would be associated with the order would be RM1.50 per unit shipping costs. You have been asked by the President to compute the per unit break-even price on this order. [ 4 marks ]
- (iii) One of the materials used in the production of Zets is obtained from a foreign supplier. Civil unrest in the supplier's country has caused a cutoff in material shipments that is expected to last for three months. SASB has enough material on hand to continue to operate at 25% of the normal levels for the three-month period. As an alternative, the company could close the plant down entirely for the three month period. Closing the plant would reduce fixed overhead costs by 40% during the three month period; the fixed selling costs would continue at two-third of their normal level while the plant was closed. What would be the dollar advantage or disadvantage of closing the plant for the three-month period? [ 6 marks ]
- (iv) The company has 500 Zets on hand that were produced last month and have small blemishes. Due to the blemishes, it will be impossible to sell these units at the normal price. If the company wishes to sell them through regular distribution channels, what unit cost is relevant for setting the relevant selling price? Explain. [ 4 marks ]
- (v) An outside manufacturer has offered to produce Zets for SASB and to ship them directly to SASB's customers. If SASB accepts this offer, the facilities that it uses to produce Zets would be idle; however, fixed overhead costs would continue at 30% of their present level. Since the outside manufacturer would pay for all the costs of shipping, the variable selling costs would be reduced by 60%. Compute the unit cost figure that is relevant to whatever quoted price is received from the outside manufacturer. [ 5 marks ]

Soalan 3 (25 markah)

Syarikat Asli Sdn Bhd. (SASB) mengeluarkan satu produk yang dinamakan Zet. Secara umumnya, syarikat mengilang dan menjual 80,000 Zets setahun pada harga jualan RM40 seunit. Kos seunit syarikat pada tahap aktiviti ni adalah seperti berikut:

Bahan langsung	RM9.50
Buruh langsung	10.00
Kos berubah overhead kilang	2.80
Kos tetap overhead kilang	5.00 (jumlah RM400,00)
Belanja jualan berubah	1.70
Belanja jualan tetap	4.50 (jumlah RM360,000)
Jumlah kos seunit	<u>RM33.50</u>

...8/-

Beberapa soalan berkaitan pengeluaran dan jualan Zet adalah tertera di bawah. Setiap soalan adalah tidak berkaitan antara satu sama lain.

**Dikehendaki:**

- (i) Andaikan SASB mempunyai kapasiti yang cukup untuk mengeluarkan 100,000 unit Zet setiap tahun tanpa peningkatan dalam kos tetap overhead kilang. Syarikat akan meningkatkan jualan sebanyak 25% melebihi tahap sekarang iaitu 80,000 unit setiap tahun jika ia bersedia untuk meningkatkan belanja jualan tetap sebanyak RM1,500. Adakah peningkatan dalam belanja jualan tetap dapat dijustifikasikan.  
[ 6 markah ]
- (ii) Andaikan SASB mempunyai kapasiti yang cukup untuk mengeluarkan 100,000 Zet setiap tahun. Syarikat mempunyai peluang untuk menjual 20,000 unit di pasaran antarabangsa. Duti import, permit luar dan lain-lain kos khas yang berkaitan dengan pesanan berjumlah RM14,000. Kos jualan yang berkaitan dengan pesanan tersebut adalah RM1.50 seunit kos penghantaran. Anda telah diminta oleh presiden untuk mengira titik pulang modal seunit untuk pesanan ini.  
[ 4 markah ]
- (iii) Salah satu daripada bahan yang digunakan dalam pengeluaran Zet diperolehi daripada pembekal luar negeri. Perusahan awam di negara pembekal telah menyebabkan terputusnya penghantaran bahan yang dijangka berterusan selama tiga bulan. SASB mempunyai bekalan secukupnya untuk meneruskan pengeluaran pada 25% daripada tahap normal untuk jangkamasa tiga bulan tersebut. Sebagai satu alternatif, syarikat boleh menutup sepenuhnya kilang untuk jangkamasa tiga bulan itu. Penutupan kilang akan mengurangkan kos tetap overhead sebanyak 40% untuk masa tiga bulan. Kos tetap jualan akan berterusan pada dua pertiga daripada tahap normal apabila kilang ini ditutup. Berapakah keuntungan atau kerugian dalam RM jika kilang ditutup selama tiga bulan?  
[ 6 markah ]
- (iv) 500 Zet ditangan yang telah dikeluarkan oleh syarikat pada bulan lepas mengalami beberapa kerosakan kecil. Disebabkan kerosakan itu, ianya agak sukar untuk menjual unit-unit tersebut pada harga biasa. Jika syarikat ingin menjual unit-unit tersebut melalui saluran edaran biasa, apakah unit kos yang relevan untuk menentukan harga jualan? Terangkan jawapan anda.  
[ 4 markah ]
- (v) Sebuah pengilang luar telah menawarkan untuk mengeluarkan Zet bagi pihak SASB dan menghantarnya terus kepada pelanggan SASB. Jika SASB menerima tawaran ini, kemudahan yang digunakan untuk mengilang Zet akan terbiar. Namun, kos tetap overhead akan berterusan pada 30% daripada tahap biasa. Memandangkan pengilang luar akan membayar semua kos penghantaran, kos berubah jualan akan berkurangan 60%. Tentukan kos seunit yang relevan pada sebarang sebutan harga yang diterima daripada pengilang luar.  
[ 5 markah ]

**Question 4 (15 marks)]**

Aneesa will retire in six years. She wants to open some type of small business operation when she retires. She is considering several investment alternatives, one of which is to open a laundromat.

After a careful study, Aneesa has determined the following:

- (a) Washers, dryers, and other equipment needed to open the laundromat would cost RM194,000. In addition RM6,000 in working capital would be required to purchase an inventory of soap, bleaches and related items and to provide change for change machine. (The soap bleaches, and related items would be sold to customers basically at cost). After six years, the working capital would be released for investment elsewhere.
- (b) The laundromat would charge RM1.50 per use for the washers and RM0.75 per use for the dryers. Aneesa expects the laundromat to gross RM1,800 each week from the washers and RM1,125 each week from the dryers.
- (c) The only variable costs in the laundromat would be 7 1/2 cents per use for water and electricity for the washers and 9 cents per use for gas and electricity for the dryers.
- (d) Fixed costs would be RM3,000 per month for rent, RM1,500 per month for cleaning, and RM1,875 per month for maintenance, insurance and other items.
- (e) The equipment would have a 10% disposal value in six years.

Aneesa will not open the laundromat unless it provides at least a 12% return, since this is the amount that she could earn from an alternative investment opportunity.

**Required:**

(Ignore income taxes)

- (i) Assuming that the laundromat would be opened 52 weeks a year, compute the expected net annual cash receipts from its operation (gross cash receipts less cash disbursement).

[ 10 marks ]

- (ii) Would you advise Aneesa to open the laundromat? Show computations using the net present value method of investment analysis. Round all the dollar amounts to the nearest whole dollar.

[ 5 marks ]

**Question 4 [15 markah]**

*Aneesa akan bersara dalam tempoh enam tahun lagi. Beliau berhajat untuk membuka perniagaan secara kecil-kecilan apabila beliau bersara. Aneesa sedang menimbangkan beberapa alternatif pelaburan, di mana salah satu daripadanya ialah membuka kedai dobi.*

*Setelah kajian teliti dibuat, Aneesa telah menentukan maklumat berikut:*

- (a) *Kos mesin basuh, pengering dan peralatan lain yang diperlukan untuk kedai ini berjumlah RM194,000. Tambahan sebanyak RM6,000 modal kerja untuk membeli inventori sabun, peluntur and item-item berkaitan and juga untuk tukaran wang kecil bagi mesin tukar. (Sabun, peluntur dan item-item berkaitan akan dijual kepada pelanggan pada harga kos). Selepas enam tahun, modal kerja akan dilaburkan di tempat lain*
- (b) *Kedai dobi akan mengenakan RM1.50 bagi setiap penggunaan mesin basuh dan RM0.75 bagi setiap penggunaan mesin pengering. Aneesa menjangkakan kedai dobi ini menghasilkan secara kasar RM1,800 setiap minggu daripada mesin basuh dan RM1,125 setiap minggu daripada mesin pengering.*
- (c) *Satu-satunya kos berubah daripada kedai ini ialah 7.5 sen bagi air dan elektrik untuk setiap penggunaan mesin cuci dan 9 sen bagi gas and elektrik untuk setiap penggunaan mesin pengering.*
- (d) *Kos tetap ialah RM3,000 sebulan untuk sewa, RM1,500 sebulan untuk pembersihan kedai, dan RM1,875 sebulan untuk pembaikan, insurans dan item lain.*
- (e) *Peralatan dijangka mempunyai 10% nilai sisa dalam masa enam tahun.*

*Aneesa tidak akan membuka kedai dobi ini kecuali jika hanya mendapat pulangan sekurang-kurangnya 12% , memandangkan amaun ini beliau boleh perolehi daripada peluang pelaburan lain.*

**Dikehendaki:**

*(Abaikan cukai pendapatan)*

- (i) *Andaikan kedai dobi akan dibuka 52 minggu setahun, tentukan penerimaan bersih tunai tahunan yang dijangka daripada operasi (penerimaan tunai kasar tolak pengeluaran tunai)*

*[ 10 markah ]*

- (ii) *Adakah anda akan menasihati Aneesa untuk membuka kedai dobi ini? Tunjukkan pengiraan anda dengan menggunakan kaedah nilai kini bersih untuk analisis pelaburan. Bundarkan kepada nilai ringgit yang hampir.*

*[ 5 markah ]*

Question 5 (22 marks)

- (a) Aim High Enterprise produces three products: A, B and C. The selling price, variable costs and contribution margin for one unit of each product follow:

	<u>Product</u>		
	A	B	C
Selling price	RM60	RM90	RM80
Less variable cost:			
Direct materials	27	14	40
Direct labour	12	32	16
Variable manufacturing overhead	3	8	4
Total variable cost	42	54	60
Contribution margin	18	36	20
Contribution margin ratio	30%	40%	25%

Due to a strike in the plant of one of its competitors, demand for the company's product far exceeds its capacity to produce. Management is trying to determine which product(s) to concentrate on next week in filling its backlog of orders. The direct labour rate is RM8 per hour, and only 3,000 hours of labour time are available each week.

**Required:**

- (i) Compute the amount of contribution margin that will be obtained per hour of labour time spend on each product. [ 6 marks ]
- (ii) Which orders would you recommend that the company work on next week – the order for product A, product B or product C? Show computations. [ 6 marks ]
- (iii) By paying overtime wages, more than 3,000 hours of direct labour can be made available next week. Up to how much should the company be willing to pay per hour in overtime wages as long as there is unfilled demand for the three products? Explain. [ 4 marks ]
- (b) Describe three methods that companies used to identify quality problem. [ 6 marks ]

Soalan 5 (20 markah)

- (a) *Aim High Enterprise* menggilang tiga produk: A, B and C. Harga jualan, kos berubah, dan margin sumbangan untuk seunit produk adalah seperti berikut:

	<b>Produk</b>		
	<u>A</u>	<u>B</u>	<u>C</u>
Harga jualan	RM60	RM90	RM80
Tolak kos berubah <i>Less variable cost:</i>			
Bahan langsung	27	14	40
Buruh langsung	12	32	16
Kos overhead kilang berubah	3	8	4
Jumlah kos berubah	<u>42</u>	<u>54</u>	<u>60</u>
Margin sumbangan	<u>18</u>	<u>36</u>	<u>20</u>
Nisbah margin sumbangan	<u>30%</u>	<u>40%</u>	<u>25%</u>

Disebabkan berlakunya mogok di kilang salah sebuah pesaing, permintaan untuk produk *Aim High* melebihi daripada kapasiti pengeluaran. Pihak pengurusan sedang menentukan produk manakah yang perlu diberi perhatian pada minggu hadapan untuk memenuhi pesanan yang tertunggak. Kadar buruh langsung ialah RM8 sejam, dan hanya 3,000 jam buruh langsung yang ada setiap minggu.

**Dikehendaki:**

- (i) Tentukan amaun margin sumbangan yang akan diperolehi bagi setiap jam buruh bagi setiap produk.  
[ 6 markah ]
- (ii) Pesanan manakah yang akan anda sarankan untuk syarikat melakukan pada minggu hadapan – pesanan untuk produk A, produk B ataupun produk C? Tunjukkan pengiraan anda.  
[ 6 markah ]
- (iii) Dengan membayar gaji lebih masa, lebih daripada 3,000 jam buruh langsung boleh diperolehi pada minggu depan. Setakat manakah syarikat bersedia untuk membayar gaji lebih masa bagi setiap jam selagi ada permintaan yang tidak dapat dipenuhi bagi setiap produk? Terangkan jawapan anda.  
[ 4 markah ]
- (b) Terangkan tiga kaedah yang digunakan oleh syarikat untuk mengenalpasti masalah dalam kualiti.  
[ 6 markah ]

Future Value of \$1;  $(1 + r)^n$

Periods	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1.040	1.050	1.060	1.070	1.080	1.090	1.100	1.110	1.120	1.130	1.140	1.150	1.160	1.170	1.180	1.190	1.200
2	1.082	1.103	1.124	1.145	1.166	1.188	1.210	1.232	1.254	1.277	1.300	1.323	1.346	1.369	1.392	1.416	1.440
3	1.125	1.158	1.191	1.225	1.260	1.295	1.331	1.368	1.405	1.443	1.482	1.521	1.561	1.602	1.643	1.685	1.728
4	1.170	1.216	1.262	1.311	1.360	1.412	1.464	1.518	1.574	1.630	1.689	1.749	1.811	1.874	1.939	2.005	2.074
5	1.217	1.276	1.338	1.403	1.469	1.539	1.611	1.685	1.762	1.842	1.925	2.011	2.100	2.192	2.288	2.386	2.488
6	1.265	1.340	1.419	1.501	1.587	1.677	1.772	1.870	1.974	2.082	2.195	2.313	2.436	2.565	2.700	2.840	2.986
7	1.316	1.407	1.504	1.606	1.714	1.828	1.949	2.076	2.211	2.353	2.502	2.660	2.826	3.001	3.185	3.379	3.583
8	1.369	1.477	1.594	1.718	1.851	1.993	2.144	2.305	2.476	2.658	2.853	3.059	3.278	3.511	3.759	4.021	4.300
9	1.423	1.551	1.689	1.838	1.999	2.172	2.358	2.558	2.773	3.004	3.252	3.518	3.803	4.108	4.435	4.785	5.160
10	1.480	1.629	1.791	1.967	2.159	2.367	2.594	2.839	3.106	3.395	3.707	4.046	4.411	4.807	5.234	5.695	6.192
11	1.539	1.710	1.898	2.105	2.332	2.580	2.853	3.152	3.479	3.836	4.226	4.652	5.117	5.624	6.176	6.777	7.430
12	1.601	1.796	2.012	2.252	2.518	2.813	3.138	3.498	3.896	4.335	4.818	5.350	5.936	6.580	7.288	8.064	8.916
13	1.665	1.886	2.133	2.410	2.720	3.066	3.452	3.883	4.363	4.898	5.492	6.153	6.886	7.699	8.599	9.596	10.699
14	1.732	1.980	2.261	2.579	2.937	3.342	3.797	4.310	4.887	5.535	6.261	7.076	7.988	9.007	10.147	11.420	12.839
15	1.801	2.079	2.397	2.759	3.172	3.642	4.177	4.785	5.474	6.254	7.138	8.137	9.266	10.539	11.974	13.590	15.407
16	1.873	2.183	2.540	2.952	3.426	3.970	4.595	5.311	6.130	7.067	8.137	9.358	10.748	12.330	14.129	16.172	18.488
17	1.948	2.292	2.693	3.159	3.700	4.328	5.054	5.895	6.866	7.986	9.276	10.761	12.468	14.426	16.672	19.244	22.186
18	2.026	2.407	2.854	3.380	3.996	4.717	5.560	6.544	7.690	9.024	10.575	12.375	14.463	16.879	19.673	22.901	26.623
19	2.107	2.527	3.026	3.617	4.316	5.142	6.116	7.263	8.613	10.197	12.056	14.232	16.777	19.748	23.214	27.252	31.948
20	2.191	2.653	3.207	3.870	4.661	5.604	6.727	8.062	9.646	11.523	13.743	16.367	19.461	23.106	27.393	32.429	38.338
30	3.243	4.322	5.743	7.612	10.063	13.268	17.449	22.892	29.960	39.116	50.950	66.212	85.850	111.065	143.371	184.675	237.376

**Exhibit 14C-2** Future Value of an Annuity of \$1 in Arrears;  $\frac{(1+r)^n - 1}{r}$

Periods	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2.040	2.050	2.060	2.070	2.080	2.090	2.100	2.110	2.120	2.130	2.140	2.150	2.160	2.170	2.180	2.190	2.200
3	3.122	3.153	3.184	3.215	3.246	3.278	3.310	3.342	3.374	3.407	3.440	3.473	3.506	3.539	3.572	3.606	3.640
4	4.246	4.310	4.375	4.440	4.506	4.573	4.641	4.710	4.779	4.850	4.921	4.993	5.066	5.141	5.215	5.291	5.368
5	5.416	5.526	5.637	5.751	5.867	5.985	6.105	6.228	6.353	6.480	6.610	6.742	6.877	7.014	7.154	7.297	7.442
6	6.633	6.802	6.975	7.153	7.336	7.523	7.716	7.913	8.115	8.323	8.536	8.754	8.977	9.207	9.442	9.683	9.930
7	7.898	8.142	8.394	8.654	8.923	9.200	9.487	9.783	10.089	10.405	10.730	11.067	11.414	11.772	12.142	12.523	12.916
8	9.214	9.549	9.897	10.260	10.637	11.028	11.436	11.859	12.300	12.757	13.233	13.727	14.240	14.773	15.327	15.902	16.499
9	10.583	11.027	11.491	11.978	12.488	13.021	13.579	14.164	14.776	15.416	16.085	16.786	17.519	18.285	19.086	19.923	20.799
10	12.006	12.578	13.181	13.816	14.487	15.193	15.937	16.722	17.549	18.420	19.337	20.304	21.321	22.393	23.521	24.709	25.959
11	13.486	14.207	14.972	15.784	16.645	17.560	18.531	19.561	20.655	21.814	23.045	24.349	25.733	27.200	28.755	30.404	32.150
12	15.026	15.917	16.870	17.888	18.977	20.141	21.384	22.713	24.133	25.650	27.271	29.002	30.850	32.824	34.931	37.180	39.581
13	16.627	17.713	18.882	20.141	21.495	22.953	24.523	26.212	28.029	29.985	32.089	34.352	36.786	39.404	42.219	45.244	48.497
14	18.292	19.599	21.015	22.550	24.215	26.019	27.975	30.095	32.393	34.883	37.581	40.505	43.672	47.103	50.818	54.841	59.196
15	20.024	21.579	23.276	25.129	27.152	29.361	31.772	34.405	37.280	40.417	43.842	47.580	51.660	56.110	60.965	66.261	72.035
16	21.825	23.657	25.673	27.888	30.324	33.003	35.950	39.190	42.753	46.672	50.980	55.717	60.925	66.649	72.939	79.850	87.442
17	23.698	25.840	28.213	30.840	33.750	36.974	40.545	44.501	48.884	53.739	59.118	65.075	71.673	78.979	87.068	96.022	105.931
18	25.645	28.132	30.906	33.999	37.450	41.301	45.599	50.396	55.750	61.725	68.394	75.836	84.141	93.406	103.740	115.266	128.117
19	27.671	30.539	33.760	37.379	41.446	46.018	51.159	56.939	63.440	70.749	78.969	88.212	98.603	110.285	123.414	138.166	154.740
20	29.778	33.066	36.786	40.995	45.762	51.160	57.275	64.203	72.052	80.947	91.025	102.444	115.380	130.033	146.628	165.418	186.688
30	56.085	66.439	79.058	94.461	113.283	136.308	164.494	199.021	241.333	293.199	356.787	434.745	530.312	647.439	790.948	966.712	1181.882

Present Value of \$1;  $\frac{1}{(1+r)^n}$

Periods	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	21%	22%	23%	24%	25%
1	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	0.826	0.820	0.813	0.806	0.800
2	0.925	0.907	0.890	0.873	0.857	0.842	0.826	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694	0.683	0.672	0.661	0.650	0.640
3	0.889	0.864	0.840	0.816	0.794	0.772	0.751	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579	0.564	0.551	0.537	0.524	0.512
4	0.855	0.823	0.792	0.763	0.735	0.708	0.683	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482	0.467	0.451	0.437	0.423	0.410
5	0.822	0.784	0.747	0.713	0.681	0.650	0.621	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402	0.386	0.370	0.355	0.341	0.328
6	0.790	0.746	0.705	0.666	0.630	0.596	0.564	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335	0.319	0.303	0.289	0.275	0.262
7	0.760	0.711	0.665	0.623	0.583	0.547	0.513	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279	0.263	0.249	0.235	0.222	0.210
8	0.731	0.677	0.627	0.582	0.540	0.502	0.467	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233	0.218	0.204	0.191	0.179	0.168
9	0.703	0.645	0.592	0.544	0.500	0.460	0.424	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194	0.180	0.167	0.155	0.144	0.134
10	0.676	0.614	0.558	0.508	0.463	0.422	0.386	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162	0.149	0.137	0.126	0.116	0.107
11	0.650	0.585	0.527	0.475	0.429	0.388	0.350	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135	0.123	0.112	0.103	0.094	0.086
12	0.625	0.557	0.497	0.444	0.397	0.356	0.319	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112	0.102	0.092	0.083	0.076	0.069
13	0.601	0.530	0.469	0.415	0.368	0.326	0.290	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093	0.084	0.075	0.068	0.061	0.055
14	0.577	0.505	0.442	0.388	0.340	0.299	0.263	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078	0.069	0.062	0.055	0.049	0.044
15	0.555	0.481	0.417	0.362	0.315	0.275	0.239	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065	0.057	0.051	0.045	0.040	0.035
16	0.534	0.458	0.394	0.339	0.292	0.252	0.218	0.188	0.163	0.141	0.123	0.107	0.093	0.081	0.071	0.062	0.054	0.047	0.042	0.036	0.032	0.028
17	0.513	0.436	0.371	0.317	0.270	0.231	0.198	0.170	0.146	0.125	0.108	0.093	0.080	0.069	0.060	0.052	0.045	0.039	0.034	0.030	0.026	0.023
18	0.494	0.416	0.350	0.296	0.250	0.212	0.180	0.153	0.130	0.111	0.095	0.081	0.069	0.059	0.051	0.044	0.038	0.032	0.028	0.024	0.021	0.018
19	0.475	0.396	0.331	0.277	0.232	0.194	0.164	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043	0.037	0.031	0.027	0.023	0.020	0.017	0.014
20	0.456	0.377	0.312	0.258	0.215	0.178	0.149	0.124	0.104	0.087	0.073	0.061	0.051	0.043	0.037	0.031	0.026	0.022	0.019	0.016	0.014	0.012
21	0.439	0.359	0.294	0.242	0.199	0.164	0.135	0.112	0.093	0.077	0.064	0.053	0.044	0.037	0.031	0.026	0.022	0.018	0.015	0.013	0.011	0.009
22	0.422	0.342	0.278	0.226	0.184	0.150	0.123	0.101	0.083	0.068	0.056	0.046	0.038	0.032	0.026	0.022	0.018	0.015	0.013	0.011	0.009	0.007
23	0.406	0.326	0.262	0.211	0.170	0.138	0.112	0.091	0.074	0.060	0.049	0.040	0.033	0.027	0.022	0.018	0.015	0.012	0.010	0.009	0.007	0.006
24	0.390	0.310	0.247	0.197	0.158	0.126	0.102	0.082	0.066	0.053	0.043	0.035	0.028	0.023	0.019	0.015	0.013	0.010	0.008	0.007	0.006	0.005
25	0.375	0.295	0.233	0.184	0.146	0.116	0.092	0.074	0.059	0.047	0.038	0.030	0.024	0.020	0.016	0.013	0.010	0.009	0.007	0.006	0.005	0.004
26	0.361	0.281	0.220	0.172	0.135	0.106	0.084	0.066	0.053	0.042	0.033	0.026	0.021	0.017	0.014	0.011	0.009	0.007	0.006	0.005	0.004	0.003
27	0.347	0.268	0.207	0.161	0.125	0.098	0.076	0.060	0.047	0.037	0.029	0.023	0.018	0.014	0.011	0.009	0.007	0.006	0.005	0.004	0.003	0.002
28	0.333	0.255	0.196	0.150	0.116	0.090	0.069	0.054	0.042	0.033	0.026	0.020	0.016	0.012	0.010	0.008	0.006	0.005	0.004	0.003	0.002	0.002
29	0.321	0.243	0.185	0.141	0.107	0.082	0.063	0.048	0.037	0.029	0.022	0.017	0.014	0.011	0.008	0.006	0.005	0.004	0.003	0.002	0.002	0.002
30	0.308	0.231	0.174	0.131	0.099	0.075	0.057	0.044	0.033	0.026	0.020	0.015	0.012	0.009	0.007	0.005	0.004	0.003	0.003	0.002	0.002	0.001
40	0.208	0.142	0.097	0.067	0.046	0.032	0.022	0.015	0.011	0.008	0.005	0.004	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000

Present Value of an Annuity of \$1 in Arrears;  $\frac{1}{r} \left[ 1 - \frac{1}{(1+r)^n} \right]$  - 16 -

Periods	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	21%	22%	23%	24%	25%
1	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	0.826	0.820	0.813	0.806	0.800
2	1.886	1.859	1.833	1.808	1.783	1.759	1.736	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528	1.509	1.492	1.474	1.457	1.440
3	2.775	2.723	2.673	2.624	2.577	2.531	2.487	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106	2.074	2.042	2.011	1.981	1.952
4	3.630	3.546	3.465	3.387	3.312	3.240	3.170	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589	2.540	2.494	2.448	2.404	2.362
5	4.452	4.329	4.212	4.100	3.993	3.890	3.791	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991	2.926	2.864	2.803	2.745	2.689
6	5.242	5.076	4.917	4.767	4.623	4.486	4.355	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326	3.245	3.167	3.092	3.020	2.951
7	6.002	5.786	5.582	5.389	5.206	5.033	4.868	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605	3.508	3.416	3.327	3.242	3.161
8	6.733	6.463	6.210	5.971	5.747	5.535	5.335	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837	3.726	3.619	3.518	3.421	3.329
9	7.435	7.108	6.802	6.515	6.247	5.995	5.759	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031	3.905	3.786	3.673	3.566	3.463
10	8.111	7.722	7.360	7.024	6.710	6.418	6.145	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192	4.054	3.923	3.799	3.682	3.571
11	8.760	8.306	7.887	7.499	7.139	6.805	6.495	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327	4.177	4.035	3.902	3.776	3.656
12	9.385	8.863	8.384	7.943	7.536	7.161	6.814	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439	4.278	4.127	3.985	3.851	3.725
13	9.986	9.394	8.853	8.358	7.904	7.487	7.103	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533	4.362	4.203	4.053	3.912	3.780
14	10.563	9.899	9.295	8.745	8.244	7.786	7.367	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611	4.432	4.265	4.108	3.962	3.824
15	11.118	10.380	9.712	9.108	8.559	8.061	7.606	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675	4.489	4.315	4.153	4.001	3.859
16	11.652	10.838	10.106	9.447	8.851	8.313	7.824	7.379	6.974	6.604	6.265	5.954	5.668	5.405	5.162	4.938	4.730	4.536	4.357	4.189	4.033	3.887
17	12.166	11.274	10.477	9.763	9.122	8.544	8.022	7.549	7.120	6.729	6.373	6.047	5.749	5.475	5.222	4.990	4.775	4.576	4.391	4.219	4.059	3.910
18	12.659	11.690	10.828	10.059	9.372	8.756	8.201	7.702	7.250	6.840	6.467	6.128	5.818	5.534	5.273	5.033	4.812	4.608	4.419	4.243	4.080	3.928
19	13.134	12.085	11.158	10.336	9.604	8.950	8.365	7.839	7.366	6.938	6.550	6.198	5.877	5.584	5.316	5.070	4.843	4.635	4.442	4.263	4.097	3.942
20	13.590	12.462	11.470	10.594	9.818	9.129	8.514	7.963	7.469	7.025	6.623	6.259	5.929	5.628	5.353	5.101	4.870	4.657	4.460	4.279	4.110	3.954
21	14.029	12.821	11.764	10.836	10.017	9.292	8.649	8.075	7.562	7.102	6.687	6.312	5.973	5.665	5.384	5.127	4.891	4.675	4.476	4.292	4.121	3.963
22	14.451	13.163	12.042	11.061	10.201	9.442	8.772	8.176	7.645	7.170	6.743	6.359	6.011	5.696	5.410	5.149	4.909	4.690	4.488	4.302	4.130	3.970
23	14.857	13.489	12.303	11.272	10.371	9.580	8.883	8.266	7.718	7.230	6.792	6.399	6.044	5.723	5.432	5.167	4.925	4.703	4.499	4.311	4.137	3.976
24	15.247	13.799	12.550	11.469	10.529	9.707	8.985	8.348	7.784	7.283	6.835	6.434	6.073	5.746	5.451	5.182	4.937	4.713	4.507	4.318	4.143	3.981
25	15.622	14.094	12.783	11.654	10.675	9.823	9.077	8.422	7.843	7.330	6.873	6.464	6.097	5.766	5.467	5.195	4.948	4.721	4.514	4.323	4.147	3.985
26	15.983	14.375	13.003	11.826	10.810	9.929	9.161	8.488	7.896	7.372	6.906	6.491	6.118	5.783	5.480	5.206	4.956	4.728	4.520	4.328	4.151	3.988
27	16.330	14.643	13.211	11.987	10.935	10.027	9.237	8.548	7.943	7.409	6.935	6.514	6.136	5.798	5.492	5.215	4.964	4.734	4.524	4.332	4.154	3.990
28	16.663	14.898	13.406	12.137	11.051	10.116	9.307	8.602	7.984	7.441	6.961	6.534	6.152	5.810	5.502	5.223	4.970	4.739	4.528	4.335	4.157	3.992
29	16.984	15.141	13.591	12.278	11.158	10.198	9.370	8.650	8.022	7.470	6.983	6.551	6.166	5.820	5.510	5.229	4.975	4.743	4.531	4.337	4.159	3.994
30	17.292	15.372	13.765	12.409	11.258	10.274	9.427	8.694	8.055	7.496	7.003	6.566	6.177	5.829	5.517	5.235	4.979	4.746	4.534	4.339	4.160	3.995
40	19.793	17.159	15.046	13.332	11.925	10.757	9.779	8.951	8.244	7.634	7.105	6.642	6.233	5.871	5.548	5.258	4.997	4.760	4.544	4.347	4.166	3.999