GAUTENG DEPARTMENT OF EDUCATION
SENIOR CERTIFICATE EXAMINATION

COMMERCIAL MATHEMATICS SG

TIME: 3 hours

FEB / MAR 2006

MARKS: 300

REQUIREMENTS:

- Commercial Tables S_n+ a_n+

- Graph Paper

- Information sheets have been provided at the end of this examination paper. You may use this information to answer the questions.

INSTRUCTIONS:

- Answer ALL the questions.

- ALL calculations must be shown. Answers must be given correct to the nearest cent or two decimal spaces.

- Write the number of the question above each answer.

- Do not write in the margins.

- You may use a calculator for all calculations.

- Neatness and the systematic arrangement of your work will count in your favour.

- Use the commercial tables when answering Question 8.

- Use the graph sheet provided when answering Question 10.

- $p = \frac{22}{7}$

QUESTION 1
RATIO AND PROPORTION, STATISTICS AND MIXTURES

1.1 Calculate the average price per kg if 5 kg coffee at R23 per kg is mixed with 7 kg of coffee at R35 per kg. (5)

1.2 **A** and **B** share R6 000, half of which was divided in the ratio 2:3 and the rest in the ratio 4:1. Calculate in what ratio the total was shared. (8)

1.3 The farmer sold $^3/_8$ of his vegetable crop and sent $^2/_5$ of the balance to a canning factory. What fraction of the crop remains? (7)

1.4 HIV prevalence by age group among the members of a certain organization in South Africa in 2004 is:

AGE GROUP – YEARS	% HIV RATE
$\angle$ 20	18
20 – 24	32
25 – 29	33
30 – 34	25
35 – 39	18
40 – 44	12
45 – 49	15

Find the mean, mode and median of the HIV rate % among the members for the age group 0 – 49 years. (10)

[30]

QUESTION 2
INSOLVENCY

2.1 An insolvent estate paid a dividend of 60 cents in the rand. A creditor received R1 615,20. What was the total value of the claim? (5)

2.2 The assets of an insolvent estate consisted of a cash sum of R9 240 and a fixed property on which there was a bond of R160 000 and which was sold for R150 000. Outstanding debts owing to the estate amounted to R7 200 of which only 80% could be collected. The trustees' expenses for the administration of the estate amounted to R4 200 and the creditors' claims to R8 000. Calculate the final dividend paid out to unsecured creditors. (20)

[25]

QUESTION 3
PARTNERSHIP

3.1 **A** and **B** started a partnership on 1 March 2004, with R60 000 and R27 500, respectively. On 31 August 2004, **A** decreased his capital by R10 000. They shared profits and losses in the ratio of capitals. The total profit for the year amounted to R600 000. The partnership agreement makes allowance for the following:

Interest on capitals at 10% per annum

Salaries as follows:

A – R4 000 per month
B – R3 000 per month
9% of the total profit to be set aside as a reserve fund.

Calculate the ratio of the capital amount in its simplest form on 28 February 2005. (8)

3.2 Calculate

3.2.1 the total interest for A and B. (8)

3.2.2 the total salaries for A and B. (3)

3.2.3 the reserve fund amount and (3)

3.2.4 the remaining profit (net profit). (3)

[25]

QUESTION 4
PROFIT AND LOSS

4.1 A trader incurs a loss of 12,5% on the selling price by selling an article for R350. Calculate the cost of the article. (6)

4.2 By selling an article for R750, a dealer makes a profit of 25% on cost price. At what price must he sell the article so as to make a profit of 33% on selling price? (12)

4.3 A wholesaler buys an electric stove from a manufacturer for R1 254. Calculate the marked price of the article if he wants to make a profit of 22,5% on cost price after allowing 17,5% trade discount and a further 5% cash discount. (12)

[30]

QUESTION 5
STOCKS AND SHARES

5.1 A person sells 8 000 7% ABC stock at 110 and invests the amount received in R3,50 ordinary shares at R2,75. Calculate the number of shares bought. (8)

5.2 An investor annually receives a dividend of R321 on 12,5% XYZ stock. Calculate the amount invested in the stock if it was bought at 125. (8)

5.3 Calculate the percentage income received from

    5.3.1 R3 920 in 14% COM stock at 80. (3)

    5.3.2 75c shares at 80c per share on which a dividend of 16% is declared. (6)

[25]

QUESTION 6
MENSURATION

6.1 What is the surface area of a steel ball with a diameter of 8,4 cm? (6)

6.2 A measuring wheel makes 176 revolutions when going around a circle with an area of $616 \, m^2$. Find the circumference of the measuring wheel in centimetres. (10)

6.3 The area of the floor of a circular tank is $15 \, 400 \, cm^2$. If the height is 250 cm, calculate the volume of the tank in m^3. (9)

6.4 Find the cost of planting grass on a triangular piece of ground 17,4 m by 12,6 m by 12 m at a cost of R30 per m^2. (10)

[35]

QUESTION 7
INTEREST, DEPRECIATION, INSURANCE

7.1 R2 000 is deposited with a bank on May 10 and withdrawn at the same time of the day on October 3. Calculate the amount withdrawn if the interest rate is 7.5% simple interest. (10)

7.2 Calculate the residual value of a car after 6 years if it depreciates at 20% per year. The initial cost is R120 000 and the depreciation is calculated annually. (9)

7.3 Goods are valued at R50 000. The insurance premium is 40c per cent. Calculate the premium payable if the policy also covers the premium. (12)

7.4   Determine the amount received for the investment:

R1 000 bi-annually at 5% p.a for 5 years at compound interest.   (9)
[40]

QUESTION 8
ANNUITIES

Use the commercial tables to calculate:

8.1   The annual instalment to redeem a loan of R518 985 at 5% per annum
compound interest in 15 equal instalments   (6)

8.2   The principal to be invested at the end of each year to yield R70 000 after 10
years if the investment earns 4½% per annum compound interest.   (6)

8.3   The amount due to a person at the end of 8 years if the person invests R4 000
at the beginning of each year at 4% per annum compound interest.   (6)

8.4   What annuity can be bought annually for the sum of R3 000 for a period of 5
years if the interest rate is 6% per annum, compounded annually, and the first
instalment is paid immediately?   (7)
[25]

QUESTION 9
RATES OF EXCHANGE, TAXES

9.1   How many US Dollars can be bought for R19 501,50 if $1 = R6,5005?   (4)

9.2   You are a buyer for a South African company. Assume the following exchange
rate is applicable:

$1 (US) =   R6,5005 (South African Rand)   =   ¥109,27 (Japan)

The following prices are quoted to you in SA:

- One computer costs $200 in the USA
- One computer costs ¥25 000 in Japan

From which country would you import computers? Substantiate your answer.
(Show all calculations.)   (10)

9.3 The Johannesburg Metropolitan Municipality bills its customers as follows:

Electricity at 43,67 cents per kilowatt (kW)

Water rates are as follows:	First 6 kl	Free
	7 – 10 kl	R3,60 per kl
	11 – 15 kl	R4,80 per kl
	16 – 20 kl	R6,00 per kl
	21 – 40 kl	R7,19 per kl
	>40 kl	R8,50 per kl

How much does a consumer pay if the consumer used 938 kW of electricity and 45 kl of water? (11)

[25]

QUESTION 10
GRAPHS

Equipment bought for R20 000 was depreciated at 10% p.a. on the diminishing balance. The book value at the end of the following years is reflected below.

YEAR	0	3	6	9	12
Book value in R	20 000	14 580	11 810	7 748	6 276

10.1 Represent the data on a graph sheet using the following scale:

Origin : 0 Years : R0

Scale : Vertical Axis (Y) : 2 cm represents R2 000

Horizontal Axis (X) : 1 cm represents 2 years (28)

Use the graph (show your readings with dotted lines) to determine the following:

10.2 The book value after 4 years (3)

10.3 The number of years the asset has been used if the book value is R9 000 (3)

10.4 The total amount of depreciation on an asset after 10 years if the original cost price was R40 000 (6)

[40]

TOTAL: 300

COMMERCIAL MATHEMATICS / *HANDELSWISKUNDE*
INFORMATION SHEET / *INLIGTINGSBLAD*

1. MENSURATION / *METING*

1.1 Right-angled triangle: / *Reghoekige driehoek*:

Area = ½ base X height / *Area = ½ basis X hoogte*

Theorem of Pythagoras: / *Stelling van Pythagoras*
$(\text{hypotenuse})^2 = (\text{base})^2 + (\text{height})^2$ / $(skuinssy)^2 = (basis)^2 + (hoogte)^2$

1.2 Non right-angled triangle: / *Nie-reghoekige driehoek:*
Area of triangle when side lengths a, b and c are given /
Area van driehoek as die lengtes van sye a, b en c gegee word
$A = \sqrt{s(s-a)(s-b)(s-c)}$ where s = ½ (a+b+c) /
$A = \sqrt{s(s-a)(s-b)(s-c)}$ *waar* s = ½ (a+b+c)

1.3 Circle: / *Sirkel*
Circumference (c) = 2 p r / *Omtrek (c) = 2 p r*
Area of Circle: $A = p\,r^2$ / *Area van Sirkel: $A = p\,r^2$*

1.4 Triangular prism (base is a triangle): /
Driehoekige prisma (basis is 'n driehoek):
Volume of prism = Area of base X height /
Volume van prisma = Area van basis X hoogte

1.5 Solid cylinder (circular prism): / *Soliede silinder (sirkelvormige prisma)*
Volume of cylinder: / *Volume van silinder*
V = Area of base X height = $p\,r^2h$ / V = *Area van basis X hoogte* = $p\,r^2h$
Cylindrical pipe / *Silindriese pyp*
Volume of pipe (material): / *Volume van pyp (materiaal):*
$V = p\,R^2h - p\,r^2h$ where R is the external radius and r is the internal radial /
$V = p\,R^2h - p\,r^2h$ *waar R die eksterne radius en r die interne radiaal is*
   = p h (R-r) (R+r) / = *p h (R-r) (R+r)*

1.6 Sphere: / *Sfeer*
Area of sphere: / *Area van sfeer:*
$A = 4\,p\,r^2$ / $A = 4\,p\,r^2$
Volume of sphere: / *Volume van sfeer*:
$V = \frac{4}{3}\,p\,r^3$ / $V = \frac{4}{3}\,p\,r^3$

2. SIMPLE INTEREST / *ENKELVOUDIGE RENTE*

$I = \dfrac{PxRxT}{100}$ where I = Simple Interest / $I = \dfrac{PxRxT}{100}$ waar I = Enkelvoudige Rente

P = Principal / *Kapitaal*
R = Rate per cent per annum / *Koers per sent per annum*
T = Time / *Tyd*

$P = \dfrac{A}{1+B}$ $\qquad P = \dfrac{A}{1+\frac{RT}{100}}$

3. COMPOUND INTEREST / *SAAMGESTELDE RENTE*

$A = P\left(1+\dfrac{r}{100}\right)^{n}$ where / *waar*   A = Amount (at the end of the investment period) /
A = Bedrag (aan die einde van die beleggingsperiode)
P = principal (the money invested) /
P = kapitaal (geld wat belê is)
r = rate / *r = koers*
n = number of years / *n = aantal jare*

4. INSURANCE / *VERSEKERING*

Insurance which also covers the premium: / *Versekering wat ook die premie dek:*

$P = \dfrac{Vp}{V-p}$ where / *waar*   V = value insured / *V = versekerde waarde*
p = premium due on value insured /
p = premie betaalbaar op versekerde waarde
P = total cost to insure the value as well as the premium /
P = totale koste om die waarde sowel as die premie te verseker

5. DEPRECIATION / *WAARDEVERMINDERING*

Formula for residual value: / *Formule vir reswaarde*

$RV = CP\left(1-\dfrac{r}{100}\right)^{n}$ where / waar RV = residual value / *RV = reswaarde*
CP = cost price / *CP = kosprys*
r = rate of depreciation / *waardevermindering*
n = number of years / *aantal jare*

AMOUNT OF R1 PER ANNUM AT THE END OF THE PERIOD
Bedrag van R1 per jaar aan die einde van die periode

$$S_n+$$

n	3½%	4%	4½%	5%	6%	7%	8%	n
1	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1
2	2,0350	2,0400	2,0450	2,0500	2,0600	2,0700	2,0800	2
3	3,1062	3,1216	3,1370	3,1525	3,1826	3,2149	3,2464	3
4	4,2149	4,2465	4,2782	4,3101	4,3746	4,4399	4,5061	4
5	5,3625	5,4163	5,4707	5,5256	5,6371	5,7507	5,8666	5
6	6,5502	6,6330	6,7169	6,8019	6,9753	7,1533	7,3359	6
7	7,7794	7,8983	8,0192	8,1420	8,3938	8,6540	8,9228	7
8	9,0517	9,2142	9,3800	9,5491	9,8975	10,2598	10,6366	8
9	10,3685	10,5828	10,8021	11,0266	11,4913	11,9780	12,4876	9
10	11,7314	12,0061	12,2882	12,5779	13,1808	13,8164	14,4866	10
11	13,1420	13,4864	13,8412	14,2068	14,9716	15,7836	16,6455	11
12	14,6020	15,0258	15,4640	15,9171	16,8699	17,8885	18,9771	12
13	16,1130	16,6268	17,1599	17,7130	18,8821	20,1406	21,4953	13
14	17,6770	18,2919	18,9321	19,5986	21,0151	22,5505	24,2149	14
15	19,2957	20,0236	20,7841	21,5786	23,2760	25,1290	27,1521	15
16	20,9710	21,8245	22,7193	23,6575	25,6725	27,8881	30,3243	16
17	22,7050	23,6975	24,7417	25,8404	28,2129	30,8402	33,7502	17
18	24,4997	25,6454	26,8551	28,1324	30,9057	33,9990	37,4502	18
19	26,3572	27,6712	29,0636	30,5390	33,7600	37,3790	41,4463	19
20	28,2797	29,7781	31,3714	33,0660	36,7856	40,9955	45,7620	20
21	30,2695	31,9692	33,7831	35,7193	39,9927	44,8652	50,4229	21
22	32,3289	34,2480	36,3034	38,5052	43,3923	49,0057	55,4568	22
23	35,4604	36,6179	38,9370	41,5305	46,9958	53,4361	60,8933	23
24	36,6665	39,0826	41,6892	44,5020	50,8156	58,1767	66,7648	24
25	38,9499	41,6459	44,5652	47,7271	54,8645	63,2490	73,1059	25

PRESENT VALUE OF R1 PER ANNUM OVER A PERIOD
Huidige waarde van R1 per jaar oor 'n tydperk

$$a_n+$$

n	3½%	4%	4½%	5%	6%	7%	8%	n
1	0,9662	0,9615	0,9569	0,9524	0,9434	0,9346	0,9259	1
2	1,8997	1,8861	1,8727	1,8594	1,8334	1,8080	1,7833	2
3	2,8016	2,7751	2,7490	2,7232	2,6730	2,6243	2,5771	3
4	3,6731	3,6299	3,5875	3,5460	3,4651	3,3872	3,3121	4
5	4,5151	4,4518	4,3900	4,3295	4,2124	4,1002	3,9927	5
6	5,3286	5,2421	5,1579	5,0757	4,9173	4,7665	4,6229	6
7	6,1145	6,0021	5,8927	5,7864	5,5824	5,3893	5,2064	7
8	6,8740	6,7327	6,5959	6,4632	6,2098	5,9713	5,7466	8
9	7,6077	7,4353	7,2688	7,1078	6,8017	6,5152	6,2469	9
10	8,3166	8,1109	7,9127	7,7217	7,3601	7,0236	6,7101	10
11	9,0016	8,7605	8,5289	8,3064	7,8869	7,4987	7,1390	11
12	9,6633	9,3851	9,1186	8,8633	8,3838	7,9427	7,5361	12
13	10,3027	9,9856	9,6829	9,3936	8,8527	8,3577	7,9038	13
14	10,9205	10,5631	10,2228	9,8986	9,2950	8,7455	8,2444	14
15	11,5174	11,1184	10,7395	10,3797	9,7122	9,1079	8,5595	15
16	12,0941	11,6523	11,2340	10,8378	10,1059	9,4466	8,8514	16
17	12,6513	12,1657	11,7072	11,2741	10,4773	9,7632	9,1216	17
18	13,1897	12,6593	12,1600	11,6896	10,8276	10,0591	9,3719	18
19	13,7098	13,1339	12,5933	12,0853	11,1581	10,3356	9,6036	19
20	14,2124	13,5903	13,0079	12,4622	11,4699	10,5940	9,8181	20
21	14,6980	14,0292	13,4047	12,8212	11,7641	10,8355	10,0168	21
22	15,1671	14,4511	13,7844	13,1630	12,0416	11,0612	10,2007	22
23	15,6204	14,8568	14,1478	13,4886	12,3034	11,2722	10,3711	23
24	16,0584	15,2470	14,4955	13,7986	12,5504	11,4693	10,5288	24
25	16,4815	15,6221	14,8282	14,0939	12,7834	11,6536	10,6748	25

GRAPH PAPER FOR QUESTION 10/
GRAFIEKPAPIER VIR VRAAG 10

CANDIDATE'S NUMBER / *KANDIDAAT SE NOMMER*:

INSTRUCTIONS / *INSTRUKSIES*:

§   Complete this graph paper for Question 10, and place it at the back of your Answer Book.
§   *Voltooi hierdie grafiekpapier vir Vraag 10, en plaas dit agter in jou antwoordboek.*

END / *EINDE*