SENIOR CERTIFICATE EXAMINATION

FEBRUARY / MARCH

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COMMERCIAL MATHEMATICS

SG

403-2/0 E

COMMERCIAL MATHEMATICS SG

403 2 0E SG

11 pages

GAUTENG DEPARTMENT OF EDUCATION
SENIOR CERTIFICATE EXAMINATION

COMMERCIAL MATHEMATICS SG

TIME: 3 hours

MARKS: 300

REQUIREMENTS:

- Commercial Tables $s_{n\neg}$ $a_{n\neg}$
- Graph Paper

INSTRUCTIONS:

- Answer ALL questions.
- ALL calculations must be shown.
- Write the number of the question above each answer.
- Do not write in the margins.
- You may use a calculator for all calculations except for Question 1.2.
- Neatness and the systematic arrangement of your work will count in your favour.
- Use the graph sheet provided when answering Question 10.
- Information pages have been provided at the end of this examination paper. You may use this information to answer the questions.
- $\pi = 22/7$
- Answers must be given correct to the nearest cent or two decimal places.

QUESTION 1
RATIO AND PROPORTION, MIXTURES AND STATISTICS

1.1 Coffee A at R6,66 per kg is mixed with coffee B at R7,20 per kg in the ratio 5:4. What is the price of the mixture per 1000 g? (4)

1.2 Simplify without the use of a calculator:
$1\frac{7}{8} \div \frac{5}{7} - 3\frac{5}{8}$ (4)

1.3 The estimated number of young people in the 20-30 years age group who were newly infected with HIV during 2005 is as follows

North America	0,9%
Caribbean and Latin America	2,6%
Eastern Europe and Central Asia	0,9%
North Africa and the Middle East	0,3%
Asia and Pacific	27,8%
Sub-Saharan Africa	67,5%

Calculate:

1.3.1 The mean (2)
1.3.2 The mode (2)
1.3.3 The median of young people newly infected with HIV during 2005 (3)

1.4 Divide R1 375 among A, B and C in the ratio $\frac{1}{3} : \frac{1}{4} : \frac{1}{6}$ (5)
[20]

QUESTION 2
INSOLVENCY

2.1 Calculate a creditor's claim if he received R14 000 from an insolvent estate which paid a dividend of $33\frac{1}{3}$ cents in the rand. (6)

2.2 The assets of an insolvent estate consisted of fixed property valued and sold at R150 000, cash on hand R2 700 and book debts which realized R8 690.

The bankrupt's total liabilities were made up as follows:

- A bond of R6 000 existed on the fixed property.
- Ordinary creditors were owed R250 000.
- Rent in arrears was R2 390.
- Sequestrated costs amounted to R3 000.

Calculate the dividend payable to the concurrent creditors. (14)
[20]

QUESTION 3
PARTNERSHIP

3.1 A business was started by X on 1 March 2004 with a capital of R80 000. Two months later Y joined to form a partnership with a capital of R60 000. They agreed to share the profits according to the capital contributed by each at the time it was invested. Calculate the ratio in which the profits were divided on 28 February 2005. (8)

3.2 X and Y entered into a partnership and contributed R60 000 and R80 000 respectively. The net profit for the year was R68 000. At the end of the year each partner received interest on his capital at 10,5% p.a. X is allowed a managerial bonus of R30 000. Of the remaining profit 15% was set aside in a reserve fund, and the remainder of the profit was divided in a ratio of X : Y = 2 : 3

Calculate X's share of the remaining profit. (12)
[20]

QUESTION 4
PROFIT AND LOSS

4.1 By selling an article for R22 500 a dealer makes a profit of 12½% on cost price. Calculate the cost price of the article. (6)

4.2 A wholesaler buys an electric stove from a manufacturer for R1 254. Calculate the marked price per 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. (10)

4.3 4.3.1 An article is marked at R640 and a discount of 12½% is allowed on the marked price. The seller makes a profit of 25% on the selling price. What is the cost price of the article? (10)

4.3.2 If the above marked price is reduced by 15% and the discount is disallowed, but the seller still makes a profit of 25% on the selling price, what will the percentage profit or loss on the cost price now be? (14)
[40]

QUESTION 5
STOCKS AND SHARES

5.1 A person invests R5 320 cash in 12,5% stock at 133. Calculate:

5.1.1 The nominal value of the stock purchased (5)
5.1.2 The annual income derived from stock (5)
5.1.3 The actual income percentage on the investment (5)

5.2 Calculate the annual income derived from 5 000 R3,75 ordinary shares quoted at R3,00 on which a dividend of 12% is payable. (5)

5.3 Calculate which of the following investments is most profitable:

5.3.1 R30 share at R36 per share and received a dividend of R6 per share (3)
5.3.2 75c share at 90c per share on which a dividend of 15% is declared (4)
5.3.3 18% Government stock at 90 (3)
5.3.4 15% Gold R3 preference shares at R2,25 (5)
(Ignore brokerage and expenses.)

[35]

QUESTION 6
MENSURATION

6.1 A measuring wheel makes 166 revolutions when going around a circle with an area of 616 m^2. Find the circumference of the measuring wheel. (10)

6.2 The internal radius of a cylindrical pipe is 25 cm and the concrete is 20 cm thick. Calculate the volume in cubic metres of the concrete used in the construction of a pipe 200 cm long. (8)

6.3 Find the surface area of a sphere with a radius of 7 m. (6)

6.4 The area of a rectangular lawn is 800 m^2. The ratio of the length : breadth = 2:1 The lawn is surrounded by a path 1.5 m wide.

6.4.1 Calculate the length and breadth of the lawn. (4)
6.4.2 Show that the area of the path is 189 m^2. (7)

6.5 Calculate, in kilolitres, the capacity of a reservoir with circular base with diameter 6 m and depth 10,5 m (1 litre = 1000 cm^3). (10)

[45]

QUESTION 7
INTEREST, DEPRECIATION, INSURANCE

7.1 A dealer charges 24% simple interest on overdue accounts. A certain debtor's account amounted to R742 in 3 months. Find the original amount of the debtor's account. (10)

7.2 An asset of R12 500 was depreciated at 33% per annum using the diminishing balance method. Calculate the residual value of the asset after two years. (6)

7.3 Goods are valued at R100 000. The insurance premium is 40 cents per cent.

Calculate the premium payable if the policy also covers the premium. (10)

7.4 R7 000 was invested for 2 years and 6 months at 13% per annum compound interest, compounded half-yearly. Calculate the total amount of interest earned at the end of this period. (14)

[40]

QUESTION 8
ANNUITIES

Use the Commercial tables to calculate the following:

8.1 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. (4)

8.2 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? (6)

8.3 The annual instalment to redeem a loan of R102 886 at 3½% per annum compound interest in 21 equal instalments which include interest as well as capital. (4)

8.4 The amount due to a person at the end of 20 years if the person invests R6 000 at the beginning of each year at 8% p.a. compound interest. (6)

[20]

QUESTION 9
RATES OF EXCHANGE, TAXES

9.1 How many British pounds can be bought for R1 496,49 if 1 pound = R11,9057? (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 Joburg Metropolitan Municipality bills its customers as follows:

Electricity at 23,67 cents per kilowatt (kw)
Water rates are as follows:

First 6kl	Free
6 – 10kl	R3,60 per kl
10 – 15kl	R4,80 per kl
15 – 20kl	R6,00 per kl
20 – 40kl	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 35 kl of water? (11)

[25]

QUESTION 10
GRAPHS

The following table compares the simple interest on R100 at 5% p.a. and compound interest on R100 at 5% p.a. respectively for a period of 35 years.

Year	0	5	10	15	20	25	30	35
Simple Interest in R	0	25	50	75	100	125	150	175
Compound Interest to the nearest Rand	0	28	63	108	165	239	333	452

10.1 Represent the information in the above table graphically. (Use the graph paper that has been provided.)

Use the scale:

Horizontal Axis : 2 cm represent 5 years
Vertical Axis : 2 cm represent R50 (20)

10.2 Use the graph to calculate:

10.2.1 The simple interest and compound interest on R100 at 5% p.a. after 25 years (6)

10.2.2 The number of years it would take for a principal of R100 to amount to R400 at 5% p.a. compound interest (3)

10.2.3 The difference between compound interest and simple interest on R300 at 5% p.a. after 27 years (6)

[35]

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) = $2 \pi r$ / *Omtrek (c)* = $2 \pi r$
Area of Circle: $A = \pi r^2$ / *Area van Sirkel:* $A = \pi r^2$

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 = $\pi r^2 h$ / V = *Area van basis X hoogte* = $\pi r^2 h$
Cylindrical pipe / *Silindriese pyp*
Volume of pipe (material): / *Volume van pyp (materiaal):*
$V = \pi R^2 h - \pi r^2 h$ where R is Die external radius and r is the internal radius /
$V = \pi R^2 h - \pi r^2 h$ *waar R die eksterne radius en r die interne radius is*
$= \pi h (R-r) (R+r)$ / $= \pi h (R-r) (R+r)$

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

2. SIMPLE INTEREST / *ENKELVOUDIGE RENTE*

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

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

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

3. COMPOUND INTEREST / *SAAMGESTELDE RENTE*

$A = P\left(1+\frac{r}{100}\right)^n$ 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:*

$P = \frac{Vp}{V-p}$ 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*

$RV = CP\left(1-\frac{r}{100}\right)^n$ 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

$S_{n\neg}$

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 FOR A PERIOD

$a_{n\neg}$

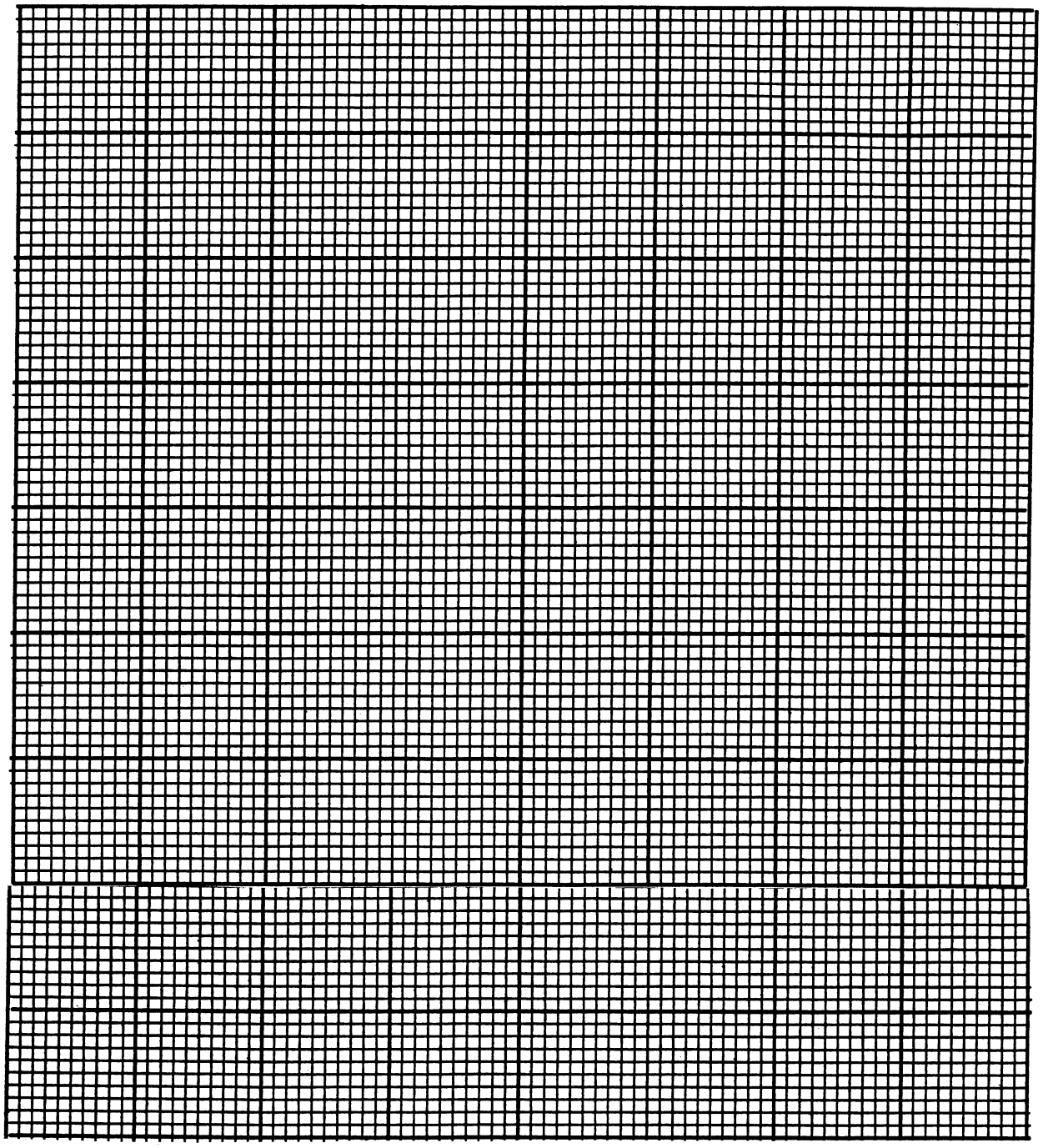
n	3½%	4%	4½%	5%	6%	7%	8%	*n*
1	0,9662	0,9615	0,9569	0,9524	0,9434	0,9346	0,9259	1
2	1,8997	1,8861	1,8727	1,8594	1,8334	1,8080	1,7833	2
3	2,8016	2,7751	2,7490	2,7232	2,6730	2,6243	2,5771	3
4	3,6731	3,6299	3,5875	3,5460	3,4651	3,3872	3,3121	4
5	4,5151	4,4518	4,3900	4,3295	4,2124	4,1002	3,9927	5
6	5,3286	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 VRAAG 10/
GRAFIEKPAPIER VIR VRAAG 10

CANDIDATE'S NUMBER / *KANDIDAAT SE NOMMER*:

INSTRUCTIONS / *INSTRUKSIES*:

- Complete this graph paper for Vraag 10, then place it at the back of your Answer Book.
- *Voltooi hierdie grafiekpapier vir Vraag 10 en plaas dit agterin jou antwoordboek.*



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