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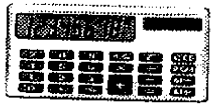

UNIVERSITEITSEKSAMENS

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QMG102-Q (419524) May/June 2007
QMS102-E (419532)
RQG102-M (419559)
RQM102-G (419540)

DEPARTMENT OF DECISION SCIENCES
INTRODUCTORY FINANCIAL MATHEMATICS

Duration : 2 Hours 100 Marks

EXAMINERS :
FIRST : MRS S ROTHMANN
SECOND : MISS J LE ROUX

Programmable pocket calculator permissible.

This paper consists of 17 pages including a list of formulæ, a table with the number of each day of the year and four sheets of paper for rough work, plus instructions for completing a mark reading sheet.

Please complete the attendance register on the back page, tear off and hand to the invigilator.

Answer *all* questions on the mark reading sheet supplied. Carefully follow the instructions for completing the mark reading sheet. Also pay attention to the following:

- Only one option (indicated as [1] [2] [3] [4] [5]) per question is correct. Do not mark more than one option per question on the mark reading sheet.
- Marks will *not* be deducted for incorrect answers.
- The paper consist of 30 questions counting a total of 100 marks.

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You are strongly advised to write your name on the mark reading sheet. Then, if you have entered your student number incorrectly, we will still be able to link you to the mark reading sheet.

Question 1

On 21 January 2007 Sarah invested an amount in an account earning 6,5% simple interest. If she has R1 200 available on 9 May 2007, then the amount that she invested was

[1] R1 006,43.
[2] R1 176,92.
[3] R1 177,36.
[4] R1 177,85.
[5] R1 223,08.

Question 2

Jonas needs R14 500 to buy a hi-fi system. Loud-and-Clear is prepared to lend him the money on condition that he signs a promissory note to pay back the money in ten months' time. If Loud-and-Clear charges a 28% simple discount rate, then the value of the promissory note equals

[1] R11 116,67.
[2] R11 756,76.
[3] R17 883,33.
[4] R18 261,62.
[5] R18 913,04.

Question 3

Bokkie wants to buy a Persian carpet. She has five interest rates to choose from if she borrows the money from the O-So-Honest Bank. The options are:

[1] 29% per year compounded monthly.
[2] 29,5% per year compounded every two months.
[3] 30% per year compounded semi-annually.
[4] 28,5% per year compounded weekly.
[5] 29% per year compounded daily.

Which is the cheapest option?

Question 4

If the continuous compounding rate for a nominal rate compounded every two months is 9,75%, then the nominal rate equals

[1] 9,67%.
[2] 9,75%.
[3] 10,00%.
[4] 10,15%.
[5] none of the above.

Question 5

Thabo will need R36 000 in five years' time. The amount of money that he must invest now at an interest rate of 7,5% per year, compounded continuously, equals

[1] R24 742,41.
[2] R25 076,11.
[3] R26 181,82.
[4] R49 500,00.
[5] R52 379,69.

Questions 6 and 7 relate to the following situation:
Harry wants to open the Fake Crown Jewels shop on 19 May 2007. On 17 November 2005 he invested R620 000 into an account earning 10,37% interest compounded quarterly. Compound interest is calculated on the first day of the first month of every quarter in the year

Question 6

If simple interest is used for odd periods and compound interest for the rest, then the amount of money that Harry will have available on 19 May 2007 equals

[1] R606 439,13.
[2] R606 539,88.
[3] R606 607,03.
[4] R606 710,07.
[5] R607 393,35.

Question 7

If fractional compounding is used for the whole period, then the amount that Harry will have available on 19 May 2007 equals

[1] R587 663,54.
[2] R591 116,07.
[3] R606 440,76.
[4] R606 610,88.
[5] R606 752,69.

Questions 8 and 9 relate to the following situation:
Three years ago Jake borrowed R7 500 from Martha. The condition was that he would pay her back in seven years' time at an interest rate of 11,21% per year, compounded semi-annually. Six months ago he also borrowed R25 000 from Martha at 9,45% per year, compounded monthly. Jake would like to pay off his debt four years from now.

Question 8

The amount of money that Jake will have to pay Martha four years from now equals

[1] R36 607,98.
[2] R45 181,81.
[3] R48 032,20.
[4] R54 278,92.
[5] R55 336,49.

Question 9

After seeing what he must pay Martha, Jake decides to reschedule his debt as two equal payments: one payment *now* and one three years from now. Martha agrees on condition that the new agreement, that will run from *now*, will be subjected to 10,67% interest, compounded quarterly. The amount that Jake will pay Martha three years from now equals

[1] R21 171,35.
[2] R22 286,88.
[3] R25 103,93.
[4] R32 500,00.
[5] none of the above.

Question 10

In three years' time Paula is going to need R145 000 to pay for a boat cruise on the Queen Mary. She *immediately starts* to make monthly deposits into an account earning 11,05% interest per year, compounded monthly. Paula's monthly deposit equals

[1] R3 384,18.
[2] R3 415,34.
[3] R4 027,78.
[4] R4 707,20
[5] R4 750,55.

Question 11

Dilly Dolly has sold one of her properties for a profit of R1 500 000. She decides to invest this money in an account earning 9,76% interest per year, compounded quarterly. The quarterly interest paid out to her every quarter for an indefinite period of time amounts to

[1] R26 912,00.
[2] R36 600,00.
[3] R48 800,00.
[4] R146 400,00.
[5] R375 000,00.

Questions 12 and 13 relate to the following situation:
Down-To-Earth sells houses. The following table represents the selling price of a house (y) in thousands of rands and the number of houses sold at that price (x).

x	5	15	19	7
y	500	900	1 500	2 000

Question 12

The standard deviation for the number of houses sold is

[1] 4.
[2] 5,72.
[3] 6,6.
[4] 11,5.
[5] none of the above.

Question 13

The correlation coefficient of a linear regression between x and y is approximately

[1] $r = -0{,}16428$.
[2] $r = 0{,}16428$.
[3] $r = 4$.
[4] $r = 5{,}72276$.
[5] none of the above.

Questions 14 and 15 relate to the following situation:
Thomas bought a house for R940 000. After making a 20% down payment on the price of the house, he managed to secure a 20 year loan for the balance. An interest rate of 10,25% per year, compounded monthly, is applicable.

Question 14

Thomas's monthly payment to amortise the loan equals

[1] R7 381,96.
[2] R9 227,45.
[3] R9 358,50.
[4] R11 503,50.
[5] R12 761,61.

Question 15

The amount of interest paid by Thomas after 12 years approximately equals

[1] R123 000.
[2] R311 000.
[3] R482 000.
[4] R580 000.
[5] R793 000.

Question 16

If $s_{\overline{n}|i} = (1+i)^n x$, then

[1] $x = a_{\overline{n}|i}$.
[2] $x = (1+i)\, a_{\overline{n}|i}$.
[3] $x = \frac{a_{\overline{n}|i}}{1+i}$.
[4] $x = \frac{(1+i)^n}{s_{\overline{n}|i}}$.
[5] none of the above.

Question 17

Suppose a simple discount rate d is equivalent to a simple interest rate r. Then the time period t under consideration can be denoted by

[1] $t = \frac{r-d}{dr}$.
[2] $t = \frac{r}{d} - 1 - r$.
[3] $t = \frac{r}{d} + 1 - r$.
[4] $t = (d-r)dr$.
[5] none of the above.

Questions 18 and 19 relate to the following situation:
Sebastiaan bought a boxing ring for R60 000 by obtaining a bank loan bearing interest at 15,75% per year, compounded half yearly. This debt must be discharged by means of the sinking fund method. The sinking fund earns 12,95% per year compounded every three months. The debt is to be discharged after five years.

Question 18

The size of each quarterly payment into the sinking fund equals

[1] R3 000,00.
[2] R4 122,00.
[3] R4 166,42.
[4] R8 891,42.
[5] none of the above.

Question 19

The total yearly cost to discharge the debt equals

[1] R8 718,08.
[2] R9 450,00.
[3] R12 000,00.
[4] R12 129,04.
[5] R18 168,08.

Question 20

The Glider Company is for sale and Crazy Charlie intends to buy it for R1 800 000. The expected return is estimated to be a uniform cashflow of R275 000 every six months for eight years. The yearly cost of capital is 11,4% compounded semi-annually. The present value of the cash flows equals

[1] R1 395 221,31.
[2] R2 565 000,00.
[3] R2 837 286,07.
[4] R4 400 000,00.
[5] R6 888 155,19.

Question 21

Tilla wants to renovate her bathroom three years from now. She estimates that it will cost her R70 000. She *starts* to save *immediately* by depositing R1 600 at the beginning of each month into an account earning 10,4%, compounded monthly. The amount still needed just before she starts to renovate her bathroom is denoted by the equation

[1] $x = 70\,000 - 1\,600a_{\overline{3\times12}|0,104\div12}$.

[2] $x = 70\,000 - 1\,600s_{\overline{3\times12}|0,104\div12}$.

[3] $x = 70\,000 - \left(1 + \frac{0,104}{12}\right) 1\,600s_{\overline{3\times12}|0,104\div12}$.

[4] $x = 70\,000 - 1\,600s_{\overline{37}|0,104\div12}$.

[5] $x = 70\,000 - 19\,200s_{\overline{3}|0,104}$.

Question 22

Monthly payments of R1 800 each are made at the end of each month for a period of 12 years into an account earning interest at 9,91% per year, compounded semi-annually. The present value of these payments approximately equals

[1] R151 275,00.

[2] R259 200,00.

[3] R487 550,00.

[4] R494 436,00.

[5] none of the above.

Question 23

Consider Stock 531

Coupon rate:	15,88% per year
Yield to maturity:	13,4% per year
Maturity date:	16 April 2034
Settlement date:	23 May 2007

The all-in price equals

[1] R111,96677%.

[2] R117,91230%.

[3] R119,50641%.

[4] R125,85230%.

[5] none of the above.

Questions 24 and 25 relate to the following situation:
The equation for the present value of Stock ABC on 07/07/07 is

$$P(07.07.07) = 6,6a_{\overline{34}|0,0785} + 7,65799$$

with $f = \frac{37}{184}$ *and the accrued interest equal to R5,31616%.*

Question 24

The clean price of Stock ABC equals

[1] R84,00947%.

[2] R85,19377%.

[3] R89,32563%.

[4] R90,50993%.

[5] R91,89586%.

Question 25

Venette decides to sell her Stock ABC with a nominal value of R1 250 000 on 7 July 2007. The amount of money that she can expect to receive is approximately equal to

[1] R1 050 120.

[2] R1 064 920.

[3] R1 066 200.

[4] R1 131 370.

[5] R1 148 700.

Question 26

An investment of R120 000 generated three successive yearly cash flows. The internal rate of return (IRR) is 10,3%. The second cash flow was R48 000 and the third cash flow was R35 000. The first cash flow approximately equalled

[1] R28 450.

[2] R37 000.

[3] R41 500.

[4] R54 460.

[5] R60 000.

Questions 27 and 28 relate to the following situation:
The following table represents the cash inflows for the Twinkle Toes Boutique for nine years.

Year	Cash inflow (R)
3	45 000
6	90 000
9	115 000

The applicable interest rate is 11,59% per year. The present value of the cash outflows is R95 000.

Question 27 -

The future value of the cash inflows approximately equals

[1] R169 330.
[2] R218 000.
[3] R250 000.
[4] R271 470.
[5] R326 950.

Question 28 -

The MIRR equals

[1] 14,72%.
[2] 21,25%.
[3] 31,90%.
[4] 38,06%.
[5] 41,91%.

Question 29

Karin has won R165 000 and decides to deposit 65% of this amount in an account earning 8,25% interest, compounded every four months. The accumulated amount after five years equals

[1] R151 490,63.
[2] R161 110,84.
[3] R161 332,31.
[4] R247 862,83.
[5] R248 203,55.

Question 30

Jeanne has taken out an endowment policy that matures in 30 years. The expected interest rate per year is 11,15%. Her first yearly payment is R7 500, after which the yearly payments will increase with R800 each year. The amount that she can expect to receive on the maturity date will be

[1] R1 536 240,75.
[2] R1 700 106,43.
[3] R2 790 641,47.
[4] R3 005 888,11.
[5] R5 916 785,00.