WMG 102

MAY/JUNE 2007

SUGGESTED SOLUTION

QUESTION 1

$S = P(1+rt)$

$P = \frac{S}{(1+rt)}$

$= \frac{1200}{(1+0{,}065 \times 108/365)}$

$= 1177{,}36$

[3]

QUESTION 2

$P = S(1-dt)$

$S = \frac{P}{(1-dt)}$

$= \frac{14500}{(1-0{,}25 \times 10/12)}$

$= 18\,113{,}64$

[5]

QUESTION 3

There are 2 ways in getting to an answer. Firstly we are borrowing money, so we are looking for the cheapest rate. Either calculate the effective rate or calculate the continuous rate.

(Note: when we invest money, looks for the highest rate)

Continuous rate: $c = m\ln(1+i)$

[1] $c = 12\ln(1+0{,}029/12) = 28{,}66\%$ 29,66

[2] $c = 6\ln(1+0{,}295/6) = 28{,}80\%$ 28,19

[3] $c = 2\ln(1+0{,}30/2) = 27{,}95\%$ 30

[4] $c = 52\ln(1+0{,}255/52) = 28{,}42\%$

[5] $c = 365\ln(1+0{,}29/365) = 28{,}99\%$

lowest rate: 27,95%

[8]

QUESTION 4

$c = m\ln(1+i)$

$0{,}095 = 6\ln(1+i/6)$

6 6

$0{,}0158 = \ln(1+i/6)$

$e^{0{,}0158} = 1+i/6$

$1{,}01638 = 1+i/6$

$e^{0{,}01638} = 1+i/6$

$i = 0{,}01650$

$= 1{,}650\%$

[5]

Remember if you cannot use ln you must use e^x

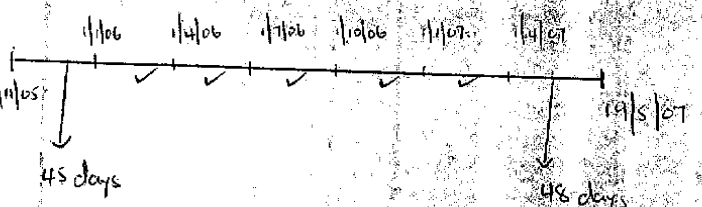
QUESTION 5

$S = Pe^{rt}$

$P = \frac{S}{e^{rt}}$

$= \frac{36000}{e^{0{,}075 \times 5}}$

QUESTION 6



$S = P(1+rt)$

$= 520000(1+0,1037 \times {}^{45}/_{365})$

$= 526\,648,16$

$S = P(1+rt)$

$= 598\,547,52(1+0,1037 \times {}^{48}/_{365})$

$= 606\,710,07$

PV = 526 648,16
i = 10,37/4
n = 4 × 5/12
FV = 598 547,52

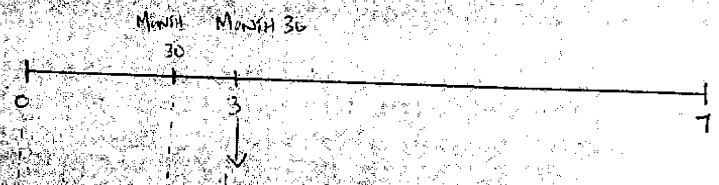
[4]

QUESTION 7

PV = 520 000
i = 10,37/4
n = $4 \times [{}^{15}/_{12} + {}^{93}/_{365}] = 6,0918$
FV = 606 610,88

[4]

QUESTION 8



PV = 7500
i = 11,21/2
n = 2 × 7
FV = 11 093,26

PV = 25000
i = 9,45/12
n = 12 × 4 1/2
FV = 38 165,66

R54 778,92

[4]

QUESTION 9

COMMON DATE WILL BE NOW

FV = R54 778,92
i = 10,67/4
n = 4 × 4
PV = R35 620,18

NOW, THE PV OF ALL AMOUNTS OWED IS R35 620,18
WE PAY NOW, 'X' AND THREE YEARS FROM NOW 'X'

WE WILL PAY AT YEAR 6 [NOW FOR 3 YRS]

$(35620,18 - X)$ IS THE NEW PV

$(35620,18 - X)(1 + 0,1067/4)^{4\times3}$
$(35620,18 - X)(1,37150)$
$48\,853,96 - 1,37150X$
$2,37150X$
X

$-X = 0$
$-X = 0$
$-X = 0$
$= 48\,853,96$
$= R20600$

[Q8]

Question 10

Beg. Mode [Annuity Due]

FV = 145000
i = 11,05/12
n = 12x3
PMT = 3384,18

[1]

Question 11

Perpetuity in Reverse: $P = 1/i$ or R/i

where 'R' is the annuity.

$R = P \times i$
$= 1500,000 \times 9.76\% \times 1/4$
$= R36600$ →

[2]

Question 12

HP

5 2nd
15 "
19 "
7 "

Clear Screen [C]
2nd Sx = 6,6

Sharp [STAT MODE].

5 M+
15 "
19 "
7 "

Clear Screen [C]
2nd Sx = 6.6

[3]

Question 13

HP

5 input, 500 2nd
15 " , 900 "
19 " , 1500 "
7 " , 2000 "

Clear Screen [C]
2nd I
2nd Sharp = r
r = 0,16428

[2]

Sharp.

5 MR ; 500 M+
15 " ; 900 "
19 " ; 1500 "
7 " ; 2000 "

Clear Screen [C]
2nd F r

Question 14

PV = 940 000 x 80% = 752 000
n = 12x20
PMT = 7381,96 →

[1]

Question 15

Remember: Interest = Instalments − Principal
Principal = Balance at y10 − Balance at y12

Balance at y12 [DO NOT CLEAR Q14]
240 − 144 = 96 n ; Compute PV
PV = 482 267,56

Principal = 752000 − 482 267.56
= 269 732,44 →

Instalments Paid for 12 years.

R7381,96 × 12mon Pa × 12 years
= 1063 002,24

Total Int. Paid = R 1063 002,24 − 269 732,44
= R 793 269,80
≃ R 793000 → [5]

QUESTION 16

$S_{\overline{n}|i} = (1+i)^n x$ Note $S_{\overline{n}|i}$ is F.V. of Annuity

$\frac{(1+i)^n - 1}{i} = (1+i)^n x$

$x = \frac{(1+i)^n - 1}{i} \times \frac{1}{(1+i)^n}$

$= \frac{(1+i)^n - 1}{i(1+i)^n}$

= P V of Annuity

$= a_{\overline{n}|i}$ → [1]

QUESTION 17

$S = P(1+rt)$, $P = S(1-dt)$

$\frac{P}{S} = \frac{S(1-dt)(1+rt)}{S}$

$1 = 1 - dt + rt - drt^2$

$\frac{dt - rt}{-dt} = \frac{-drt^2}{-drt}$

$\frac{t(d-r)}{dt} = t$

$t = \frac{r-d}{dr}$ → [1]

QUESTION 18

FV = 60 000 ; FV = 60 000
j = 17,95/4 ; j = 17,95/4
n = 2 × 2 ; n = 4 × 2
Pmt = 2179,52 → [5]

QUESTION 19

R8 400 × 15 % = 9450 [2]
+ 2179,52 × 4 = 18168,08

Question 20

-1800,000 Cf.
275,000 Cf.
16 Nj
11,4/2 i

Compute NPV

= 1037 286,07
ADD 1800,000,00
2837 286,07

OR

PMT = 275000
i = 11,4/2
n = 2×8
PV = 2837 286,07

[3]

Question 21

R70,000 is the future value.
She starts investing now [BEG MODE]
(R1600)

Amount Needed = R70,000 - FV of 1600

FV of R1600 is: $R s_{\overline{n|}i} (1+i)$
= $1600 s_{\overline{3\times4}|0,104/12} \left(1+\frac{0,104}{12}\right)$

∴ Answer.

[3]

Question 22

Convert Rate

HP
9.91 2ND Nom
2 2ND P/Y
2ND Eff
= 10.16%
→ 12 2ND P/Y
2ND Nom
= 9,71%

Sharp
2 2ND Eff
9.91
10.16%
12 2ND APR
10,16 =
9.71%

PMT = 1800
i = 9.71/12
n = 12 × 12
PV = R159751

[8]

Question 23

16/4/07 — 23/5/07 — 16/10/07 — 16/4/08 — - - - n - - - 16/4/2034

PMT = 100 × 15,88% × 1/2
= 7,94
FV = 100

i = 13,4/2
n = (2×26)+1
= 53

PV = R117,91230

Cum interest → Buyer gets interest

H = 183
R = 146
f = 146/183

R 117,91230
+ 7,94
125,85230

FV = 125,85230
i = 13,4/2
n = 146/183
PV = R119,50641

[3]

QUESTION 24

PMT = 6,6
FV = 100
i = 15,7/2
n = 34
PV = R85,29586 ✓

Cum Int

R85,29586 ✓
+ 6,6
R91,89586 ✓

FV = 91,89586
i = 15,7/2
n = 37/184
PV = R90,50993 ✓ (CAll – n)

∴ Clean Price = R90,50993 ✓ – R5,31616 ✓
= R85,19377 ✓

[2]

QUESTION 25

7/7 to First Int Date
Value on this date is R85,29586 ✓

∴ R 1250,000 ÷ 100 × R85,29586 ✓
≅ R 1066200

[3]

QUESTION 26

Quick way is Trial & Error

– 120,000 cf
60,000
48000
35000
2ND IRR = 10,26 ✓ = 10,3 ✓

[5]

QUESTION 27

PV	45000	90000	115000
	11.59	11.59	11.59
n	6	3	0
FV	86555,88	125059.98	115000

Σ = R326950

[5]

QUESTION 28

$$MIRR = \left(\frac{FV_{out}}{PV_{in}}\right)^{1/n} - 1$$

$$\left(\frac{326950}{95000}\right)^{1/9} - 1$$

14.72 ✓

[1]

Question 29

PV = 165000 × 0,65

= 107250

I = 8,25/3

n = 3×5

FV = R161 110,84 [2]

Question 30

$$S = \left[\frac{(1+i)^n - 1}{i}\right]\left[R + \frac{Q}{i}\right] - \frac{nQ}{i}$$

$$= \left[\frac{(1+0,1115)^{30} - 1}{0,1115}\right]\left[7500 + \frac{800}{0,1115}\right] - \left[\frac{30 \times 800}{0,1115}\right]$$

$$= (204,83210)(14674,89) - (215246,64)$$

$$= \underline{R2790641,90} \quad [3]$$

Good Luck