SOLUTION TO FIRST CYCLE 2012 BUSINESS MATHEMATICS

1. Let the capital = 1

   $AV = C(1+i)^n$

   $2 = 1(1.05)^n$

   $n = \frac{log2}{log1.05}$

   $n = 14\ years$ (B)

2. $Unique\ payment = C_1(1+i)^{n-p1} + C_2(1+i)^{n-p2} + \dots\dots + C_n(1+i)^{n-pn}$

   $\Rightarrow n = 4$

   $; AV = 10000(1.09)^2 + 20000(1.09) + 15000 + (1.09)^{-1}$

   $AV = 11881 + 21800 + 13761.461$

   $AV = 47443\ FRS$ (D)

3. $Let\ the\ initial\ sum = 1\backslash$

   $AV = c(1+i)^n$

   $3 = 11(1+i)^{20}$

   $20log1 + i = log3$

   $log1 + i = \frac{log3}{20}$

   $log1 + i = 0.023856062$

   $1 + i = 1.056$

   $i = 0.056$

   $r = 5.6\%$ (C)

4. $AV = 2000\,000$

   $C = ?$

   $i = 0.07$

   $n = 01/01/09 - 31/12/01 = 3$

   $AV = C(1+i)^n$

   $2000\,000 = c(1.07)^3$

   $C = \frac{2000000}{(1.07)^3}$

   $\mathbf{C = 1632596}$ (B)

5.

6. *let the increase be in AP with first term* $= 0$

$d = 5000\ tons$

$n = 1990 - 2011 = 20\ years$

$\sum d = \left[\frac{n-1}{2}\right] nd$

$\sum d = \left[\frac{21-1}{2}\right] \{21 * 5000\}$

$\sum d = 1\ 050\ 000$

$Total\ product = 1050000 + 1\ 000\ 000$

$Total = 2\ 050\ 000$ (A)

7. $N = 20000$

$C = 200$

$Ci = 11$

$R = 220$

$n = 15$

$r = \frac{C}{R} = \frac{11}{220} = 0.05$

$A_1 = 20000[\frac{0.05}{(1.05)^{15} - 1}]$

$A_1 = 926.85$ (D)

8. $AV = C(1+i)^n$

$AV = 33455.6395$

$C = 25000$

$i = 0.06$

$\Rightarrow 33455.6395 = 25000(1.06)^n$

$\frac{AV}{C} = (1+I)^n(1+I)^n \Rightarrow \frac{33455.6395}{25000} = (1.06)^n$

$1.33822558 = (1.06)^n$

$n = \frac{log 1.33822558}{log 1.06}$

$n = 5\ years$ (A)

9. $C = 3\ 000\ 000$

$AV = 4964987$

$n = 8$

$AV = C(1+i)^n$

$4964987 = 3000000(1+i)^8$

$\frac{4964987}{3000000} = (1+i)^8$

$1.654995667 = (1+i)^8$

$\frac{log1.654995667}{8} = 1+i$

$log1 + i = 0.027349607$

$1 + i = 1.065$

$i = 0.065$

$\mathbf{r = 6.5\%}$ **(D)**

10.

11.

12. $Let\ the\ 1st\ term = a$

$common\ ratio = r$

$5th\ term = ar^4$

$9^{th} term = ar^8$

$ar^8 = 32805000$

$ar^4 = 405000$

$\frac{ar^8}{ar^4} = r^4$

$r^4 = \frac{32805000}{405000}$

$r^4 = 81$

$r = \sqrt[4]{81}$

$r = 3$ (A)

13.

14. $NAV = OV(1-r)^n$

$NAV_{12} = OV(1-r)^{12}$

$NAV_{12} = \frac{400000}{5} = 80000$

$\Rightarrow 80000 = 400000(1-r)^{12}$

$\frac{80000}{400000} = (1-r)^{12}$

$0.2 = (1-r)^{12}$

$log0.2 = 12log1 - r$

$log1 - r = \frac{log0.2}{12}$

$log1 - r = 0.0582475$

$1 - r = 0.87448$

$r = 12.6\%$ (D)

15. *daily expenditure*

$breakfast = \frac{9}{60}$

$Launch = \frac{3}{6}$

$dessert = \frac{4}{45}$

$saving = 19500$

$Total\ budget = \frac{9}{60} + \frac{3}{6} + \frac{4}{45} + 19500$

$Total\ budget - 19500 = \frac{9}{60} + \frac{3}{6} + \frac{4}{45}$

$\frac{27 + 90 + 16}{180} = \frac{133}{180}$

$\Rightarrow 180 - 133 = 47$

$47 = 19500$

$180 = x$

$47x = 3510000$

$x = \frac{3510000}{47}$

$x = 74680$

$Total\ budget = 74680\ Frs$

16. $Original\ price = 100\%$

$Price\ decrease = 25\%$

$New\ price = 75\%\ of\ original\ price$

$75 = 6600$

$100 = x$

$x = 8800frs$

$Original\ price = 8800Frs$

$lo = 192300Frs$

$$a = lo\left[\frac{i}{(1-(1+i)^{-n}]}\right]$$

$$23746.265 = 192300\left[\frac{0.0416}{[1-(1.0416)^{-n}]}\right]$$

$$\frac{23746.265}{192300} = \frac{0.0416}{[1-(1.0416)^{-n}]}$$

$$\frac{0.123480369}{1} =$$

SECTION B

17. $Let\ the\ two\ amounts = A, B$

$A = A$

$B = \frac{3}{4}A \Rightarrow B = 0.75A$

$Let\ the\ duration\ of\ investment\ be = t$

$$\Rightarrow \frac{A*6*t}{1200} = \frac{0.75A*6*(t+6)}{1200}$$

$0.005t = 0.00375 + 0.02625$

$0.05A - 0.0375A = 5000$

$0.0125A = 5000$

$A = 400\,000$

$B = 400\,000(0.75)$

$B = 300\,000frs$

18. $Interest\ of\ last\ year = 948.39$

$A_{n-1} = 22797.875$

$A_{n-1} = A_n$

$\Rightarrow An = 22797.875$

$a = An + In$

$\Rightarrow a = 22797.875 + 948.39$

$a = 23746.265$

$a = An(1+i)$

$1 + i = \frac{a}{An}$

$1 + i = \frac{23746.265}{22797.875}$

$1 + i = 1.0415999 \cong 1.0416$

$i = 0.0416$

$r = 4.16\%$

$loi = 8000$

$lo(0.0416) = 8000$

$lo = \frac{8000}{0.0416}$

$lo = \frac{8000}{0.0416}$

$lo = 192300Frs$

$a = lo\left[\frac{i}{(1-(1+i)^{-n}]}\right]$

$23746.265 = 192300\left[\frac{0.0416}{[1-(1.0416)^{-n}]}\right]$

$\frac{23746.265}{192300} = \frac{0.0416}{[1-(1.0416)^{-n}]}$

$\frac{0.123480369}{1} = \frac{0.0416}{[1-(1.0416)^{-n}]}$

$from\ the\ financial\ table, -n = 10\ years$

$\Rightarrow n = 10\ years$