INV2601 OCT/NOV 2010 EXAM MEMORANDUM

Question	Correct Option	Solution
1	**3**	Nominal risk free rate (NRFR) = [(1 + RRFR)(1+EI) - 1] × 100 = [(1.08) (1.05) – 1] × 100 = [1.134 – 1] × 100 = 13.40%
2	**3**	ii Establishing investment objectives and constraints v Establishing investment policy i Selecting a portfolio strategy iv Selecting assets iii Measuring and evaluating performance ii v i iv iii
3	**2**	i Liquidity and price continuity iii Low transaction costs iv External efficiency i iii iv
4	**2**	Close to R115
5	**4**	Unsystematic risk
6	**2**	No growth model: $P_o = \frac{E}{k}$ Where E = R5.00 k = ? $k = RFR + \beta(R_m – RFR)$ = 6 +1.4(12 – 6) = 6 + 8.4 = 14.40%

		$P_0 = \frac{5.00}{0.144}$ $= R34.72$
7	**1**	$Beta\ coefficient\ (\beta) = \frac{corr_{Z,M} \times \sigma_Z \times \sigma_M}{\sigma^2{}_M}$ $= \frac{0.75 \times \sqrt{15} \times \sqrt{2}}{2}$ $= 2.05$
8	**4**	E_A = 3.20 + 4.4(0.75) +5.1(2.10) = 3.2 + 3.3 +10.71 = 17.21% E_B = 3.20 + 4.4(0.8) +5.1(4.25) = 3.20 + 3.52 + 21.675 = 28.40%
9	**1**	FV 0 PMT 10 000 N 8 I/YR 12% COMP PV 49 676.40 PMT 0 FV 49 676.40 N 5 I/YR 12% COMP PV R28 188
10.	**1**	PV -R1 500 FV R1 840 N 4 COMP I/YR 5.24%
11	**1**	FV 545 000 N 10 [5 × 2] I/YR 7% [8 + 6 = 14/2 = 7%] COMP PV R277 050

12	**4**	$k = \frac{D_1}{P_0} + g$ Expected rate of return = $\frac{2}{50} + 0.05$ $= 9\%$ Expected return (9%) ≤ Required return (14%). Therefore don't buy because the share is overvalued.
13	**2**	The formula for the three stage dividend model is as follows: $V_0 = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \frac{P_3}{(1+k)^3}$ $Where: P_3 = \frac{D_4}{k-g}$ **Step 1:** Calculate the expected future cash flows: $D0 = 1.00$ $D1 = 1(1.25) = 1.25$ $D2 = 1(1.25)(1.15) = 1.4375$ $D3 = 1(1.25)(1.15)(1.10) = 1.5813$ $D4 = 1(1.25)(1.15)(1.10)(1.05) = 1.6603$ $P_3 = \frac{D_4}{k-g}$ $= \frac{1.6603}{0.10 - 0.05}$ $= R33.206$ **Step 2:** Calculate the intrinsic value: $V_0 = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \frac{P_3}{(1+k)^3}$ $= \frac{1.25}{(1.10)^1} + \frac{1.4375}{(1.10)^2} + \frac{1.5813}{(1.10)^3} + \frac{33.2060}{(1.10)^3}$ $= 1.1364 + 1.1880 + 1.1881 + 24.9482$ $= R28.46$ Or Having completed the first step, you can also use your financial calculator to complete the second step as follows.

		33.2060 ← P_3 $\underline{+1.5813}$ ← D_3 0 R1.25 R1.4375 R34.7873 ← $Cash\ flows$ 0 1 2 3 ← Years $CF_0 = 0$ $CF_1 = 1.25$ $CF_2 = 1.4375$ $CF_3 = 34.7873\ \ (1.5813 + 33.206)$ $\quad NB: CF_3 = D_3 + P_3$ $I/YR = 10\%$ $COMP\ NPV = \text{R}28.46$
14	**2**	Price /book value (P/BV) = $\frac{\text{Price per share}}{\text{Book value per share}}$ $= \frac{25}{1.50}$ =16.67
15	**4**	Selling previously bought government securities
16	**3**	ROE = net profit margin × total asset turnover × financial leverage = 5.50% × 2.7 × 2 =29.70%
17	**2**	A high probability of low or negative rates of return
18	**2**	Supply and demand are governed by numerous factors that are only rational
19	**1**	Share’s price rises above its 200-day moving average
20	**4**	Margin = 200 × R60 × 0.50 = R6 000 Profit = (75 – 60) × 200 = R3 000

		Rate of return = $\frac{3\ 000}{6\ 000}$ = 50%
21	**3**	Sinking fund provision
22	**3**	**Step 1:** Calculate the yield to maturity FV R1 000 PV -R1 200 PMT 80 N 20 COMP I/YR 6.22% **Step 2:** Calculate the bond equivalent yield $= [(1 + \ 0.0622)^{0.5}$ - 1] ×100 × 2 $= [(1.0622)^{\ 0.5}$ - 1] ×100 × 2 = [1.0306 – 1] × 100 × 2 = 6.13%
23	**3**	Calculate the yield to call: FV R1 364 PV -R1 115.57 PMT 35 N 16 COMP I/YR 4.4159 =4.4159 × 2 =8.29%
24	**3**	**Step 1:** Calculate the future value of reinvested coupons =R100(1.09) + R100 =R109 + R100 =R209 **Step 2:** Calculate the total future value = Future value of reinvested coupons + par value of bond = R209 +R1 000 =R1 209

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Step 3: Calculate the realized compound or horizon yield
FV R1 209
PV -R1 093
N 2
COMP I/YR 5.17%

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Calculate the equivalent 12-month spot rate

$$\frac{7.50}{1.04} + \frac{107.50}{(1 + x)^2} = 102.75$$

$$7.2115 + \frac{107.5}{(1 + x)^2} = 102.75$$

$$\frac{107.5}{(1 + x)^2} = 95.5385$$

$(1 + x)^2 = 1.1252$
$1 + x = 1.1252^{0.5}$
x = (1.0608 – 1) × 100 × 2
x = 12.16%

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<tr><td>26</td><td>2</td><td>

<table>
<tr><th></th><th>V_-</th><th>V_0</th><th>V_+</th></tr>
<tr><td>FV</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>PMT</td><td>40</td><td>40</td><td>40</td></tr>
<tr><td>N</td><td>10</td><td>10</td><td>10</td></tr>
<tr><td>I</td><td>5.5</td><td>6</td><td>6.5</td></tr>
<tr><td>PV</td><td>886.936</td><td>852.80</td><td>820.279</td></tr>
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$$\text{Effective duration} = \frac{(V-) – (V+)}{2V_0\,(\Delta y/100)}$$

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		$= \dfrac{886.936 - 820.279}{2 \times 852.80 \times 0.01}$ $= \dfrac{66.657}{17.053}$ $= 3.909$
27	**2**	Convexity effect = $C(\Delta y/100)^2$ $= 93.85 \times (1.5/100)^2$ $= 93.85 \times 0.0002$ $= 0.0211$
28	**3**	South African Futures Exchange (SAFEX)
29	**2**	i Forward contracts ii Futures contracts iv Swaps i ii iv
30	**3**	Theoretical futures price $= \mathrm{F}(1 + \mathrm{r})^{\mathrm{t}}$ = 130(1.06) = R137.80
31	**4**	Theoretical futures price (R137.80) > market price (R100) Reverse cash and carry arbitrage Sell spot; invest proceeds; buy futures
32	**3**	Maximum profit = X – premium = Breakeven = 70 – 2.45 = R67.55
33	**1**	Put-call parity: $S + p = c + \dfrac{X}{(1 + r)^{t}}$ $100 + 6.50 = c + \dfrac{105}{(1.08)^{0.5}}$ 100 + 6.50 = c + 101.0393 106.50 = c + 101.0393

		c = 106.50 – 101.0393 c = R5.46
34	**2**	Covered call
35	**2**	Lower bound price of a call: C ≥ S – $X(1+r)^{-t}$ ≥ 115 – $100(1.10)^{-0.75}$ ≥ 115 – 93.1012 ≥ R21.90
36	**4**	$Correlation\ coefficient\ = \dfrac{Covariance_{A,B}}{\sigma_A \times \sigma_B}$ $= \dfrac{0.032}{0.26 \times 0.14}$ $= \dfrac{0.032}{0.0364}$ = 0.879
37	**3**	Standard deviation of a portfolio $= \sqrt{(0.3^2 \times 0.2^2) + (0.7^2 \times 0.1^2) + (2 \times 0.3 \times 0.7 \times 0.5 \times 0.2 \times 0.1)}$ $= \sqrt{(0.09 \times 0.04) + (0.49 \times 0.01) + (0.0042)}$ $= \sqrt{(0.0036 + 0.0049 + 0.0042)}$ $= \sqrt{0.0127}$ =11.27%
38	**3**	Equally invested in X and Z
39	**4**	Yield spread analysis
40	**2**	Jensen measure = $r_p - [r_f + \beta(r_m - r_f)]$ = 30 – [9 + 1.6(14 – 9)] = 33 – 17 = 13%