ICAN PROFESSIONAL LEVEL

FINANCIAL MANAGEMENT

END OF DIET SOLUTIONS

SUGGESTED SOLUTION TO Q1

Net present value calculation

Year	**0**	**1**	**2**	**3**	**4**	**5**
	N'000	**N'000**	**N'000**	**N'000**	**N'000**	**N'000**
Sales revenue (w1)		7,500	21,600	58,300	75,540	129,200
Less: Variable costs (w2)		3,000	8,400	22,050	27,780	46,170
Fixed costs		1,500	1,575	1,654	1,736	1,823
Training and development		3,600	3,360	2,205	2,778	4,617
Cash flows before tax		**(600)**	**8,265**	**32,391**	**43,246**	**75,590**
Taxation (w3)		2,520	747	(4,078)	(6,249)	(8,718)
Working capital	(1,500)	(1,410)	(3,670)	(1,724)	(5,366)	13,670

Machinery	(120,000)	----	-----	-----	-----	40,000
Net cash flows	(121,500)	510	5,342	26,589	31,631	120,542
DCF @ 12%	1	0.8929	0.7971	0.7118	0.6355	0.5674
Present values (12%, w4)	**(121,500)**	**455**	**4,259**	**18,926**	**20,102**	**68,399**

Net present value is approximately N(9,359,000)

Workings

W1 – DETERMINATION OF SALES VALUE

Year (n)	1	2	3	4	5
Units produced and sold	7,500	20,000	50,000	60,000	95,000
Unit price N1000(1.08)^n	1,000	1,080	1,166	1,259	1,360
Sales revenue (Qty X SP)	7,500	21,600	58,300	75,540	129,200

W2- **DETERMINATION OF VARIABLE COST**

Year (n)	1	2	3	4	5
Units produced and sold	7,500	20,000	50,000	60,000	95,000
variable costs	400	420	441	463	486
Variable costs (N'000)	3,000	8,400	22,050	27,780	46,170

W3- DETERMINATION OF TAX LAIBILITY

Year	1	2	3	4	5
Cash flows before tax (N'000)	(600)	8,265	32,391	43,246	75,590
Capital Allowance (N'000)	(12,000)	(12,000)	(12,000)	(12,000)	(32,000)
Taxable profits (N'000)	(12,600)	(3,735)	20,391	31,246	43,590
Taxation@20% (N'000)	(2,520)	(747)	4,078	6,249	8,718

W4- DETERMINATION OF APPROPRIATE DISCOUNT RATE

Asset beta of project = 1.8 x (3 x 125)/(3 x 125 + 92 x 1.02 x 0.8)
= 1.50

Equity beta: project beta adjusted for financial risk of ATC = 1.5 x (3.5 x 104 + 156 x 0.8)/(3.5 x 104)
= 2.014

Cost of euqity = $\mathbf{R_f + B(R_m - R_f)}$
= 3% + 2.014 x 6%
= 15.08%

WACC (discount rate) = ke(Ve/Vf) + Kd(Vd/Vf)
= (15.08% x 364 + 6% x 0.8 x 156)/520
= 11.996% approx. 12%.

SUGGESTED SOLUTION TO Q2

MACHINE AA

Expected sales and contribution Yr1 and Yr2 – Machine capacity 105,000units

Demand	Prob	Exp value
65,000	0.20	13,000
85,000	0.30	25,500
95,000	0.30	28,500
105,000*	0.20	21,000
		88,000

Expected contribution = 88,000 x N1 = N 88,000

- Where the possible demand is above the machine capacity, the machine capacity prevails

- Year 3 – Capacity 90,000unit

Demand	Prob	Exp value
65,000	0.20	13,000
85,000	0.30	25,500
90,000	0.30	27,000
90,000	0.20	27,000
		92,500

- Expected contribution = 92,500 x N1

- *Calculation of Annual cash flow*

Year	1	2	3
Contribution	88,000	88,000	92,500
Operating cost	(50,000)	(70,000)	(100,000)
Profit	38,000	18,000	(7,500)

- *DETERMINATION OF OPTIMUM REPLACEMENT PERIOD*

Replace Every Year

ITEM	YEAR	CASHFLOW	DCF @ 145	PV
Outlay	0	(75,000)	1	(75,000)
Profit	1	38,000	0.88	33,440
Scrap value	1	40,000	0.88	35,200
			NPV	(6,360)

AEC = 6360/0.88
= 7,227

Replace Every Two years

ITEM	YEAR	CASHFLOW	DCF @ 145	PV
Outlay	0	(75,000)	1	(75,000)
Profit	1	38,000	0.88	33,440
Profit	2	18,000	0.77	13,860
Scrap value	2	30,000	0.77	23,100
			NPV	(4,600)

AEC = 4600/1.65

= 2788

- Replace Every Three years

ITEM	YEAR	CASHFLOW	DCF @ 145	PV
Outlay	0	(75,000)	1	(75,000)
Profit	1	38,000	0.88	33,440
Profit	2	18,000	0.77	13,860
Profit	3	(7,500)	0.67	(5,025)
Scrap value	3	25,000	0.67	16,750
			NPV	(15,975)

AEC = 15975/2.32

= 6886

- SUMMARY

OPTION	AEV
Replace every year	(7,227)
Replace Every two years	(2,788)
Replace Every three years	(6,886)

- Decision – based on the summary above, it is cheaper to replace the machine every two years to minimize average Annual cost

MACHINE ZZ

Demand	Prob	Exp value
65,000	0.20	13,000
85,000	0.30	25,500
95,000	0.30	28,500
115,0000.20	23,000	
		90,000

Expected Contribution = 90,000 x N1

N90,000

NB - the capacity of the machine in each of the three(3) years, which is 130,000 is above all the possible market demands, this implies that the market demand prevails.

DETERMINATION OF ANNUAL PROFITS

Year	1	2	3
Contribution	90,000	90,000	90,000
Operating cost	(50,000)	(55,000)	(60,000)
Profit	40,000	35,000	30,000

ETERMINATION OF OPTIMUM REPLACEMENT PERIOD

Replace Every Year

ITEM	YEAR	CASHFLOW	DCF @ 145	PV
Outlay	0	(120,000)	1	(120,000)
Profit	1	40,000	0.88	35,200
Scrap value	1	70,000	0.88	61,600
			NPV	(23,200)

AEC = 23,200/0.88

= 26360

Replace Every Two years

ITEM	YEAR	CASHFLOW	DCF @ 145	PV
Outlay	0	(120,000)	1	(120,000)
Profit	1	40,000	0.88	35,200
Profit	2	35,000	0.77	26,950
Scrap value	2	60,000	0.77	46,200
			NPV	(11,650)

AEC = 11650/1.65

= 7061

Replace Every Three years

ITEM	YEAR	CASHFLOW	DCF @ 145	PV
Outlay	0	(120,000)	1	(120,000)
Profit	1	40,000	0.88	35,200
Profit	2	35,000	0.77	26,950
Profit	3	30,000	0.67	20,100

• Scrap value	3	55,000	0.67	36,850	

- NPV (900)
- AEC = 900/2.32
- = 388
- SUMMARY

OPTION	AEV
Replace every year	(26,364)
Replace Every two years	(7,061)
Replace Every three years	(388)

- Decision – based on the summary above, it is cheaper to replace the machine every three years to minimize average Annual cost

CONCLUSION- Which machine should be selected?

MACHINE	OPTION SELECTED	AEV of the option
AA	Every 3 years	(2,788)
ZZ	Every 2 Years	(388)

Machine ZZ has the least AEV of cost and should be selected

(b) OTHER FACTORS TO BE CONSIDERED

- Obsolescence
- Terms of supply
- Taxation
- Level of reliability of the sales estimates
- Possible subsidized financing

(c) from the calculations in (a) above, the tow machines (AA & ZZ) generates negative NPV. This means that none of the new machines should be acquired.

ii. When to replace the Existing Machine

Determination of expected Sales and

Contribution

Year 1

Demand Unit	probability %	Expected Sales (units)
65,000	0.20	13,000
85,000	0.30	25,500
95,000	0.30	28,500
110,0000.20	22,000	
		89,000

Expected Contribution in year 1 = 89,000 X N1

= N89,000

Note that where the capacity is below the possible market demand, the capacity prevails. Thus, in the above calculation, market demand of 115,000is above the capacity of 110,000,hence, 110,000 is substituted in place of 115,000.

Year 2

Demand Sales Unit	probability %	Expected (units)
65,000	0.20	13,000
85,000	0.30	25,500
95,000	0.30	28,500
90,000	0.20	18,000
		83,500

Expected Contribution in year 2 = 83,500 X N1

= N83,500

OPTION 1: SCRAP NOW

Since the new machine is not acquired, only the scrap value of the old machine is relevant. Scrap Value=NPV= N50,000

OPTION 2: SCRAP AFTER 1 YEAR

Item	Year	NCF	DCF@14%	PV
Operating Cost	1	(60,000)	0.88	(52,800)
Contribution	1	89,000	0.88	78,320
Scrap Value	1	30,000	0.88	26,400
			NPV	**51,920**

OPTION 3: SCRAP AFTER 2 YEARS

Item	Year	NCF	DCF@14%	PV
Operating Cost	1	(60,000)	0.88	(52,800)
	2	(80,000)	0.77	(61,600)
Contribution	1	89,000	0.88	78,320
	2	83,500	0.77	64,295
Scrap Value	2	10,000	0.77	7,700
			NPV	**35,915**

CONCLUSION: The best option is to keep the machine for one more year and scrap in at the end of year 1

SUGGESTED SOLUTION TO Q3

(a) Discount rate for the appraisal of the proposed diversification into freezers

First, estimate the average equity beta in the freezer industry, then degear this figure. Regear it up to Hotalot's debt/equity ratio and apply the CAPM to find Hotalot's cost of equity. A WACC can then be calculated for Hotalot.

Step 1: Average equity beta in the freezer industry

Company	**Value of shares***		**Equity Beta factor**
F	16 million x 0.25 x 12 =	N48 million	1.1
G	9 million x 0.533 x 10 =	N48 million	1.25
S	14 million x 0.381 x 9 =	N48 million	1.30
T	10.6 million x 0.323 x 14 =	N48 million	1.05
		N192 million	

**Value of shares = Number of shares x EPS x PE ratio*

Since all the companies have the same market value of shares, the average equity beta is simply:

$$\frac{1.1+1.25+1.3+1.05}{4} = 1.175$$

Total value of debt in the companies is:

	N'million
F:	5.3
G:	12.6
S:	18.2

T: 4.0

40.1 million

The average debt/equity ratio in the freezer industry is therefore

40.1/192

Degearing the equity beta:

βa = βe E/E+D(1-t)

Ba = 1.175 X 192/192+40.1(1-0.35)

=1.035

The market value of Hotalot's shares is (4 million x N1.06 x 8)

= N33.92 million,

the market value of its debt is N17.4 million. Then regearing the beta to Hotalot's debt/equity ratio:

$$\beta e = \beta a + (\beta a - \beta d)\left(\frac{Vd(1-T}{Ve}\right)$$

1.035 + (1.035-0)(17.4X0.65)/33.92

= 1.38

The required return on Hotalot's equity, from the CAPM

= Rf + (Rm − Rf) β

= 9% + (16% − 9%) 1.38

= 18.66%

The weighted average cost of capital for Hotalot's new diversification is

$$Ke\left(\frac{VE}{ve+vp+vd}\right)\left(\frac{Vd}{1-t}\right)$$

$$)\ \boldsymbol{ve} + \boldsymbol{vp} + \quad) + \mathbf{Kd}(\qquad) \quad \boldsymbol{vd}\ (\mathbf{1} - \boldsymbol{t})$$

$$\mathbf{18.66\%}\left(\frac{\mathbf{33.92}}{\mathbf{33.92+17.4}}\right) + \mathbf{9.5\%(1-0.35)}\left(\frac{\mathbf{17.4}}{\mathbf{33.92+17.4}}\right)$$

14.42%

(b) The assumption that corporate debt is risk-free

Corporate debt is not risk-free. There is a risk of default which implies that the debt has a positive beta. Studies show that corporate debt is likely to have a beta of between 0.2 and 0.3.

From the information given in this question Hotalot must have a debt beta of 0.0714 since its Kd = 9% + (16% − 9%) 0.0714 = 9.5%. However the instruction in the question is to assume a debt beta of 0.3, and this must, of course, be observed.

Assuming that all corporate debt has a beta of 0.3, both the degearing and regearing calculations in part (b) above will need to be adjusted.

The 'asset beta' of an organisation is the weighted average of the beta of equity and the beta of debt. The asset beta is the same as the degeared beta, so:

$$Ba = 1.175\left(\frac{192}{192+(40.1x0.65}\right) + 0.3\left(\frac{(40.1x0.65)}{192+(40.1x0.65)}\right)$$

$$= 1.07$$

This is the revised degeared β for the freezer industry.

Regearing to Hotalot's level of gearing –

$$Be\left(\frac{33.92}{33.92+17.4}\right) + 9.5\%(1-0.35)\left(\frac{17.4}{33.92+17.4}\right) = 1.07$$

$$1.07 = \beta e \times 0.075 + 0.075$$

$$\beta e = 1.327$$

Applying the CAPM gives Hotalot's cost of equity as 9% + (16% − 9%) 1.327

= 18.29%

Hotalot's WACC then becomes

$$\mathbf{18.29\%}\left(\frac{33.92}{33.92+17.4}\right) + \mathbf{9.5\%(1-0.35)}\left(\frac{17.4}{33.92+17.4}\right)$$

14.18%

Compared with the original estimate of 14.42%. The margin of error on these estimates is, however, quite high – which means that the assumption that corporate debt is risk-free is unlikely to have a significant effect on the accuracy of Hotalot's estimates.

(c) Portfolio theory suggests that the total risk of a portfolio of investments can be reduced by diversifying the investments held in the portfolio, e.g. by investing capital in a number of different shares rather than buying shares in only one or two companies.

Even when a portfolio has been well-diversified over a number of different investments, there is a limit to the risk-reduction effect, so that there is a level of risk which cannot be diversified away. This undiversifiable risk is the risk of the financial system as a whole, and so is referred to as systematic risk or market risk. Diversifiable risk, which is the element of total risk which can be reduced or minimised by portfolio diversification, is referred to as unsystematic risk or specific risk, since it relates to individual or specific companies rather than to the financial system as a whole.

Portfolio theory is concerned with total risk, which is the sum of systematic risk and unsystematic risk. The capital asset pricing model assumes that investors hold diversified portfolios, and so is concerned with systematic risk alone.

Does systematic risk give the complete picture?

The capital asset pricing model assumes that Hotalot's shareholders are well diversified and are only concerned with systematic risk. Undiversified or partly diversified shareholders should also be concerned with unsystematic risk and should seek a total return appropriate to the total risk that they face.

Even well diversified shareholders might be concerned with unsystematic risk. The total risk of a company comprises systematic and unsystematic risk. It is total risk (the total variability of cash flows) which determines the probability of a company failing, and the investor experiencing additional bankruptcy costs. The greater the expected bankruptcy costs and the greater the probability of corporate failure, the more concerned

investors are likely to be with the total risk and not just systematic risk.

(iv) **Capital market efficiency** is concerned with pricing efficiency when weak form, semi-strong form and strong form efficiency are being discussed. In relation to pricing efficiency, the efficient markets hypothesis (EMH) suggests that share prices fully and fairly reflect all relevant and available information. Relevant and available information can be divided into past information, public information and private information.

Weak form efficiency

This form of pricing efficiency arises when share prices fully and fairly reflect all past share price movements. Past share price movements cannot therefore be used to predict future share prices in order to make an abnormal gain and share prices appear to follow a random walk, with share prices responding to new information as this arrives on the capital market.

Semi-strong form efficiency

This form of pricing efficiency arises when share prices fully and fairly reflect all relevant and available public information, which includes all past information. Public information cannot therefore be used to make an abnormal gain, since capital markets and share prices quickly and accurately respond to new information. Well-developed capital markets are held to be semi-strong form efficient.

Strong form efficiency

This form of pricing efficiency arises when share prices fully and fairly reflect all private information as well as public information. When capital markets are strong form efficient, no-one can make abnormal returns, even investors who possess private or insider information. This level of pricing efficiency is not found in the real world, which is why governments legislate against insider dealing.

Significance of EMH to financial managers

If the EMH is correct and share prices are fair, there is no point in financial managers seeking to mislead the capital market, because such attempts will be unsuccessful. Window-dressing financial statements, for example, in order to show a company's performance and position in a favourable light, will be seen through by financial analysts as the capital market digests the financial statement information in pricing the company's shares.

Another consequence of the EMH for financial managers is that there is no particular time which is best for issuing new shares, as share prices on the stock market are always fair. Because share prices are always fair, there are no bargains to be found on the stock market, i.e. companies whose shares are undervalued.

An acquisition strategy which seeks to identify and exploit such stock market bargains is pointless if the EMH is correct.

It should be noted, however, that if real-world capital markets are semi-strong form efficient rather than strong form efficient, insider information may undermine the strength of the points made above. For example, a company which is valued fairly by the stock market may be undervalued or overvalued if private or insider information is taken into account.

SUGGESTED SOLUTION TO Q4

(a) i. Total market Value of the share Offer

EPS = N25m/40m = N0.625
P/E ratio = 20
Share price = 20 x N0.625
N12.50 per share
Share offer = 5shares x (16m shares/4)
= 20million
Value of Share Offer = N12.50 x 20million
N250m

ii. Ayo's EPS

Earnings (post Acquisition)	N'm
Existing earnings-Ayo	25
Lola	9.6
Post tax Synergic benefit	2.4
	37

No of Shares (post Acquisition) 40m + 20m =60m
EPS = N37m/60m x 100k
= 61.7k

iii. Post Acquisition
MPS EPS = 61.7k
P/E ratio = 20(100-5)% = 19
MPS = 19 x 61.7k = N11.72

b. **Effect on wealth of shareholders Ayo shareholders**

Original holding = 40m@N12.50
N500m

New share Price = N11.72
New share Value = 40m@N11.72
= N468.8m
Loss in shareholders wealth = N500m – N468.8m
N31.2m

Lola Shareholders

Original EPS N9.6m/16m =N0.60
P/E ratio = 15
Share rice = 15 x N0.60 = N9
Original holding = 16m@N9
N144m
New holding = 20m@N11.72
N234.4
Gain in shareholders wealth = N234.4m – N144m
N90.4m

Market capitalization:

Individually: Ayo 40m x N12.50 = N500m
Lola 16m x N9 = N144m
Combined 60m x N11.72 N703.2m
From the above it can be deduced that there are benefits to be gained in the overall terms

Beneficiaries of Offer

If the proposed offer is made, all of the benefits of acquisition will accrue to lola plc shareholders and the Ayo shareholders will suffer a loss in share value. However, the dividend per share for lola shareholders is likely to be lower in the future that it is at present.
The directors of Ayo might wish to consider a less generous offer than the current premium of N106million (N250m – N144m) on the purchase of lola. For example, share exchange would value the offer at N200m (16m shares @ N12.50) thereby still providing a substantial premium to the Lola shareholders but with no loss to the Ayo Shareholders.

SUGGESTED SOLUTION TO Q5

(a)

Credit Sales	₦4,800,000 per annum
Average credit period	45 days

The annual cost is as follows:	₦
45/365 x ₦4,800,000 x 14.5%	85,808
Bad debts: 1% x ₦4,800,000	48,000
	133,808

The cost of the factor:

80% of credit sales financed by the factor would be 80% of ₦4,800,000 = ₦3,840,000. For a consistent comparison, we must assume that 20% of credit sales would be financed by a bank overdraft.

The average credit period would be only 30 days. The annual cost would be as follows,

		₦
Factor's finance	30/365 x ₦3,840,000 x 12%	37,874
Overdraft	30/365 x ₦960,000 x 14.5%	11,441
		49,315

Cost of factor's services: 2.5% x ₦4,800,000	120,000
Less savings in company's administrative costs	(96,000)
Net cost/(benefit) of the factor	73,315

Conclusion

The factor option is cheaper by ₦60,493 (₦133,808 – ₦73,315) based on the above calculations. Management is therefore advised to accept the services of the factor.

NOTE:

**₦3,840,000 = 80% of ₦4,800,000

* ₦960,000 = ₦20% of ₦4,800,000

(b) Factoring can be used under the following situations:

(i) When a company has a substantial amount of its working capital tied up in debtors which it cannot collect easily.

(ii) When a company is faced with liquidity problems due to failure of customers to meet the credit period allowed to them.

(iii) When the credit control system is becoming increasingly expensive to maintain.

(iv) When the company's fixed assets are limited and it cannot obtain additional finance without offering security.

(v) When a company wishes to raise finance without further borrowing or diluting equity.

c.

i Currency futures are standardized for the purchase and sale of foreign currency where delivery takes place at a specified future date at a specific price. They are closely related to forward contract but with minor differences.

ii. The exposure is to the risk of a rise in the euribor rate. Therefore the company should sell 16 June contracts (8 contracts × 6 months/3 months) if it is hedging a six-month loan exposure.

In May, the futures position will be closed. The selling price is 95.75.

Open futures position: sell at		96.50
Close position:	buy at	95.75
	Gain	00.75

Gain = 75 ticks per contract at €25 per tick.

Total gain on futures position = 16 contracts × 75 ticks × €25

= €30,000.

The company will borrow 8 million euros at 4.25%.

		Hedging the six-month rate €
	Interest cost: €8 million × 3/12 × 4.25%	
	Interest cost: €8 million × 6/12 × 4.25%	170,000
Less	gain on futures position	(30,000)
	Net effective cost	140,000

The net effective cost can be converted into an effective annual interest rate that has been achieved by the hedge with futures.

Net effective interest rate for hedge of six-month rate =

140,000/8,000,000 X 12/6

= 0.035 or 3.50%

Given a perfect hedge and no basis, the hedge fixes the effective the interest rate when the futures position was opened.

SUGGESTED SOLUTION TO Q6

(a) Total value of the company

Step 1: Value of a similar all-equity company.

We have the current value of the geared company, which is ₦100 million, consisting of ₦80 million equity and ₦20 million debt capital. We can calculate the cost of a similar company that is all-equity financed.

VG= VU- Dt

100 million = VU + (20 million × 0.25)

VU = 95 million

Step 2: Value of the company at the new level of gearing.

The company will be replacing ₦20 million of equity with ₦20 million of debt capital, so in the new gearing structure, debt capital increases.

value of the debt = ₦20 million + ₦20 million

= ₦40 million.

We can calculate the total cost of the company at its new gearing level, using the same MM formula.

VG = VU- Dt

VG = 95 million + (40 million × 0.25)

= 105 million.

The total value of the company at the new gearing level will be ₦105 million. Of this, ₦40 million will be

debt capital; therefore the value of equity will be :

VF = VE + VD

105 = VE + 40

VE = N65Million

(b) WACC

Source of finance	Market value	Cost	Market value x Cost
	₦ million	r	MV x r
Equity	80.00	0.10	8.00
Debt	20.00	0.045	0.90
	100.00		8.90

WACC = 8.9/100

= 0.089 or 8.9%.

We can use the MM formula for WACC to calculate what the WACC would be in a similar ungeared company.

The WACC of a similar ungeared company is:

WACCg = WACCu(1 – Vdt/Vf)

0.089 = WACCu(1 – 20(0.25)/100)

$WACC_U$ = 0.09368

WACC of the company at the new level of gearing.

Having established the WACC in an all-equity company, we can now use the same formula to calculate the WACC in the company at its new level of gearing, with ₦40 million debt and ₦65 million of equity. (The value of equity and debt capital at the new level of gearing were calculated in (a)).

$WACC_g = WACC_u(1 – Vdt/Vf)$

0.089 = WACCu(1 – 40(0.25)/105)

WACCG = 0.09368 × 0.90476
WACCG = 0.085
= 8.5%.

Cost of equity

(i) Step 1: Cost of equity of a similar all-equity company.

A similar approach is taken for calculating the cost of equity. We start by calculating the cost of equity in a similar all-equity company, using the MM formula for Proposition 2. We know the value of KEG and we need to calculate a value for KEU. In the original geared company, the value of equity is ₦80 million and the value of debt capital is ₦20 million.

The cost of equity in a similar all-equity company is calculated as follows:

Keg = keu + (Keu – Kd)(Vd/Ve)(1-t)
10 = KEU + [(1 – 0.25) (KEU – 6) 20/80]
10 = KEU + 0.1875 KEU – 1.125
1.1875KEU = 11.125
KEU = 9.3684.

Step 2: Cost of equity of the company at the new level of gearing.

Having calculated the cost of equity in a similar all-equity company, we can now calculate the cost of equity in the company at its new level of gearing. Debt capital is ₦40 million and equity is ₦65 million.

(The value of equity and debt capital at the new level of gearing were calculated in (a)

$$Keg = keu + (Keu - Kd)\frac{(Vd)}{Ve}(1-t)$$

KEG = 9.3684 + (1 – 0.25) (9.3684 – 6) 40/65
KEG = 9.3684 + 1.5546
= 10.923, say 10.9%.

SUGGESTED SOLUTION TO Q7

(a)

Year	Net Earnings per share	Net dividend N per share	Dividend as % of Earnings
2004	1.40	0.84	60
2005	1.35	0.88	65
2006	1.36	0.90	67
2007	1.30	0.95	73
2008	1.25	1.00	80

Change in EPS = $\frac{0.15}{1.40} \times 100 = 10.7\%$ **DPS** $\frac{0.16}{0.84} \times 100 = 19\%$

During this period, earnings per share have declined by 10.7%, while at the same time, dividend per share has increased by 19.0%
The payment ratio has increased from 60% in 2004 to 80% in 2008, and thus the proportion of earnings retained has fallen to 20%. If it is assumed that the capital structure has not changed over the period, then it can be seen that both actual earnings and return on capital employed have declined over the period.
One possible implication of this policy is that insufficient earnings have been retained to finance the investment required to at least, maintain the rate of return on capital employed. It then means that the Company is falling behind its competitors, which could have a serious impact on the long-term profitability of the business. However, N1.00 dividend per share in the current year will result in a fall in the share price.

(a) Rate of Return

For the purposes of calculation, it is assumed that any new investment will earn a rate of return equivalent to that required by the shareholders (i.e 15%), and that this will also be the level of return that is earned on existing investments for the foreseeable future. It is further assumed that investors are indifferent as to whether they receive their returns in the form of dividend or as capital appreciation.

Option 1

The amount of dividend per share is N1.00 with no growth forecast. The rate of return required by shareholders is 15%.
The theoretical share price can be estimated using the dividend valuation model.
Ke = d1

po where ke = Cost of equity
d1 = Dividend per share
Po = Market price per share

0.15Po = N1.00

Po = N1.00
0.15

= N6.67 ex-div or N7.67 cum-div

100% of the total return will be paid as dividend.

Option 2

In this case, 50% of the expected return is in the form of dividend and 50% as capital appreciation.

A numerical example will clarify the position.

The rate of growth of dividend g may be expressed as:

g = rb

where r = required rate of return
b = proportion of profits retained Therefore, with dividend at 50 kobo per share;

g = 0.15 x 0.5 = 0.075

NOTE Po = d1
r-g

where d1 = do (1+g)

Po = 0.5 x 1.075
0.15 – 0.075

= N7.17 or N7.17 plus 50k = N7.67 cum-div

Option 3

In this case, 25% of the expected return is paid in form of dividend while 75% is retained.

Therefore, g = 0.15 x 0.75 = 0.1125

Po = 0.25 x 1.1125 = N7.416

0.15 - 0.1125

=

N

7

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4

2

e

x

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d

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v

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r

Option 4

N7.42 plus 25 kobo dividend

= N7.67 cum-div.

In this case, for a share price of N6.67, investors would need to believe that retained profits will be invested in projects yielding annual growth of 15% and that the share price will be at this rate. 100% of the expected return is provided in the form of capital appreciation under this option.