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MANUFACTURING ENGINEERING TRIPOS PART IIA

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Friday 22 April 2016 9 to 12

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**Paper 5**

**Module 3P8: FINANCIAL AND MANAGEMENT ACCOUNTING**

**Module 3P9: INDUSTRIAL ECONOMICS, STRATEGY AND GOVERNANCE**

Answer *four* questions, one from each of sections **A**, **B**, **C** and **D**.

Answers to sections **A**, **B**, **C** and **D** must appear in four separate booklets.

All questions carry the same number of marks.

The **approximate** percentage of marks allocated to each part of a question is indicated in the right margin.

Write your candidate number **not** your name on the cover sheet.

**STATIONERY REQUIREMENTS**

8 page answer booklet x 4

Rough work pad

**SPECIAL REQUIREMENTS TO BE SUPPLIED FOR THIS EXAM**

CUED approved calculator allowed

Engineering Data Book

10 minutes reading time is allowed for this paper.

**You may not start to read the questions printed on the subsequent pages of this question paper until instructed to do so.**

SECTION A

Answer **one** question from this section.

1 The balance sheet of Natmas Ltd. as at 31 March 2011 included the following information:

|  | £       |
|--|---------|
| Ordinary share capital, issued and authorised  | 300,000 |
| Reserves (profit balance)                      | 120,000 |
| 10% loan stock (repayable in 2020)             | 180,000 |
| Fixed assets (after depreciation)              | 270,000 |
| Net current assets (including balance at bank) | 330,000 |

The company's activities for the year to 31 March 2012 are likely to result in the following expectations:

- (1) All customers will keep to credit terms of two months and suppliers are paid one month after delivery of goods (as in the previous period).
- (2) Goods for resale are purchased at the rate of £93,000 per calendar month (compared with £75,000 for 2010/11) and stocks are to rise to £216 000, by the end of the financial year (compared with £180,000 at 31 March 2011).
- (3) Overhead expenses (excluding interest and depreciation charges) of £138,000, of which £30,000 will be unpaid at the end of 2011/12 (compared with £24,000 as at 31 March 2011).
- (4) Sales of £120,000 per calendar month (compared with £90,000 per calendar month for the year ending 31 March 2011) including a gross profit margin of 25% on selling price.
- (5) No disposal of fixed assets, but additional fixed assets will be purchased for £90,000 cash.
- (6) Provision for depreciation will be raised from an aggregate amount of £180,000 at 31 March 2011 to £234,000.
- (7) The annual interest charges on the company's loans are paid on 1 April for the preceding year.
- (8) The dividend on share capital at 15% provided for in the balance sheet at 31 March 2011 will be paid, and a dividend of 25% on share capital is recommend out of the profits for 2011/12.

On the basis that all expectations are realised

- (a) Provide a profit and loss account for the year ending 31 March 2012. [30%]
- (b) Provide a detailed balance sheet at 31 March 2012 showing comparative figures at 31 March 2011. [30%]
- (c) Provide a summary statement of cash received and paid during the year to 31 March 2012. [20%]
- (d) Explain the pros and cons of preparing a cash flow statement using the indirect method. [20%]

## 1(a) Natmas Ltd. Profit and Loss Account for the year ended 31 March 2012

|                               | £000         | £000         |
|-------------------------------|--------------|--------------|
| Sales                         |              | 1,440        |
| Less: Cost of goods sold:     |              |              |
| Stock 1 Apr. 2011             | 180          |              |
| Add Purchase                  | <u>1,116</u> |              |
|                               | 1,296        |              |
| Less Stock 31 Mar. 2012       | <u>216</u>   |              |
| Gross Profit                  |              | <u>1,080</u> |
|                               |              | 360          |
| Less: Overhead expenses       | 138          |              |
| Interest on loan              | 18           |              |
| Depreciation                  | <u>54</u>    |              |
| Net profit                    |              | <u>210</u>   |
|                               |              | 150          |
| Less: Provision for dividends |              | <u>75</u>    |
| Profit retained               |              | <u>75</u>    |

(b) Balance Sheet of Natmas Ltd. as at 31<sup>st</sup> March 201231 March  
2011

| £000       | <u>ASSETS</u>                     | £000       | £000       |
|------------|-----------------------------------|------------|------------|
| 270        | Fixed Assets (after depreciation) |            | 306        |
|            | <u>Current Assets</u>             |            |            |
| 180        | Stock                             | 216        |            |
| 180        | Trade Debtors                     | 240        |            |
| <u>132</u> | Cash at Bank                      | <u>129</u> | <u>585</u> |
| <u>762</u> |                                   |            | <u>891</u> |
|            | <u>LIABILITIES</u>                |            |            |
| 300        | Ordinary share capital            |            | 300        |
| 120        | Reserve                           |            | 195        |
| 180        | 10% Loan Stock                    |            | 180        |

| <u>Current Liabilities</u> |                               |           |            |
|----------------------------|-------------------------------|-----------|------------|
| 75                         | Sundry Creditors              | 93        |            |
| 18                         | Interest Outstanding          | 18        |            |
| 24                         | Overhead expenses outstanding | 30        |            |
| <u>45</u>                  | Proposed dividend             | <u>75</u> | <u>216</u> |
| <u>762</u>                 |                               |           | <u>891</u> |

(c) Cash Account

|             | £000              |                   | £000              |
|-------------|-------------------|-------------------|-------------------|
| Balance b/f | 132               | Creditors         | 1,098             |
| Debtors     | 1,380             | Overhead expenses | 132               |
|             |                   | Fixed Assets      | 90                |
|             |                   | Interest on Loan  | 18                |
|             |                   | Dividends         | 45                |
|             |                   | Balance c/f       | 129               |
|             | <hr/> 1,512 <hr/> |                   | <hr/> 1,512 <hr/> |

Workings

- (1) Purchase 2011-12 = £93,000 x 12 = £1,116,000
- (2) Sales 2011-12 = £120,000 x 12 = £1,440,000
- (3) Receipts from debtors: 2010-11 Sales = £90,000 x 2 = £180,000

|   |                                   |                   |
|---|-----------------------------------|-------------------|
|   | : 2011-12 Sales = £120,000 x10=   | <u>£1,200,000</u> |
|   |                                   | <u>£1,380,000</u> |
| (4) Payment to creditors: 2010-11 Purchase = £75,000 x1 = |                                   | £75, 000          |
|   | : 2011-12 Purchase = £93,000 x11= | <u>£1,023,000</u> |
|   |                                   | <u>£1,098,000</u> |
|   |                                   |                   |
| (5) Interest on Loan: £180,000 x 10%= £18,000             |                                   |                   |
| (6) Depreciation for the year: £234,000-£180,000=54,000   |                                   |                   |
| (7) Dividends: 2010-11: £300,000*15/100=£45,000           |                                   |                   |
| 2011-12: £300,000*25/100=£75,000                          |                                   |                   |
| (8) Fixed asset (net) all in £: 31 Mar. 81                | 270,000                           |                   |
| Addition  | <u>90,000</u>                     |                   |
|   | 360,000                           |                   |
| Less Depreciation   | <u>54,000</u>                     |                   |
| 31 Mar. 82  | <u>306,000</u>                    |                   |
|   |                                   |                   |
| (9) Reserves: 31 Mar. 81                                  | £120,000                          |                   |
| Add Retained profits for 2011-12                          | <u>£75,000</u>                    |                   |
|   | <u>£195,000</u>                   |                   |

(10) Opening cash balance calculation:

|                               | £000       | £000 |
|-------------------------------|------------|------|
| <u>Current Assets</u>         |            |      |
| Stock                         | 180        |      |
| Trade Debtors                 | 180        |      |
| Cash at Bank (Balancing item) | <u>132</u> | 492  |

Current Liabilities

|                               |           |            |
|-------------------------------|-----------|------------|
| Sundry Creditors              | 75        |            |
| Interest Outstanding          | 18        |            |
| Overhead expenses outstanding | 24        |            |
| Proposed dividend             | <u>45</u> | <u>162</u> |
| Net current assets (as given) |           | <u>330</u> |

(d) The pros of the indirect method of cash flow statement allows:

- (i) Shed slight on quality of reported earnings by reconciling earnings with net cash position
- (ii) Reveals link between profits and cash, hence demonstrates ability to convert profits into cash
- (iii) Analyses the sources of cash inflow and outflow from operating activities, investing activities and financing activities.

The cons of the indirect method of preparing the cash flow statement are:

- (i) Provides less clarity by setting out operating cash receipts and payments
- (ii) Accruals adjustments made, hence more susceptible to manipulation than the indirect method

*Examiner's Comments:*

*The candidates were good in answering parts (d). On average the answers to part (a) and (b) was reasonably satisfactory but with more variation in terms of quality. In particular, students found it difficult to calculate the opening cash balance as a balancing item from the information provided. Part (c) required a simple cash statement not necessarily a cash flow statement.*

2 The current assets and current liabilities of Zeti & Co at the end of March 2014 are as follows:

|                           |              |              |
|---------------------------|--------------|--------------|
|                           | £000         | £000         |
| Inventory                 | 5,700        |              |
| Trade receivables         | <u>6,575</u> |              |
| Total current assets      |              | 12,275       |
| Trade payables            | 2,137        |              |
| Overdraft                 | <u>4,682</u> |              |
| Total current liabilities |              | <u>6,819</u> |
| Net current assets        |              | <u>5,456</u> |

For the year to end of March 2014, Zeti & Co had sales of £40 million, all on credit, while cost of sales was £26 million.

For the year to end of March 2015, Zeti & Co has forecast that credit sales will remain at £40 million while cost of sales will fall to 60% of sales. The company expects current assets to consist of inventory and trade receivables, and current liabilities to consist of trade payables and the company's overdraft.

Zeti & Co also plans to achieve the following target working capital ratio values for the year to the end of March 2015:

Inventory days: 60 days  
 Trade receivables days: 75 days  
 Trade payables days: 55 days  
 Current ratio: 1.4 times

- (a) Calculate the following for end of March 2014:
- (i) inventory days;
  - (ii) trade receivable days;
  - (iii) trade payable days. [20%]
- (b) Calculate the target acid test ratio of Zeti & Co at the end of March 2015 and compare it to the acid test ratio as at the end of March 2014. [20%]
- (c) Analyse and compare the current asset and current liability positions as at March 2014 and March 2015, and discuss how the working capital financing policy of Zeti & Co would have changed during that period. [40%]
- (d) In order to better understand the working capital financing policy of Zeti & Co, discuss what other information you might require and why. [20%]

2. (a) Zeti & Co

Ratio calculations

Inventory days =  $365 \times (5,700/26,000) = 80$  days

Trade receivables days =  $365 \times (6,575/40,000) = 60$  days

Trade payables days =  $365 \times (2,137/26,000) = 30$  days

(b) At the end of March 2015:

Cost of sales =  $40,000,000 \times 0.6 = \text{£}24,000,000$

Inventory using target inventory days =  $24,000,000 \times 60/365 = \text{£}3,945,206$

Trade receivables using target trade receivables days =  $40,000,000 \times 75/365 = \text{£}8,219,178$

Current assets =  $3,945,206 + 8,219,178 = \text{£}12,164,384$

If the target current ratio is 1.4 times, current liabilities =  $12,164,384/1.4 = \text{£}8,688,846$

The target acid test ratio =  $8,219,178/8,688,846 = 0.95$  times

The acid test ratio as at 31 March 2014 =  $6,575/6,819 = 0.96$  times

The acid test ratio has declined marginally implying a slight reduction in the liquidity position of Zeti & Co.

(c) The current liabilities at the end of March 2015, calculated in part (b), can be divided into trade payables and the forecast overdraft balance.

Trade payables using target trade payables days =  $24,000,000 \times 55/365 = \text{£}3,616,438$ .

The overdraft (balancing figure) =  $8,688,846 - 3,616,438 = \text{£}5,072,408$

Comparing current assets and current liabilities:

|                    | March 2014   |              | March 2015   |              |
|--------------------|--------------|--------------|--------------|--------------|
|                    | £000         | £000         | £000         | £000         |
| Inventory          | 5,700        |              | 3,495        |              |
| Trade receivables  | <u>6,575</u> | 12,275       | <u>8,219</u> | 12,164       |
| Trade payables     | 2,173        |              | 3,616        |              |
| Overdraft          | <u>4,682</u> | <u>6,819</u> | <u>5,072</u> | <u>8,688</u> |
| Net current assets |              | <u>5,456</u> |              | <u>3,476</u> |



The overdraft as a percentage of current liabilities will fall from 69% (4,682/6,819) to 58% (5,072/8,688). Even though the overdraft is expected to increase by 8.3%, current liabilities are expected to increase by 27.4% (8,688/6,819). Most of this increase is expected to be carried by trade payables, which will rise by 69.2% (3,616/2,137), with trade payables days increasing from 30 days to 55 days.

At the end of March 2014, current liabilities were 56% of current assets (100 x 6,819/12,275), suggesting that 44% of current assets were financed from a long-term source. At the end of March 2015, current liabilities are expected to be 71% of current assets (100 x 8,688/12,164), suggesting that 29% of current assets are financed from a long-term source. This increasing reliance on short-term finance implies an aggressive change in the working capital financing policy of Zeti & Co.

(d) The other information that might be helpful are related to the  
(A) overall product strategy of Zeti & Co in order to understand how it is managing the product portfolio:

- (i) the product mix strategy
- (ii) pricing strategy
- (iii) competitive pressures
- (iv) the product life cycle of the firm
- (v) the strategy to build market share
- (vi) any complementary products Zeti & Co might launch in the future

(B) The availability and access to finance

- (i) relative funding costs between long term and short term funds
- (ii) availability of short versus long term funds

*Examiner's Comments:*

*Students were able to answer question (a) very well and (b) reasonably well. The better students were able to discuss working capital financing policy for part (c) with reference to the analysis. The answers to question (d) were also reasonably well answered.*

## SECTION B

Answer *one* question from this section.

3 Chola Plc has £60,000 to spend on capital investment projects. There is currently a choice of three projects: Pepper, Cardamom and Cinnamon. The initial capital outlay is on fixed assets with a five-year life. The cost of capital is 10 %. The interest rate table is given in Fig. 1. Assume that depreciation will be charged on a straight-line basis.

| Initial capital outlay | Pepper       |               | Cardamom     |               | Cinnamon     |               |
|------------------------|--------------|---------------|--------------|---------------|--------------|---------------|
|                        | £60,000      |               | £30,000      |               | £30,000      |               |
| Year                   | Inflows<br>£ | Outflows<br>£ | Inflows<br>£ | Outflows<br>£ | Inflows<br>£ | Outflows<br>£ |
| 1                      | 52,000       | 32,000        | 32,000       | 15,000        | 12,000       | 4,000         |
| 2                      | 58,000       | 24,000        | 22,000       | 16,000        | 10,000       | 3,000         |
| 3                      | 54,000       | 21,000        | 19,000       | 14,000        | 16,000       | 4,000         |
| 4                      | 4,000        | 5,000         | 20,000       | 13,000        | 14,000       | 3,000         |
| 5                      | 4,000        | 2,500         | 6,000        | 3,000         | 12,000       | 2,000         |

- (a) Calculate for each of the three projects:
- the payback period;
  - the accounting rate of return (using initial investment);
  - the net present value;
  - the internal rate of return. [50%]
- (b) Write a memo to the management team of Chola Plc highlighting your recommendation on which project(s) to invest in. State your reasons. [30%]
- (c) Explain why *real options* are important in investment appraisal decisions. [20%]

## Interest Rate Table

| Interest rate p.a., $r$ | Number of years, $T$ | Present value of £1 receivable at the end of $T$ years,<br>$PV = \frac{1}{(1+r)^T}$ |
|-------------------------|----------------------|---|
| 5%                      | 1                    | 0.9254  |
|                         | 2                    | 0.9070  |
|                         | 3                    | 0.8638  |
|                         | 4                    | 0.8227  |
|                         | 5                    | 0.7853  |
|                         | 6                    | 0.7462  |
|                         | 7                    | 0.7107  |
|                         | 8                    | 0.6768  |
|                         | 9                    | 0.6446  |
|                         | 10                   | 0.6139  |
| 10%                     | 1                    | 0.9091  |
|                         | 2                    | 0.8264  |
|                         | 3                    | 0.7513  |
|                         | 4                    | 0.6830  |
|                         | 5                    | 0.6209  |
|                         | 6                    | 0.5645  |
|                         | 7                    | 0.5132  |
|                         | 8                    | 0.4665  |
|                         | 9                    | 0.4241  |
|                         | 10                   | 0.3855  |
| 15%                     | 1                    | 0.8696  |
|                         | 2                    | 0.7561  |
|                         | 3                    | 0.6575  |
|                         | 4                    | 0.5718  |
|                         | 5                    | 0.4972  |
|                         | 6                    | 0.4323  |
|                         | 7                    | 0.3759  |
|                         | 8                    | 0.3269  |
|                         | 9                    | 0.2843  |
|                         | 10                   | 0.2472  |
| 20%                     | 1                    | 0.8333  |
|                         | 2                    | 0.6944  |
|                         | 3                    | 0.5787  |
|                         | 4                    | 0.4823  |
|                         | 5                    | 0.4019  |
|                         | 6                    | 0.3349  |
|                         | 7                    | 0.2791  |
|                         | 8                    | 0.2326  |
|                         | 9                    | 0.1938  |
|                         | 10                   | 0.1615  |

Fig. 1

## 3. Chola Plc

|         | Pepper    |               | Cardamom  |              | Cinnamon  |               |
|---------|-----------|---------------|-----------|--------------|-----------|---------------|
|         | Cash Flow | Profit*       | Cash Flow | Profit*      | Cash Flow | Profit*       |
| Year    | £         | £             | £         | £            | £         | £             |
| 0       | (60,000)  |               | (30,000)  |              | (30,000)  |               |
| 1       | 20,000    | 8,000         | 17,000    | 11,000       | 8,000     | 2,000         |
| 2       | 34,000    | 22,000        | 6,000     | -            | 7,000     | 1,000         |
| 3       | 33,000    | 21,000        | 5,000     | (1,000)      | 12,000    | 6,000         |
| 4       | (1,000)   | (13,000)      | 7,000     | 1,000        | 11,000    | 5,000         |
| 5       | 1,500     | (10,500)      | 3,000     | (3,000)      | 10,000    | 4,000         |
| Overall |           | <b>27,500</b> |           | <b>8,000</b> |           | <b>18,000</b> |

\*Cash flows are simply inflows less cash outflows. Profit is cash flow less depreciation, which is £12,000 per year (initial capital outlay £60,000/5 years) for Pepper, and £6,000 per year (initial capital outlay £30,000/5 years) for Cardamom and Cinnamon. Therefore, for Pepper year 1 profit is £20,000 cash flow less £12,000 depreciation = £8,000.

Answers for (a) and (b) below.

**(i) Payback period**

Pepper

2 (i.e., £54,000) + £6,000/£33,000 years = 2.18 years.

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Cardamom

3 (i.e., £28,000) + £2,000/£7,000 years = 3.29 years

Cinnamon

3 (i.e., £27,000 + £3,000/£11,000 years = 3.27 years

Here we calculate when the cumulative cash flows cover the initial capital outlay.  
Pepper is the best project under this criterion.

**(ii) Accounting rate of return**

Average annual profit/Initial investment \* 100

Pepper

$(£27,500/5)/£60,000*100 = 9.2\%$

Cardamom

$(£8,000/5)/£30,000*100 = 5.3\%$

Cinnamon

$(£18,000/5)/£30,000*100 = 12\%$

Using this criterion we would choose Pepper as its return of 9.2% is better than the average for Cardamom and Cinnamon of 8.65%  $[(5.3\%+12\%)/2]$ .

**(iii) Net present value**

|                         | Pepper   | Cardamom | Cinnamon | Discount rate @ 10% | Pepper   | Cardamom | Cinnamon |
|-------------------------|----------|----------|----------|---------------------|----------|----------|----------|
| Year                    | £        | £        | £        | £                   | £        | £        | £        |
| 0                       | (60,000) | (30,000) | (30,000) | 1                   | (60,000) | (30,000) | (30,000) |
| 1                       | 20,000   | 17,000   | 8,000    | 0.9091              | 18,182   | 15,455   | 7,273    |
| 2                       | 34,000   | 6,000    | 7,000    | 0.8264              | 28,098   | 4,958    | 5,785    |
| 3                       | 33,000   | 5,000    | 12,000   | 0.7513              | 24,793   | 3,757    | 9,016    |
| 4                       | (1,000)  | 7,000    | 11,000   | 0.6830              | (683)    | 4,781    | 7,513    |
| 5                       | 1,500    | 3,000    | 10,000   | 0.6209              | 931      | 1,863    | 6,209    |
| Net present value (NPV) |          |          |          |                     | 11,321   | 814      | 5,796    |

Pepper has a NPV of £11,321 which is more than the combined NPV of Cardamom and Cinnamon of £6,610 (£814 and £5,796). We would, therefore, choose to invest our £60,000 in Pepper.

**(i) Internal rate of return (IRR)**

Choose a 20% discount rate to arrive at a negative NPV.

|                         | Pepper   | Cardamom | Cinnamon | Discount rate @ 20% | Pepper   | Cardamom | Cinnamon |
|-------------------------|----------|----------|----------|---------------------|----------|----------|----------|
| Year                    | £        | £        | £        | £                   | £        | £        | £        |
| 0                       | (60,000) | (30,000) | (30,000) | 1                   | (60,000) | (30,000) | (30,000) |
| 1                       | 20,000   | 17,000   | 8,000    | 0.8333              | 16,666   | 14,166   | 6,666    |
| 2                       | 34,000   | 6,000    | 7,000    | 0.6944              | 23,610   | 4,166    | 4,861    |
| 3                       | 33,000   | 5,000    | 12,000   | 0.5787              | 19,097   | 2,894    | 6,944    |
| 4                       | (1,000)  | 7,000    | 11,000   | 0.4283              | (482)    | 3,376    | 5,305    |
| 5                       | 1,500    | 3,000    | 10,000   | 0.4019              | 603      | 1,206    | 4,019    |
| Net present value (NPV) |          |          |          |                     | (506)    | (4,192)  | (2,205)  |

Calculate IRR, using formula:

IRR = Lowest discount rate + difference in discount rate \*(lower discount rate NPV/difference in NPVs)

$$\text{Pepper} = 10\% + (10\% * \text{£}11,321 / (\text{£}11,321 + \text{£}506)) = 19.6\%$$

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$$\text{Cardamom} = 10\% + (10\% * \text{£}814 / (\text{£}814 + \text{£}4,192)) = 11.6\%$$

$$\text{Cinnamon} = 8\% + (10\% * \text{£}5,796 / (\text{£}5,796 + \text{£}2,205)) = 17.2\%$$

Therefore, as Chola Plc's cost of capital is 10%, which is less than these rates, we could undertake all projects if funds were not limited to £60,000. As we have to choose either Pepper or Cardamom and Cinnamon, we would choose Pepper as it has the highest IRR.

Overall, we would probably choose Pepper because they were best using payback, accounting rate of return, net present value and IRR. Need to discuss the pros and cons of each method in the memo to the management with reference to the numbers that were calculated.

(c) Flexibility in business decisions is valuable

(I) Real options: (i) option to proceed with a project and (ii) adjustments a firm can make after a project has been accepted

- Option to expand, option to abandon, timing options
- NPV ignores these and may thus underestimate the true value of the project when there is *uncertainty* and *irreversibility*.

(II) Problems with real options

- Valuation is difficult
- Technological changes

*Examiner's Comments:*

*Part (a) was done well on average although often there were mistakes made in calculating the accounting rate of return. Good answers showed the workings to get the answers rather than merely showing final answers by using a calculator. Section (b) was done satisfactorily with better answers discussing the advantages and disadvantages of the different investment appraisal methods. Section (c) was generally well answered.*



4 Zorro and Son, a small but specialised engineering business, manufactures and sell three products: M, R and S. For the year ending 30 June 2012 the activity programme is expected to be:

| Product | Direct Materials | Direct Wages | Overhead<br>(25% Fixed) | Sales  | Total Quantities |
|---------|------------------|--------------|-------------------------|--------|------------------|
|         | £                | £            | £                       | £      | Units            |
| M       | 4,000            | 8,000        | 16,000                  | 40,000 | 400              |
| R       | 19,200           | 12,000       | 24,000                  | 72,000 | 600              |
| S       | 12,000           | 12,000       | 24,000                  | 60,000 | 600              |

(a) Calculate the contribution and profit for the year ending 30 June 2012 if actual activity is as expected. [10%]

(b) Calculate the change in the profits for the year if the business were to accept a sub-contract from a larger firm to produce an additional 50 units of product S at a selling price of £90 each. Assume that the resources would be available subject to the need to buy additional machinery at a cost of £2,300 which, it is estimated, would have a scrap value of £300 after its useful life of 4 years (assuming a straight-line depreciation policy). Use of this machinery would incur annual running costs of £300 per annum. [30%]

(c) Calculate which of the products would provide the largest profit if existing direct labour (as inferred by direct wages in the table above) could be applied to the exclusive production of M, R, or S without any change in the total fixed overheads. It may be assumed that the same type of machining and labour is required in the production of all three products. Assume that direct labour receives the same rate of remuneration whichever product is manufactured. [30%]

(d) Write a report comparing the total profits for the business for the year under (a), (b) and (c) above respectively. Discuss the practical considerations to be borne in mind before deciding whether or not to adopt change from the original plan. [30%]

## 4. (a) Zorro and Son

## Statement of Profit for the Year ending 30 June 2012

|                     | Products      |               |               |                |
|---------------------|---------------|---------------|---------------|----------------|
|                     | M             | R             | S             | Total          |
|                     | £             | £             | £             | £              |
| Sales               | 40,000        | 72,000        | 60,000        | 172,000        |
| Less Marginal cost  | <u>24,000</u> | <u>49,200</u> | <u>42,000</u> | <u>175,200</u> |
| Contribution        | 16,000        | 22,800        | 18,000        | 56,800         |
| Less Fixed overhead | <u>4,000</u>  | <u>6,000</u>  | <u>6,000</u>  | <u>16,000</u>  |
| Profit              | <u>12,000</u> | <u>16,800</u> | <u>12,000</u> | <u>40,800</u>  |

WorkingsMarginal cost

|                             | M             | R             | S             |
|-----------------------------|---------------|---------------|---------------|
|                             | £             | £             | £             |
| Direct materials            | 4,000         | 19,200        | 12,000        |
| Direct wages                | 8,000         | 12,000        | 12,000        |
| Variable Overheads –<br>75% | <u>12,000</u> | <u>18,000</u> | <u>18,000</u> |
|                             | <u>24,000</u> | <u>49,200</u> | <u>42,000</u> |

|   |            |
|---|------------|
| (b)   | £          |
| Marginal cost of 50 units of S = $42,000/600 \times 50 =$ | 3,500      |
| Additional depreciation $(2,300-300)/4 =$                 | 500        |
| Additional running costs =                                | <u>300</u> |

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|                                       |                   |
|---------------------------------------|-------------------|
| Total additional cost of sub-contract | 4,300             |
| Sales @ £90 each                      | <u>4,500</u>      |
| Additional profit                     | <u><u>200</u></u> |

(c)

|  | M      | R      | S      |
|--|--------|--------|--------|
|  | £      | £      | £      |
| Contribution                                   | 16,000 | 22,800 | 18,000 |
| Profitability:<br>Contribution/Direct<br>Wages | 2.0    | 1.9    | 1.5    |

Since profitability is highest in the case of Product M it will provide the largest profit in the given case.

(d) A comparison of the total profits under the three situations is given below:

|                    | Profit (£) |
|--------------------|------------|
| Existing programme | 40,800     |
| Proposal (b)       | 41,000     |
| Proposal (c)       | 48,000     |

It will be observed that proposal (a) does not bring in as much of a change in the total profits. There is only an increase of £200. This is negligible in the light of practical considerations involved while taking up the sub-contract. The first being whether the sub-contract is a continuing one, at least, for four years. Secondly, whether own sales will be affected by providing more units of the product. The proposal has to be affected only if both these considerations are favourable.

As per proposal (b) it is quite attractive when we go by the increase in the profits. But there are practical considerations to be looked into such as whether:

- (1) the other products, R and S, are complimentary to M so that if R and S are not produced the demand for M may come down,
- (2) market will accept M in full, and
- (3) non-production of R and S will affect customer satisfaction

To sum up, the proposals are acceptable only if the above practical considerations are favourably assessed. However, proposal (b) can be vigorously pursued and optimal utilisation of direct labour in this direction would be a welcome change.

Notes of total profit calculations:

Total Profit under Proposal (b) = £40,800+£200= £41,000

Total profit under proposal (c) = Contribution/Direct Wages x Direct Wages-Fixed Costs

$$=[£2 \times £(8,000+12,000+12,000)]-£16,000$$

$$= £48,000$$

*Examiner's Comments:*

*Part (a) required students to calculate the contribution and profits which was well done. Parts (b) and (c) required students to calculate variation to the profits due to different manufacturing options for the products. Using the contribution per labour hour to calculate the answer in part (c) was often over looked. Part (d) required a discussion of options from (b) and (c) respectively.*

SECTION C

Answer **one** question from this section.

- 5 (a) How might a persistent global credit crisis affect the scale and scope of modern firms? [50%]

*Economies of scale* exist whenever the average cost per unit of output falls as the volume of output increases. *Economies of scope* exist whenever the total cost of producing two different products or services is lower when a single firm instead of two separate firms produces them. In general, capital intensive production processes are more likely to display economies of scale and scope than are labor or materials intensive processes. By offering cost advantages, economies of scale and scope not only affect the sizes of firms and the structure of markets, they also shape critical business strategy decisions, such as whether independent firms should merge and whether a firm can achieve long-term cost advantages in the market through expansion. Likewise, firms adopt diversification as a means to achieving scale and scope as a business strategy.

The continuation of a global credit crisis over an extended period of time would limit the ability of firms to finance the expansion of production facilities, the acquisition of firms in horizontal markets and the development of supporting infrastructure by government. The lack of liquidity caused by a credit crisis would force firms to depend on internally developed capital and slow their diversification and growth. Additionally, a global credit crisis would close distant markets to firms as financing for shipments and inventories would be significantly reduced. Moreover, the persistence of the credit crisis increases perceived risks. Such an increase in perceived risk would make firms less willing to acquire and merge with other firms, hence limit economies of scale and scope.

*Examiner's Comments:*

*A basic answer should cover the explanation of scale and scope economics and its relationship to the credit crisis. A strong answer should build on these and explain the implications for firms and why, with examples where appropriate. The better students for question (a) were able to discuss the implications of the credit crisis both in terms of uncertainty as well as funding limitations.*

- (b) Why are the concepts of own and cross-price elasticities of demand essential to competitor identification and market definition? [50%]

The magnitude of consumer responses to changes in a product market's (or industry's) price is measured by the own-price elasticity of demand, which equals the percentage change in a product market's sales that results from a one percent change in price. If an industry raises price and consequently loses most of its customers to another industry (or industries), we conclude that the market under consideration faces close substitute products (or the product market competes with other product markets). Measuring the own-price elasticity of demand tells us whether a product faces close substitutes, but it does not identify what those substitutes might be. We can identify substitutes by measuring the cross-price elasticity of demand between two products. The cross-price elasticity measures the percentage change in demand for good Y that results from a 1-percent change in good X. The higher the cross-price elasticity, the more readily consumers substitute between two goods when the price of one good is increased. Also, in two-sided markets (e.g., Adobe Reader and PDF Distiller), the cross-price elasticities are important in deciding pricing. This has implications for competitor identification and market definition when the products/services is not provided by the same firm.

*Examiner's Comments:*

*A basic answer covered the explanation the concepts of cross price elasticity clearly and its relationship to competitor identification and market definition. Strong answers built on these and explain the implications for firms based on the literature especially with reference to two-sided/multi-sided network markets and with examples where appropriate.*

6 (a) What does the concept of *cooperation* add to Porter's five forces approach to industry analysis? [50%]

Firms often cooperate and compete at the same time in order to create and capture value. The emergence of shorter product lifecycle, convergence of multiple technologies and increasing costs of conducting R&D require firms to have multiple resources in order to improve continuously on delivering the existing value proposition, while exploring new opportunities to enhance innovation. Such multiple resource requirements often do not reside within a single firm and, hence, firms in the same industry often cooperate in order to share such resources and then go on to compete to

divide the created value jointly. Such collaborative activity has been called cooptation.

*Cooptation* is the concept that the forces that shape industry profits are to a great extent the result of choices made by the individual firms within the industry. As these firms become savvier regarding the reaction of rivals to their own actions, they will choose actions that reduce the likelihood of losing industry profits to price wars, consumer surplus, and/or ineffective negotiations with suppliers. As each firm comprehends its own role within the industry, firms can collectively fashion strategies that “cause” a force to have only a limited effect. If firms ignore the concept of cooptation, they must resign themselves to simply reacting to the industry forces.

*Examiner’s Comments:*

*A basic answer explained the concept of cooptation and Porter’s five forces analysis respectively. Strong answers built on these and explain the implications for firms; and in particular the challenges for firms with examples where appropriate. Better students were able to go beyond merely describing Porter’s five forces and articulating its implications for the forces in question when cooptation is included.*

(b) How can the value chain help a firm identify its strategic position? [50%]

The *value chain* is a technique for describing the vertical chain of production. The value chain is also a useful device for thinking about how value is created in an organization. The value chain depicts the firm as a collection of value-creating activities, such as production operations, marketing and distribution, and logistics. Each activity in the value chain can potentially add to the benefit (B) that consumers get from the firm’s product and each can add to the cost (C) that the firm incurs in producing and selling the product. A firm creates more value than competitors only by performing some or all of these activities better than they do. We can often categorize strategic positions into two broad categories, either a cost advantage or a differentiation advantage. If a firm outperforms other firms in activities that generate superior B (differentiation) or in activities that generate a lower C (cost), the firm’s strategic position should rely on these activities.

However, there are limitations of the value chain analysis whereby in two/multi-sided network markets the linear value chain analysis might be less relevant. In such markets, a network of firms might come together in order to create value for the customer and

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there could be feedback loops as a result of network externalities which requires a collaborative approach among firms.

*Examiner's Comments:*

*A basic answer explained the concept of value chain and how it might relate to strategic positioning. Strong answer built on these and explain the limitations of the approach in particular in two/multi-sided network markets. Better student were able to relate the value chain analysis to competitive advantage due to cost or differentiation and also provide examples.*



SECTION D

Answer **one** question from this section.

7 (a) Consider a firm selling two products, A and B, that substitute for each other. Suppose that an entrant introduces a product that is identical to product A. What factors do you think will affect whether a price war is initiated, and who wins the price war? [50%]

Given that the incumbent is producing two substitute goods, the incumbent has more to lose if a price war erupts. The reason is, if the incumbent lowers the price of good A to match the price of the entrant's identical offering, the incumbent loses revenues on good B as well as on good A because customers who used to purchase good B will substitute toward good A. If exit barriers are minimal, the incumbent might prefer to exit the market for good A rather than endure a price war. The incumbent is more likely to stay and fight if exit barriers are high and/or good A and B are weak substitutes. Clearly the probability of a price war decreases if the level of demand for these goods is high relative to the combined capacities of the firms. In addition, whether a price war is initiated would depend on the capability of the incumbent firm to innovate and develop alternative products.

*Examiner's Comments:*

*A basic answer included an outline of the issue and its implications of the price war they might initiate and the conditions to do so. However, a strong answer also included a discussion of how an incumbent firm might avoid such a price war e.g., through innovation. Most students answered the question reasonably well but the better ones were able to relate the pricing of one product on the decision of the other product.*

(b) Consumers often identify brand names with quality. Do you think branded products usually are of higher quality than generic products and therefore justify their higher prices? Discuss. [50%]

A brand is a name, term, sign, symbol, or design, or a combination of them which is intended to identify the goods or services of one seller to differentiate them from those of competitors. There are several roles that brands can play:

- Identify maker
- Signal of quality

- Barrier to entry
- Legal protection
- Price premium and competitive advantage

Brand equity stems from the greater confidence that consumers place in a brand than they do in its competitors. This translates into consumer's loyalty and their willingness to pay a premium price for the brand.

Establishing a brand name is very costly for firms. Large sums of capital must be invested continually over a long period of time before a firm earns a significant brand identity. In the sale of experience goods—goods whose quality cannot be assessed before they are purchased and used—the reputation for quality that a firm establishes can be a significant advantage. Consumers can reason that a firm who has invested continually in its brand identity is unlikely to chisel on quality and risk depreciating its precious brand image. In other words, incurring the cost of establishing a brand identity is a means for firms to signal to consumers that the firm offers quality products. Hence, the expectation is that branded products are of higher quality than generic products and should, therefore, garner higher prices.

We should not expect, however, that all sellers of experience goods would brand their goods. For certain goods consumers may be much more price sensitive than quality sensitive. A firm who incurs costly marketing may find itself unable to pass this cost on to customers who do not sufficiently value the signal that the firm is selling a higher quality product.

Also, establishing a brand identity is less attractive to sellers of search goods, or goods whose quality and other attributes can be established at the time of sale. Since the consumer can ascertain the quality of the product directly, signals of quality are not necessary. Hence, sellers of search goods might be better off selling their products under a generic label. Theoretically, a consumer should not pay a premium for a branded search good because the brand name does not confer any additional information.

*Examiner's Comments:*

*A basic answer included how brands are useful. However, a strong answer also included a discussion of how different product/service characteristics might influence the use of branding. Better students were able to relate the branding issue with the type of product e.g., experience goods and credence goods.*

8 (a) Use the logic of the Cournot equilibrium to explain why it is more effective for a firm to build capacity ahead of its rival than it is for that firm to merely announce that it is going to build capacity. [50%]

First, describe what is a Cournot equilibrium. In the Cournot duopoly model the firms decide on the quantity assuming that the price changes to clear the output. Each firm has to choose a quantity of output to produce given the other firm's choice of output in order to maximise profits. Market price decreases with output. The Nash equilibrium is the pair of outputs such that each firm's action is a best response to the other firm's action. The firm changes its behaviour if it can increase its profit by changing its output, on the assumption that the output of the other firm will not change but the price will adjust to clear the market.

The purpose of a commitment is to alter the future behavior of the firm and of the firm's rivals in such a way as to improve the net present value of the profits of the firm making the commitment. If a firm announces a capacity expansion, but the firm's announcement is not credible, the behavior of rival firms will not be affected by the announcement. Hence the announcement has no strategic effect whatsoever if the firm's credibility is in doubt. If the firm actually builds the capacity, rival firms have no choice but to alter their behavior in response to the expansion of capacity. If the firms are Cournot competitors, firms will react by choosing a lower capacity if their rival has expanded their capacity. Had the firm simply made an announcement rather than actually building the capacity, rival firms could have chosen higher capacity forcing the announcing firm to "renege" on its announcement as its best response to its rivals ignoring its initial announcement.

Finally a discussion of the game theory implications of full information, uncertainty etc should be discussed.

*Examiner's Comments:*

*A basic answer included an explanation of the mechanics of Cournot equilibrium. However, a strong answer also include a discussion of how the concept of Cournot equilibrium plays out in strategic situations and its implications for announcement strategy of firms and also a reference to its limitations. The students were able to explain the principles of the Cournot game well. The better students were able to draw implications of credibility in the announcement of capacity expansion and also draw on examples to illustrate their point.*

(b) *Strategic fit* can be defined as the achievement of synergies across related business units resulting in a combined performance that is greater than the units could achieve if they operated independently. Explain how a matrix organisation could result in the achievement of strategic fit. [50%]

A matrix organization gives the firm flexibility by organizing resources along two (or more) dimensions. Such combinations in turn enable the firm to achieve the optimal levels of staffing given specific scenarios. Stochastic demand can greatly influence the amount or skill sets required of resources. Flexibility can address such issues. For example, Amoco Corporation's information technology department assigns experts to functional groups called *Centers of Expertise*. The firm staffs projects by selecting the appropriate number of experts from their respective Centers, depending on project needs. Simple projects may demand only a few experts from a given Center, whereas complex projects may require numerous experts from multiple Centers.

There are advantages and disadvantages of the matrix organisation.

(I) Advantages

- Measuring divisional performance is easier under M-form.
- Pay for performance schemes are easier to implement in managerial compensation.
- Division can coordinate functional activities
- Divisional managers compete for funds in the internal capital markets based on their operating performance in the past.

(II) Disadvantages

- Struggles to cope with clients who span divisions
- Duplication of management effort

*Examiner's Comments:*

*A basic answer included an explanation of the matrix organisation and its benefits and costs. However, a strong answer also included a discussion of how such benefits and costs of matrix organisations can help firms achieve strategic fit – the when and why – conditions with examples where appropriate. The students were able to explain the principles of the matrix organizational structure. Better students were able to relate to*

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*the advantages and disadvantages of such an organisational structure by reference to case examples.*

**END OF PAPER**