General comments

This sitting produced a good pass rate. High average marks were achieved on Questions 1, 2 and 3 in particular.

It was clear that well prepared candidates did not have difficulty completing the examination in the time allowed.

Workings generally were comprehensive and clearly set out, although some candidates produced their final solution to Question 1.7 without providing any justification for their discount rate %.

There was some evidence of candidates failing to read question requirements sufficiently carefully. This was particularly evidenced in:

- Question 1.6, which asked for the current market price of a bond, not the yield to maturity which was in fact given in the question;
- Question 2d(i), where the expected value of sales demand needed to be calculated;
- Question 2e, where focus on environmental costing and effect on financial performance was required;
- Question 3b, where discussion of figures for the previous quarter was required;
- Question 4c, where non-financial factors needed to be explained.
### Question 1.1

1.1 It is estimated that at the end of this year AB will have trade payables outstanding of $547,800. This represents 55 days of purchases based on a 365 day year. All purchases are on credit and are spread evenly each year.

AB is preparing the budget for next year and estimates that annual purchases will increase by 15%. The trade payables days are expected to change from 55 days to 50 days due to several suppliers offering early settlement discounts.

The budgeted trade payables outstanding at the end of next year will be:

<table>
<thead>
<tr>
<th>Option</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$629,970</td>
</tr>
<tr>
<td>B</td>
<td>$498,000</td>
</tr>
<tr>
<td>C</td>
<td>$692,967</td>
</tr>
<tr>
<td>D</td>
<td>$572,700</td>
</tr>
</tbody>
</table>

The correct answer is **D**

### Workings

Annual purchases this year = $547,800/55 * 365 = $3,635,400
Annual purchases next year = $3,635,400 x 1.15 = $4,180,710
Trade payables outstanding = $4,180,710 x 50/365 = $572,700
Question 1.2

1.2 BC had trade receivables of $242,000 at the start of the year. BC forecasts that the sales revenue for the year will be $1,500,000. All sales are on credit.

Trade receivable days at the end of the year are expected to be 60 days based on a 365 day year.

The expected receipts from customers during the year are closest to:

A $1,495,425  
B $1,742,000  
C $1,253,425  
D $1,504,575

The correct answer is A

Workings

<table>
<thead>
<tr>
<th></th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales revenue for the year</td>
<td>$1,500,000</td>
</tr>
<tr>
<td>Plus cash received from last year</td>
<td>$242,000</td>
</tr>
<tr>
<td>Less trade receivables at end of year ($1,500,000/365 x 60)</td>
<td>($246,575)</td>
</tr>
<tr>
<td>Cash received from customers</td>
<td>$1,495,425</td>
</tr>
</tbody>
</table>

Question 1.3

A decision maker who makes decisions using the maximax decision criterion would be described as:

A Pessimistic  
B Optimistic  
C A bad loser  
D Cautious

(2 marks)

The correct answer is B
Question 1.4

PQ is purchasing the lease on a property which has an annual lease payment of $300 in perpetuity. The lease payments will be paid annually in advance.

PQ has a cost of capital of 12% per annum.

The present value of the lease payments is:

<table>
<thead>
<tr>
<th>Option</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$2,500</td>
</tr>
<tr>
<td>B</td>
<td>$2,800</td>
</tr>
<tr>
<td>C</td>
<td>$3,600</td>
</tr>
<tr>
<td>D</td>
<td>$3,900</td>
</tr>
</tbody>
</table>

(2 marks)

The correct answer is **B**

Workings

The first lease payment is paid in advance i.e. in Year 0

<table>
<thead>
<tr>
<th>Time</th>
<th>Cash flow</th>
<th>Discount factor 12%</th>
<th>Present value $</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>300</td>
<td>1.0000</td>
<td>300</td>
</tr>
<tr>
<td>1 - ∞</td>
<td>300</td>
<td>1 / 0.12 = 8.3333</td>
<td>2,500</td>
</tr>
<tr>
<td>Present Value</td>
<td></td>
<td></td>
<td>2,800</td>
</tr>
</tbody>
</table>

The present value of the lease payments is $2,800.
Question 1.5

RS is a retailer of pet products. A dog basket that it sells has an annual demand of 15,000 units. Demand is spread evenly throughout the year.

RS pays its supplier $60 for each basket. Ordering costs are $150 per order and the annual cost of holding one basket in inventory is estimated to be $6.

The economic order quantity (EOQ) for the dog basket to the nearest unit is:

A) 612 units
B) 173 units
C) 866 units
D) 1,025 units

(2 marks)

The correct answer is C

Workings

\[ EOQ = \sqrt{\frac{2CD}{Ch}} \]

Where:

- \( C_o \) = (cost per order) = $150
- \( D \) = (annual demand) = 15,000 units
- \( Ch \) = (cost of holding one unit for one year) = $6.00

\[ EOQ = \sqrt{\frac{2 \times 150 \times 15,000}{6}} \]

= 866
**Question 1.6**

A bond has a coupon rate of 8.5% per annum. The next interest payment will be made in one year’s time. The bond will repay the par value of $100 when it matures in seven years’ time.

**Required:**

**Calculate** the expected current market price of the bond if yields to maturity on similar bonds are 7% per annum.

(3 marks)

**Workings**

Yield to maturity of similar bonds is 7%, therefore use 7% as the discount rate.

<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Description</th>
<th>Cash flow</th>
<th>Discount Factor (7%)</th>
<th>Present Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-7</td>
<td>Interest</td>
<td>8.50</td>
<td>5.389</td>
<td>45.81</td>
</tr>
<tr>
<td>7</td>
<td>Redemption</td>
<td>100</td>
<td>0.623</td>
<td>62.30</td>
</tr>
<tr>
<td>0</td>
<td>Market value</td>
<td></td>
<td></td>
<td>108.11</td>
</tr>
</tbody>
</table>

The current expected market value of the bond is therefore $108.11.
**Question 1.7**

A company is considering an investment project that has a life of four years and requires an initial investment of $800,000. Net cash inflows are estimated to be $281,000 per year. The project has a positive net present value of $53,397 when discounted at 12% per annum. Ignore tax and inflation.

**Required:**

Calculate, to the nearest 1%, the maximum discount rate at which the project will be financially viable.

(3 marks)

**Workings**

It is necessary to find the annuity factor where the initial investment will be equal to the net cash inflows.

$281,000 \times \text{four year annuity factor} = 800,000$

Four year annuity factor = $800,000/281,000 = 2.847$

The four year annuity factor for 15% = 2.855

The four year annuity factor for 16% = 2.798

The maximum discount rate at which the project will be financially viable is therefore 15%.

**Alternatively:**

Using a 20% discount rate

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash flow</th>
<th>Discount factor</th>
<th>Present value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>800,000</td>
<td>1.000</td>
<td>(800,000)</td>
</tr>
<tr>
<td>1-4</td>
<td>281,000</td>
<td>2.589</td>
<td>727,509</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(72,491)</td>
</tr>
</tbody>
</table>

Using interpolation:

12% + (53,397/(53,397+72,491)) \times 8%

12% + 3.39% = 15.39%

To the nearest 1%, the discount rate is 15%.
**Question 1.8**

A company normally pays its supplier 50 days after the invoice date. The supplier has offered the company a 2% early settlement discount if the invoice is paid within 10 days of the invoice date. The company pays 11% per annum on its overdraft which will be used to fund the early settlement.

**Required:**

*Calculate* whether the company should accept the early settlement discount.

(4 marks)

**Workings**

Payment will be made 40 days early.

Number of compounding periods = 365/40 = 9.125

\[1 + r = (1.00/0.98)^{9.125}\]

\[1 + r = 1.20244\]

The effective annual rate of the early settlement discount is 20.24%

The cost of the overdraft is 11% per annum, therefore the company should accept the early settlement discount.

**Alternatively:**

If payment is made on the 10th day the discount is worth $10,000 x 0.02 = $200

Saving on overdraft interest if payment is made on the 50th day:

The daily interest rate = \(365 \times (1+0.11)^{-1} = 0.000285959\)

40 days interest = \(1 + 0.000285959)^{40} - 1\)

= 0.01150237

= $9,800 x 0.01150237

= $112.72

Therefore pay on the 10th day and accept the early settlement discount.
Examiners Comments

Question 1
Performance in the multiple choice questions (1.1 to 1.5) was very good with only Question 1.4 presenting a consistent problem. In this question a significant majority of candidates failed to appreciate the implications of lease payments being made in advance (Option B) rather than in arrears (Option A).

Questions 1.6, 1.7 and 1.8 were all reasonably well answered but for each question a number of candidates made no attempt.

In answer to Question 1.7, there was at times very little justification provided by candidates for the discount rate stated as the solution, or indeed no justification was provided at all. This was probably because the annuity table had been used but it is essential for candidates to make the workings clear in their answer, as stated in the question rubric. The four year annuity factor approach provided in the Examiner’s answer, which was the most direct route to the solution, was not in fact a popular approach for candidates.

Also in answer to 1.7, it was surprising how many candidates reworked the net present value at 12% to derive the $53,397 provided in the question. This was an unnecessary use of valuable time.

Some candidates seemed to find Question 1.8 quite challenging and did not really know where to start because they did not know the compounding formula used to determine the comparable benefit of the 2% settlement discount. Other candidates, presumably being unfamiliar with the compounding formula, used simple interest. This was either by calculating the % overdraft cost over 40 days to compare with the 2% discount or by selecting an invoice value, say $100, and then calculating the cost of the overdraft and the benefit of the discount in $. This was suitably rewarded with marks.

Common errors:

Question 1.6:
- Using interest of 7%, rather than 8.5%, to determine the annual cash inflows
- Discounting at 8.5% per annum, rather than 7%
- Attempting to calculate a yield to maturity (a requirement of some past questions) despite the fact that this was given in the question
- Including interest for six years rather than seven.

Question 1.7:
- Errors in the calculation of a second net present value
- Errors in the interpolation formula and/or its solution such that at times the IRR solution was impossible from the data used but was not recognised as such by candidates
- Simply dividing the NPV at 12% by the total PV of net cash inflows at 12% ($53,397/$853,397) to derive an answer of 6%. These candidates gained no marks for answering a different sensitivity question, which has been set in previous sittings, requiring the calculation of the reduction in the net cash flows that could be accommodated before a project becomes non-viable.

Question 1.8:
- 1.00 and 0.98 were reversed in the compounding formula
- 365 and 40 were reversed in the compounding formula
- 1.00/0.98 was multiplied by 365/40 rather than compounded
- Confusion about the number of days to include in the calculation, especially when simple interest was applied
- Incorrect interpretation of the solution to the compounding formula
- Believing that the early settlement discount, at an effective rate of 20% per annum, was a more expensive option than the 11% overdraft. It should be appreciated that the early settlement discount is a return from making an earlier cash outflow and was greater than the cost of borrowing the money to do it.
Section B – 30 marks
ANSWER ALL SIX SUB-QUESTIONS. YOU SHOULD SHOW YOUR WORKINGS AS MARKS ARE AVAILABLE FOR THE METHOD YOU USE

<table>
<thead>
<tr>
<th>Question 2(a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) ‘Public sector organisations are often judged by their economy, efficiency and effectiveness. Consequently they should use an approach to budgeting other than incremental budgeting.’</td>
</tr>
</tbody>
</table>

Required:
Explain ONE advantage and TWO disadvantages of public sector organisations using incremental budgeting.

(5 marks)

Rationale
The question assesses learning outcome B3(b) apply alternative approaches to budgeting. It examines candidates’ ability to explain the advantages and disadvantages of incremental budgeting.

Suggested Approach
Candidates should clearly explain one advantage and two disadvantages of incremental budgeting in public sector organisations.

<table>
<thead>
<tr>
<th>Marking Guide</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Explanation of one advantage and two disadvantages</td>
<td>1 mark per valid point  Up to 2 marks for each advantage or disadvantage</td>
</tr>
</tbody>
</table>

Maximum marks awarded 5 marks

Examiner’s comments
This question was reasonably well answered on the whole, with many candidates describing what incremental budgeting is and being aware of the advantages and disadvantages of this budgeting method.

Common errors:
It was widely recognised that this budgeting method is relatively easy/straightforward/quick but candidates generally failed to make any comparison with alternative budgeting approaches. Also, many candidates had an over-simplistic view of incremental budgeting, believing that it is simply a case of adding inflation to the previous year’s outcome/budget.

Regarding disadvantages, a large number of candidates recognised that, using incremental budgeting, much of the previous budget is not re-evaluated and thus inefficiency and/or slack may well be built in. Answers, however, were frequently very generic and made no reference to economy or effectiveness in the public sector.
**Question 2(b)**

EF manufactures and sells three products, X, Y and Z. The following production overhead costs are budgeted for next year:

<table>
<thead>
<tr>
<th>Activity</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set up</td>
<td>560,000</td>
</tr>
<tr>
<td>Material handling</td>
<td>242,000</td>
</tr>
<tr>
<td>Inspection</td>
<td>386,000</td>
</tr>
<tr>
<td><strong>Total production overheads</strong></td>
<td><strong>1,188,000</strong></td>
</tr>
</tbody>
</table>

Budgeted details for each of the products for next year are as follows:

<table>
<thead>
<tr>
<th>Product</th>
<th>Production units</th>
<th>Batch size</th>
<th>Number of set ups per batch</th>
<th>Number of material movements</th>
<th>Number of inspections</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>10,000</td>
<td>100</td>
<td>2</td>
<td>16,530</td>
<td>1,188</td>
</tr>
<tr>
<td>Y</td>
<td>16,000</td>
<td>200</td>
<td>3</td>
<td>20,938</td>
<td>1,782</td>
</tr>
<tr>
<td>Z</td>
<td>18,000</td>
<td>300</td>
<td>6</td>
<td>17,632</td>
<td>2,430</td>
</tr>
</tbody>
</table>

**Required:**

Calculate the total budgeted production overhead cost for each product using activity based budgeting.

*(5 marks)*

**Rationale**

The question assesses learning outcome B2(b) *calculate projected revenues and costs based on product/service volumes, pricing strategies and cost structures.* It examines candidates’ ability to calculate budgeted product costs using activity based budgeting.

**Suggested Approach**

Candidates should firstly identify the cost driver for each of the activities and the number of cost drivers for each product and in total. They should then use the cost driver information to charge the overhead costs to each product.

**Marking Guide**

- Total number of set ups
- Cost apportionment to products

**Marks**

1½ marks
1 mark for each activity + ½ mark for totals by product

**Maximum marks awarded**

5 marks
Examiner’s comments

Full marks were reasonably common for this question on activity based costing. However, set up costs proved a problem for some candidates but, despite this, the vast majority were able to correctly apportion the remaining costs (for material handling and inspection) using the respective number of cost drivers given in the question. A problem here was in the, at times, unreasonable rounding of the cost driver rate for each activity. Candidates should recognise that if they round the rates then the total costs apportioned to products will be different from those budgeted.

Common errors:

1. For material handling and for inspection costs some candidates, having calculated a cost driver rate for each, misapplied the cost driver rates, often resulting in a significantly different total overhead being apportioned compared with that budgeted.

2. On set up costs, many candidates could not calculate the number of set ups correctly, from the data provided in the question, in order to apportion the overhead costs. Commonly, in attempting to calculate the number of set ups:
   • Either the number of set ups per batch (2+3+6=11) was used as the cost driver thus failing to recognise that the number of batches differed significantly between the three products;
   • Or batch size for each product was multiplied by the number of set ups per batch (200+600+1,800=2,600) thus failing to recognise that it was the number of batches, not the batch size, that was needed in the calculation.

3. Where the cost driver rate of $700 per set up was correctly calculated, from a total of 800 set ups, some candidates then failed to apportion the costs correctly because they then used different cost drivers (i.e. not the 800 set ups).
### Question 2(c)

(c) **Prepare** a payoff table showing the profits for production quantities of 40,000 tonnes, 60,000 tonnes and 80,000 tonnes.

*(5 marks)*

### Rationale

The question assesses learning outcome D1(d) *prepare expected value tables*. It examines candidates’ ability to prepare a payoff table showing the possible profit at different levels of demand and production.

### Suggested Approach

Candidates should firstly calculate the profit per tonne of production sold and the cost per tonne of production unsold. They should then calculate the profit for each of the combinations of levels of demand and production quantities.

### Marking Guide

<table>
<thead>
<tr>
<th>Marks</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Profit from each outcome</td>
</tr>
<tr>
<td></td>
<td>Format of payoff table</td>
</tr>
</tbody>
</table>

### Maximum marks awarded

5 marks

### Examiner’s comments

Very few candidates scored maximum marks on this question mainly because they were unable to deal correctly with any excess production in the preparation of a payoff table.

Common errors:

1. Only deducting the disposal cost of $20 per tonne to deal with any excess production and thus failing to realise that the production cost of $70 per tonne also had to be accounted for.
2. Preparing a payoff table with production quantities on both axes and assuming that the production quantity in each case would be sold.
3. Failing to recognise that each item in the $3 \times 3$ table was a unique outcome and adding either the rows or the columns to derive impossible and meaningless totals.
4. Presenting an incomplete table. Commonly, only three values were calculated on the basis that demand would be known before a decision had to be made about the production quantity. Thus the three values calculated were for demand 38,000 tonnes/production 40,000 tonnes, demand 54,000 tonnes/production 60,000 tonnes and demand 72,000 tonnes/production 80,000 tonnes.
Question 2(d)

It has now been estimated that the probabilities of the weather conditions are 30%, 50% and 20% for severe, normal and mild weather respectively.

Required:

(i) **Calculate** the profit that would be earned if the decision about the production quantity was based on the expected value of demand.

(3 marks)

(ii) **Describe** the attitude to risk of a decision maker who makes decisions using the expected value decision rule.

(2 marks)

(Total for sub-question (d) = 5 marks)

Rationale

Part (i) of the question assesses learning outcome D1(c) *analyse risk and uncertainty by calculating expected values and standard deviations together with probability tables and histograms.*

Part (ii) of the question assesses learning outcome D1(a) *analyse the impact of uncertainty and risk on decision models that may be based on relevant cash flows, learning curves, discounting techniques etc.*

Part (i) examines candidates’ ability to calculate the expected demand and the resultant profit if the decision on production quantity was based on the expected demand.

Part (ii) requires candidates to describe the attitude to risk of a decision maker who makes decisions using the expected value decision rule.

Suggested Approach

(i) Candidates should firstly apply the probabilities for the weather conditions to calculate the expected value of demand. They should then establish the production quantity that would be required to meet the expected demand. They should then calculate the profit that would be earned from this combination of demand and production quantity.

(ii) Candidates should clearly describe the attitude to risk of a decision maker who applies the expected value decision rule.

Marking Guide

<table>
<thead>
<tr>
<th>Marking Guide</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV of demand</td>
<td>1 mark</td>
</tr>
<tr>
<td>Production 60,000 tonnes</td>
<td>1 mark</td>
</tr>
<tr>
<td>Profit</td>
<td>1 mark</td>
</tr>
<tr>
<td>Risk neutral</td>
<td>1 mark</td>
</tr>
<tr>
<td>Indifference to risk</td>
<td>1 mark</td>
</tr>
</tbody>
</table>

Maximum marks awarded 5 marks
Examiner's comments

This question, on the calculation and use of expected value, was not generally well answered. In part (i), very few candidates calculated the expected value of demand and/or used it to determine the preferred production quantity and the resulting profit.

Common errors in part (i):

1. In the relatively few cases where the expected value of demand was calculated, candidates generally ignored any excess production requiring disposal in any subsequent profit calculation (i.e. it was assumed that 56,200 tonnes would be produced and sold).
2. Calculating the expected value of the profit for each of the three possible production quantities. This involved multiplying the probabilities given in the question, as appropriate, by each profit value in the $3 \times 3$ table in answer to part (c) and then summing sets of three values to derive a total for each production quantity.
3. As in 2. above but instead incorrectly summing different sets of three profit values to derive a total for each demand level (weather condition). This would be of no assistance in making a decision, in advance of the winter season, about what the production quantity should be.

In answer to part (ii), many candidates identified that a decision maker using the expected value rule would be risk neutral. Very few candidates could elaborate usefully on that.
Question 2(e)

Environmental management is considered to be one of the most important issues facing companies today. An effective environmental costing system will not only support a company’s environmental management but may also improve the financial performance of the organisation.

Required:

Explain THREE ways in which an environmental costing system can lead to improved financial performance.

(5 marks)

Rationale

The question assesses learning outcome A3(a) apply principles of environmental costing in identifying relevant internalised costs and externalised environmental impacts of the organisation’s activities. It examines candidates’ ability to explain the ways in which an environmental costing system can lead to improved financial performance.

Suggested Approach

Candidates should clearly explain three ways in which an environmental costing system may lead to improved financial performance.

Marking Guide

Cost reduction 1 mark per point
Increased revenue Up to 2 marks per benefit
Improved decision making
Avoidance of costs of failure
Reputation

Maximum marks awarded 5 marks
Examiner’s comments

There were many reasonable attempts at this question on environmental costing. Many candidates could discuss, and provide an example of, cost reduction that could follow from a focus on environmental costs. They were often also able to explain the reputational benefits of publicising the concern for environmental costs which would attract customers and improve employee motivation.

Common errors:
1. Simply listing a number of internal and/or external failure costs.
2. Failure to link references to environmental cost reduction or environmental management to an environmental costing system and/or to improved financial performance.
Question 2(f)

(f) A company is considering five investment projects as follows:

<table>
<thead>
<tr>
<th>Project</th>
<th>Investment $</th>
<th>Profitability Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12,000</td>
<td>0.20</td>
</tr>
<tr>
<td>B</td>
<td>8,000</td>
<td>0.05</td>
</tr>
<tr>
<td>C</td>
<td>20,000</td>
<td>0.60</td>
</tr>
<tr>
<td>D</td>
<td>16,000</td>
<td>0.40</td>
</tr>
<tr>
<td>E</td>
<td>14,000</td>
<td>0.30</td>
</tr>
</tbody>
</table>

The company has $40,000 available for investment. Projects C and D are mutually exclusive. All projects can be undertaken only once and are divisible.

**Required:**

**Calculate** the maximum net present value (NPV) that can be earned from the projects given that there is only $40,000 available for investment.

(5 marks)

**Rationale**

The question assesses learning outcome C2(c) prioritise projects that are mutually exclusive, involve unequal lives and/or are subject to capital rationing. It examines candidates’ ability to prioritise projects where some of the projects are mutually exclusive and where there is capital rationing.

**Suggested Approach**

Candidates should firstly rank the projects based on the profitability index taking into account that projects C and D are mutually exclusive. They should then allocate the available funds based on the ranking taking into account that the projects are divisible. They should then use the profitability index to calculate the net present value of the projects and the maximum net present value that can be earned from the projects.
Marking Guide

<table>
<thead>
<tr>
<th>Marking Guide</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranking of investment projects</td>
<td>1 mark</td>
</tr>
<tr>
<td>Allocation of $40,000 available</td>
<td>1½ marks</td>
</tr>
<tr>
<td>NPV of selected investments</td>
<td>1½ marks</td>
</tr>
<tr>
<td>Total NPV</td>
<td>1 mark</td>
</tr>
</tbody>
</table>

Maximum marks awarded 5 marks

Examiner’s comments

This question, on the topic of capital rationing, was reasonably well answered. Many candidates understood the meaning of the profitability index, and the implications both of mutual exclusivity and project divisibility, and gained full marks. A number of candidates calculated the present values of the net cash inflows of each of the projects by adding 1 to each of the profitability indices (e.g. Project A $12,000×1.2=$14,400) which was an acceptable alternative approach as long as the $40,000 available sum was fully utilised.

Common errors:
1. Ignoring, or misunderstanding the implications of, the instruction in the question about mutual exclusivity.
2. Ignoring, or misunderstanding the implications of, the instruction in the question about project divisibility.
3. Although providing a correct ranking of projects, some candidates then proceeded, unnecessarily, to calculate the profit that would result from different combinations of projects to utilise the investment sum available.
4. Providing a solution that required investment of more than $40,000.
5. Not understanding the profitability index and the implications for investment and for the calculation of project NPVs.
Section C – 50 marks
ANSWER BOTH THE TWO QUESTIONS

Question 3

(a) **Prepare** a statement that reconciles the budgeted contribution with the actual contribution for October. Your statement should show the variances in as much detail as possible.  

(b) **Discuss** the performance of the Production Director using the information given in the variance statement above.  

(c) **Calculate** the following variances for October, taking account of the more detailed information regarding the labour mix:
   
   (i) The total labour efficiency variance  
   (ii) The total labour mix variance  
   (iii) The total labour yield variance  

(Total for Question Three = 25 marks)

Rationale

The question assesses a number of learning outcomes. Part (a) assesses learning outcome A1(d) **apply standard costing methods, within costing systems, including the reconciliation of budgeted and actual profit margins.** It examines candidates’ ability to calculate variances to enable the reconciliation of budgeted and actual contribution margins. Part (b) assesses learning outcome A1(f) **interpret material, labour, variable overhead, fixed overhead and sales variances, distinguishing between planning and operational variances.** It examines candidates’ ability to discuss the reasons why the variances may have arisen and the possible interrelationship between the variances. Part (c) also assesses learning outcome A1(d) **apply standard costing methods, within costing systems, including the reconciliation of budgeted and actual profit margin.** It examines candidates’ ability to calculate labour mix and yield variances.

Suggested Approach

In part (a) candidates should firstly calculate the budgeted contribution and the actual contribution for the period. They should then calculate each of the variances for sales, material and labour. They should then prepare a reconciliation statement starting with the budgeted contribution, adjusting for the sales volume contribution variance to calculate a revised contribution and then showing each of the individual variances to reconcile the budgeted contribution to actual contribution. In part (b) candidates should discuss the effect that the production director’s decision has had on the company performance as shown by the variances. In part (c) candidates should calculate the total labour efficiency variance, mix variance and yield variance using the further information available about the labour mix.
### Marking Guide

<table>
<thead>
<tr>
<th>Marking Guide</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part (a):</strong></td>
<td></td>
</tr>
<tr>
<td>• Budgeted and actual contribution</td>
<td>1 mark each</td>
</tr>
<tr>
<td>• Variances</td>
<td>1 mark each (× 6)</td>
</tr>
<tr>
<td>• Reconciliation statement</td>
<td>2 marks</td>
</tr>
<tr>
<td><strong>Part (b):</strong></td>
<td></td>
</tr>
<tr>
<td>Discussion of performance via variances</td>
<td>1 mark per valid point</td>
</tr>
<tr>
<td><strong>Part (c):</strong></td>
<td></td>
</tr>
<tr>
<td>• Efficiency variance</td>
<td>2 marks</td>
</tr>
<tr>
<td>• Mix variance</td>
<td>3 marks</td>
</tr>
<tr>
<td>• Yield variance</td>
<td>2 marks</td>
</tr>
<tr>
<td><strong>Maximum marks awarded</strong></td>
<td>25 marks</td>
</tr>
</tbody>
</table>

### Examiner's comments

Part (a) was especially well answered as candidates generally showed themselves to be well versed in basic standard costing variance analysis and in using the variances in a statement in order to reconcile budgeted and actual contribution. Many candidates scored maximum marks for this part.

Part (b) was also quite well answered where candidates used the variances provided for the previous quarter to provide an appraisal of the Production Director’s performance. However, there was also evidence of candidates failing to read the question carefully or not attempting this part at all.

Part (c), requiring the calculation of more advanced labour cost variances, was less well answered overall. Calculation of the efficiency and yield variances was frequently not attempted. There was a distinct contrast between candidates’ fairly widespread ability to calculate the labour mix variance correctly and their relative inability to calculate the revised labour efficiency variance or the labour yield variance. Candidates often calculated the same efficiency variance as they had for part (a). It is important to realise that, although the total labour variance was unchanged, the split of that variance between rate and efficiency was affected by the additional information about labour mix provided in part (c) of the question. It should also be realised that any change in the mix of labour from higher to lower grade/skill will result in a favourable mix variance. It would be anticipated that this would probably adversely affect the yield, as was the case here.

Common errors:

**In part (a)**

1. Calculation, and inclusion in the reconciliation statement, of the sales volume revenue variance. This was either instead of or, occasionally, in addition to the sales volume contribution variance. In order to reconcile budgeted and actual contribution it is the effect of a change in sales volume on contribution, not just on revenue, that is required.
2. Use of budgeted volumes, rather than flexing the budget using actual volumes, in the calculation of the cost variances.
3. Calculation of the total material cost variance and the total labour cost variance believing that they represented the material price and labour rate variances.
4. Calculation, and then rounding, of the actual material price per kg and the actual labour rate per hour, in the calculation of the material price and labour rate variances. These variances should be calculated using the total amounts paid, to avoid rounding error, which is also a more straightforward variance calculation.
5. Incorrect labelling and signage of variances.
6. Failure to attempt a reconciliation statement.
In part (b)
1. Commenting instead on the variances from part (a).
2. Comparing the performance for the previous quarter with the performance in October.
3. Simply stating the obvious by repeating the information provided in the question, often without reference to the variances for the period.
4. Discussing whether the standards should have been changed and/or operational and planning variances calculated.
5. Failing to calculate the net effect of the various actions taken.
6. Focusing on what should be done now.

In part (c)

For efficiency, where any attempt was made:
1. Calculating the variance as $144,000 Adverse on the same basis as for part (a), ignoring the additional information provided about the different elements in the labour mix.
2. Calculating the revised rate variance of $14,000 Favourable instead.
3. Calculating the total labour variance of $64,000 Adverse instead.

For mix:
1. Confusion about the signage of the separate skilled and semi-skilled elements.
2. Confusion about how to value the variances in hours. Candidates at times used the $54 & $18 per unit rather than the $30 & $15 per hour.

For yield, where any attempt was made:
1. Confusion about the valuation of the input variance of 6,000 hours or of the output variance of 2,000 units. If the labour yield variance is calculated in hours it is valued at the standard labour cost per hour using the standard mix. If the yield variance is calculated in units it is valued at the standard labour cost per unit of output.
Question 4

(a) **Evaluate** whether JK should introduce the new model. You should use net present value (NPV) as the basis of your evaluation. Workings should be rounded to the nearest $0.1 million.  

(b) **Calculate** for the Supertab project:
   (i) the internal rate of return (IRR)  
   (ii) the discounted payback period

JK could outsource the production of the Supertab to an overseas manufacturer. The accountant has presented figures to show that the NPV of the project based on outsourcing the production is $0.3 million higher than the NPV of in-house production.

(c) **Explain** THREE non-financial factors that JK would need to consider before deciding whether to outsource production.

(Total for Question Four = 25 marks)

Rationale

Part (a) assesses learning outcomes C1(b) *apply the principles of relevant cash flow analysis to long-run projects that continue for several years* and learning outcome C2(a) *evaluate project proposals using the techniques of investment appraisal*. It examines candidates’ ability to identify the relevant costs of a project and then apply discounted cash flow analysis to calculate the net present value of the project. Part (b) also assesses learning outcome C2(a) *evaluate project proposals using the techniques of investment appraisal*. It examines candidates’ ability to calculate the internal rate of return (IRR) and the discounted payback period for the project. Part (c) assesses learning outcome C1(g) *prepare decision support information for management, integrating financial and non-financial considerations*. It examines candidates’ ability to explain non-financial factors that a company would need to consider before deciding whether to outsource the production of the product.

Suggested Approach

In part (a) candidates should firstly calculate the contribution for each year of the project. They should then deduct the fixed costs after adjusting these for depreciation. The tax depreciation and tax payments should then be calculated. The total cost of the investment, the residual value and the working capital cash outflows and inflows should be added to the net cash flows. The net cash flows after tax should then be discounted at the discount rate of 12% to calculate the net present value (NPV) of the project. In part (b)(i) candidates should use the cash flows calculated in part (a) and discount these at a higher discount rate to get a negative NPV. They should then use interpolation to calculate the IRR of the project. In part (b)(ii) candidates should use the discounted cash flows calculated in part (a) to calculate the cumulative discounted cash flows at the end of each year and the discounted payback period of the project. In part (c) candidates should clearly explain three non-financial factors that the company should consider before deciding whether to outsource production.
<table>
<thead>
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<th>Marking Guide</th>
<th>Marks</th>
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</thead>
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<tr>
<td>Part (a):</td>
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<tr>
<td>Fixed costs net of depreciation</td>
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<tr>
<td>Contribution</td>
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<tr>
<td>Tax depreciation</td>
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<td>30% tax and phasing</td>
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<tr>
<td>Investment &amp; residual value</td>
<td>1 mark</td>
</tr>
<tr>
<td>Working capital</td>
<td>1 mark</td>
</tr>
<tr>
<td>NPV &amp; conclusion</td>
<td>2½ marks</td>
</tr>
<tr>
<td>Part (b):</td>
<td></td>
</tr>
<tr>
<td>Net cash flow after tax &amp; appropriate discount rate</td>
<td>2 marks</td>
</tr>
<tr>
<td>IRR calculation</td>
<td>2 marks</td>
</tr>
<tr>
<td>Cumulative discounted cash flows</td>
<td>2 marks</td>
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<tr>
<td>Payback calculation</td>
<td>1 mark</td>
</tr>
<tr>
<td>Part (c):</td>
<td></td>
</tr>
<tr>
<td>Identification of non-financial factors</td>
<td>1 mark each</td>
</tr>
<tr>
<td>Explanation of factors</td>
<td>1 mark each</td>
</tr>
<tr>
<td>Maximum marks awarded</td>
<td>25 marks</td>
</tr>
</tbody>
</table>

**Examiner’s comments**

Reasonable average marks were gained for parts (a) and (c) with part (b) being less well answered. In part (a), requiring an NPV evaluation of a proposed investment in production equipment, candidates frequently included some non-relevant costs. Invariably absorbed fixed overheads were included and also, at times, the sunk marketing costs, both of which were not relevant to the decision to be made. Relevant costs for decision making are those that will be incurred as a direct result of the decision i.e. they are the costs that would be affected by the decision being made. Many candidates also had problems with the calculation of tax especially where negative cash flow figures arose.

A consequence of the inclusion of non-relevant costs in answer to part (a) was that the NPV of the investment in production equipment was usually a large negative figure and this, especially, caused difficulty for many candidates with their calculation of IRR and payback in part (b). Many candidates did not attempt this part.

In part (c), financial factors as well as, or sometimes instead of, non-financial factors were often included. However, this part was generally quite well answered with candidates explaining a wide variety of issues associated with a decision to outsource production. It is always important, however, that candidates demonstrate that they can apply their generic knowledge to specific situations (for example the question of staff redundancy – see below).

**Common errors:**

**In part (a)**

1. Inclusion of costs in the investment evaluation that were not relevant to the decision about whether to invest in production equipment. This was especially the absorption of fixed overheads at $120 per machine hour. It should be realised that these are not incremental costs but simply the apportionment of overhead costs that would be incurred anyway by the organisation. At times, the marketing costs already incurred were also included. Whilst these costs are relevant to the profitability of the project as a whole they should not have any influence on the decision that has to be made because they are sunk costs i.e. have already been incurred.

2. Errors in the calculation of depreciation or failure to deduct depreciation of the new production equipment from the additional fixed overheads. It is necessary to exclude depreciation from the additional costs because it is not a cash flow and is already accounted for by the inclusion of the investment of $20m as a cash outflow in Year 0 of the DCF evaluation.
3. Confusion of signage and totalling where there were both taxable profits and tax losses during the life of the investment. This especially became a problem for those candidates who set off the tax depreciation, effectively a loss for tax purposes, against those profits/losses before calculating the tax cash flows. For example, a tax loss becomes a bigger tax loss when the tax depreciation is included leading to a tax saving of 30% of the total.

4. Believing that there would not be any reclaim of tax where tax losses arose, despite the clear instruction in the question about the availability of taxable profits from other parts of the business.

5. Including working capital $6m and/or marketing costs $2m in the calculation of tax depreciation.

6. Not adjusting for the $5m disposal value in the calculation of the balancing tax depreciation in Year 5.

7. Treatment of the tax depreciation amounts as cash outflows, rather than simply a way of reducing the taxable profit, thus effectively doubling the net investment amount to $30m.

8. Including the residual value and/or the working capital inflow in the taxable amount for Year 5.

9. Not including the $6m release of working capital at the end of the project.

10. Not including a concluding comment as to whether or not the investment is worthwhile.

In part b(i)
1. Not using the net cash flow after tax from the answer to part (a) in the calculation of a further NPV.

2. Not using a sensible discount rate to calculate a second NPV. If a negative NPV was calculated in answer to part (a) then a rate below 12% should have been chosen and vice versa.

3. Not being able to apply the interpolation formula, or judge the reasonableness of the result, especially with negative figures. Where these figures were large the sensible approach for a candidate would be to explain, in writing, that a positive NPV was not possible from their own figures.

In part b(ii)
1. Calculation of an undiscounted, rather than a discounted, payback period.

2. Calculation of a payback period of more than five years for a five-year project, or a statement to that effect.

3. Using cash flows discounted at a rate other than the cost of capital of 12%.

In part (c)
1. Redundancy of existing staff as a result of this possible outsourcing, which was frequently stated by candidates to be a concern, should not have been an issue because the new model was clearly indicated, in the question, to be new business in a different segment of the market. What could have been an issue, but was very rarely raised by candidates, was a fear for existing staff that outsourcing of production may in the future spread to some of the organisation’s existing business.

2. Inclusion of financial factors.