Section A

Question	Correct Answer	Marks
1	**B** **Stratified** Stratified sampling is where the population is divided into different groups, such as the levels of employees in this situation, and a random sample is taken from each group. The is what the human resources manager has proposed.	2
2	**B and C** **The annual depreciation charge is not a relevant cost** **Fixed costs would have a relevant cost element if a decision causes a change in their total expenditure** Labour can be a sunk cost where work has happened prior to the decision being made, just as material costs can be sunk when inventory is held. Material held in inventory must be taken account of when calculating relevant cost, though it would not be valued at its original historic purchase price as this is sunk.	2
3	**C** **17.9%** $\text{Internal rate of return} = a\% + \left[\frac{NPV_a}{(NPV_a - NPV_b)} \times (b-a)\right]\%$ $= 13\% + \left[\frac{9{,}362}{(9{,}362 + 2{,}015)} \times (19-13)\right]\%$ $= 13\% + \left[\frac{9{,}362}{11{,}377} \times 6\right]\%$ $= 17.9\%$	2
4	**The relevant cost to purchase Gn is $2,250 – Incorrect** **The relevant cost to purchase and convert Lf into Gn is lower than that of purchasing Gn - Correct** Purchase Gn: Total relevant cost = 50 x $46 = $2,300 Purchase Lf and convert into Gn: Total relevant cost = $150 + (50 x $42) = $2,250, which is lower than the purchase cost of Gn.	2

5	**A sampling technique that involves selecting the first item randomly and then every nth item – Systematic sampling** **A sampling technique that involves dividing the total population into small groups and then randomly selecting one group – Cluster sampling** Random sampling is where every item in the population has an equal chance of being selected.	2
6	**$19,250** The project requires 400kg of material. The 150kg in inventory can be used as part of this. The original purchase cost of $55 is a sunk cost and so it is not relevant. Therefore, the alternative use for this inventory is to sell it at $40 per kg, which is the relevant cost. For the remaining 250kg, these will have to be purchased at the current purchase price of $53 per kg. The total relevant cost for the project is (150 kg x $40) + (250 kg x $53) = $19,250 Note: the figure which should be inserted into the answer area is 19250	2
7	**A** **The margin of safety will decrease and the break-even point will increase** Break-even point = fixed costs/contribution per unit. If the cost of raw materials increases, the contribution per unit will fall, resulting in a higher break-even point. Margin of safety = budgeted sales – break-even sales. If the break-even point is higher, the margin of safety will be lower.	2

8	**The median value for staff absence is higher than the mean value – Incorrect** **The mode value for staff absence is higher than the median – Incorrect** To establish the median value the data needs to be listed in numerical order: 11, 11, 11, 12, 12, 13, 18, 19, 20. There are 9 items of data and so the median will be the middle, the 5th item, which has a value of 12. The mode represents the most popular item, which is 11, occurring three times. The mean is equal to the sum of the data values divided by number of data items = 127/9 = 14.11. Hence the mode is the lowest value, followed by the median and the mean is the highest.	2
9	**$583** $500 x 1.08 x 1.08 = $583.20 Note: the figure which should be inserted into the answer area is 583	2
10	**67%** Coefficient of determination is the square of the correlation coefficient = 0.822 = 0.67 = 67%. Note: the figure which should be inserted into the answer area is 67	2
11	**C** **Line J** The dashed horizontal line shown below the zero profit point represents the fixed costs (loss made when output level is zero). At the level of activity shown, Line J represents the total contribution. This is the break-even point where the total contribution will equal the total fixed costs. At levels of activity below this level a loss will be made and above this level a profit is seen.	2

<table>
<tr>
<td>12</td>
<td>
B

Hours of direct labour

Resources required to meet the monthly demand are:
<table>
<tr><th>Usage per ball</th><th>Rugby</th><th>Basket</th><th>Tennis</th><th>Total required to meet demand</th><th>Available resource</th></tr>
<tr><td>Direct materials (kg)</td><td>0.5</td><td>0.75</td><td>0.2</td><td>424</td><td>450</td></tr>
<tr><td>Direct labour (hours)</td><td>0.2</td><td>0.2</td><td>0.25</td><td>255</td><td>250</td></tr>
<tr><td>Machine time (hours)</td><td>0.8</td><td>0.6</td><td>0.4</td><td>608</td><td>650</td></tr>
</table>
Therefore, it is direct labour which does not have sufficient availability and is the limiting factor
to the absorption of overhead costs to the final product.
</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>
A

1,562

Numerator for b calculation
= n∑XY – ∑X∑Y
= (5 x 8,547) – (197 x 209)

= 1,562
</td>
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<tr>
<td>14</td>
<td>
A

$12,000

The value of the investment now = $15,972/1.13 = $12,000
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<td>15</td>
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B

+45

Trend for June = 175 + (25 x 6) = 325

The forecast is prepared using an additive model. Forecast of 370 is 45 units above the trend hence a positive seasonal variation of 45.
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<td>2</td>
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</table>

<table>
<tr><td>16</td><td>7

Total sales = 6 + 4 + 8 + 7 + 11 + 6 + 10 + 9 + 5 + 7 + 14 + 4 + 2 + 6 = 99

Therefore, the mean number of items is 99 ÷ 14 = 7.1 (i.e., 7 to the nearest item).

Note: the figure which should be inserted into the answer area is 7</td><td>2</td></tr>
<tr><td>17</td><td>$1.12

<table><tr><th></th><th>Units</th><th>$</th></tr><tr><td>High</td><td>110,000</td><td>218,200</td></tr><tr><td>Low</td><td>100,000</td><td>207,000</td></tr><tr><td>Difference</td><td>10,000</td><td>11,200</td></tr></table>
Variable cost per unit = $11,200/10,000 units = $1.12

Note: the figure which should be inserted into the answer area is 1.12</td><td>2</td></tr>
<tr><td>18</td><td>D

A cost which has already been incurred

Sunk costs are costs that have been incurred in the past and are irrelevant to any decision that is being made 'now'.</td><td>2</td></tr>
<tr><td>19</td><td>B

12.9

Coefficient of variation = standard deviation/mean

Numerator = standard deviation = √variance = √166 = 12.9 to 1 decimal place</td><td>2</td></tr>
<tr><td>20</td><td>4 years

Payback is achieved when cash inflows from a project equal the cash outflows.

Cash outflows = $120,000

As cash inflows are regular, payback can be calculated as $120,000/$30,000 = 4 years

Note: the figure which should be inserted into the answer area is 4</td><td>2</td></tr>
</table>

21 — 2

$2.50

Difference in units of 34,000 – 4,000 = 30,000 gives rise to a change in costs equal to $103,000 - $22,000 - $6,000 = $75,000 (adjusted for the $6,000 increase in fixed costs that would be incurred at higher output level).

Variable cost per unit = $75,000/30,000 units = $2.50.

Note: the figure which should be inserted into the answer area is 2.50

22 — 2

D

Product D, Product B, Product C, Product A

The ranking of products should be based on contribution per unit of limiting factor. In this case the limiting factor is skilled labour.

	Product A	Product B	Product C	Product D
Contribution ($)	2.80	2.60	1.90	2.40
Hours of skilled labour per unit	1.4	1.2	0.9	1.0
Contribution per hour of skilled labour ($)	2.00	2.17	2.11	2.40
Ranking	4	2	3	1

Therefore, the products should be made in the order: D, B, C, A.

23 — 2

C

Positive NPV of $561

Time	Cash flow ($)	Discount factor @ 8%	Present value ($)
0	(10,000)	1	(10,000)
1	6,500	0.926	6,019
2	5,300	0.857	4,542

NPV = $561

This NPV is positive as the present value of the cash inflows exceeds the initial investment of $10,000.

24	**B** **The difference in units between the expected sales volume and the break-even sales volume** The margin of safety is calculated as the budgeted (expected) sales – breakeven sales. It can also be expressed as the above shown as a % of budgeted sales.	2
25	**C** **It will pass through the middle of the plotted points** When drawing a line of best fit the aim is to position it such that it passes as close to the middle of the plotted variables as possible. It would not be possible to draw a straight line that passed through every point (unless there was perfect correlation). Positive correlation occurs where a line is upward sloping – it is equally possible for the line of best fit to be downward sloping. The line of best fit would not be influenced by the outliers as these would be obvious when the scatter diagram is plotted and hence would be ignored.	2
26	**A** **$375** The total annual inventory holding cost is calculated as (order quantity/2) x holding cost per unit = (250/2) x $3 = $375.	2
27	**C** **Velocity** Velocity is where the speed at which data is being streamed into systems and organisations is increasing rapidly. To be useful, this data needs to be captured and analysed in an efficient and timely manner.	2
28	**The equivalent annual interest rate (EAR) of Ultra is NOT higher than that of Mega, but it is above 4.00 % so statement 1 is incorrect and statement 2 is correct** Bank account Ultra EAR: Nominal annual interest rate, r = 0.04 n = 365 (days in a year) nominal interest rate per day, i = r/n = 0.04/365 = 0.000109589 EAR = (1 + i)n – 1 = (1 + 0.000109589)365 – 1 = 0.0408 = 4.08%	2

29	**C and D** **The trend sales figure for Q3 is equal to 290** **The forecast sales figure for Q3 is equal to 174** Trend Q3 = (20 x 3) + 230 = 290 Forecast for Q3 = 290 x 0.6 = 174 The trend is increasing by 20 units a quarter, but the application of the seasonal variations will lead to the forecast figures showing a more variable quarterly movement. Trend is increasing by 20 units a quarter, shown by 20Q in the trend equation, not 230.	2
30	**C** **400** Co = 64 D = 625 x 4 quarters = 2,500 Ch = 2 EOQ = $\sqrt{}$2CoD/Ch = $\sqrt{}$(2 x 64 x 2500) / 2 = $\sqrt{}$160000 = 400	2
31	**D** **Contribution per m2 of mahogany** Royal Co needs to make sure it is making the most of its scarce resource –mahogany. It should therefore prioritise production based upon the contribution earned per unit of limiting factor, i.e., per m2 of mahogany.	2

32

$32,000

	Output (units)	Total cost ($)
High	360	40,064
Low	215	36,816
Difference	145	3,248

Variable cost per unit = $3,248/145 units = $22.40

Total variable cost at low level of output = $22.40 x 215 = $4,816

Total fixed cost = $36,816 - $4,816 = $32,000

Note: the figure which should be inserted into the answer area is 32000

2

33

B

3 years + 4 months

Year	Cash flow ($)	Cumulative cash flow ($)
0	(160,000)	(160,000)
1	30,000	(130,000)
2	45,000	(85,000)
3	69,000	(16,000)
4	54,000	38,000

Payback arises in the third year. Cash flow is assumed to arise evenly throughout the year.

The $16,000 required to pay back the investment will therefore occur after 16,000/54,000 = 0.2963 of a year, which equates to 0.2963 x 12 = 3.6 months.

The payback period is 3 years + 4 months (to nearest whole month).

2

34

D

4,080

Each unit of product X requires 1.8kg of material. As there is a loss of 10% in manufacturing, 2kg (1.8/ 0.9) is needed for each unit.

Total material required to manufacture 2,000 units = 4,000kg. In addition, 80kgs are required in order to increase the inventory from 420kg to 500kg. In total 4,000kg + 80kg = 4,080kg need to be purchased.

2

35	**C and D** **0, - 0.94** 0 and -0.94 are correct as the correlation coefficient lies between the values of -1 and +1.	2
36	**B** **375 kg** The minimum inventory level = reorder level – (average usage x average lead time) = ((1,500 – (450 x 2.5)) = 375 kg	2
37	**A and D** **Net present value is the present value of all future cashflows arising from an investment decision** **Payback period will be expressed as a time period** NPV has been correctly defined. Payback period is the length of time it takes the net cash inflows of a project to recover the initial investment. IRR is the rate of return generated by a project, expressed in % terms. ROCE is a % measure for the profit arising from an investment divided by the investment value.	2
38	**Where the time series is approximately linear, the line of best fit can be estimated on a scatter graph – True** **Where the time series is not approximately linear, moving averages can be calculated - True** Scatter graphs can be used to estimate a line of best fit, but only where the relationship shown is approximately linear. Where no obvious linear relationship exists, moving averages can still be used to estimate the trend.	2

39	**A and C** **Simulation of the outcome of a change to store opening times** **Prediction of customer visits to the store** Big data can be used by a company to predict trends, such as customer behaviour and volumes (visits), and simulate the impact of changes such as opening hour changes. It would not be appropriate to use for a short-term resource planning situation such as that of staff absence cover as this would need to be done with reference to specific details of the individual retail workers. The data that the store manager has access to would not be of use in supplier contract negotiations. In future if data is obtained relating to industry terms and relationships, this may be a useful addition to the negotiation process.	2
40	**$50,000** Relevant costs are future cash flows arising as a direct consequence of a decision. Costs of $28,000 (development) and $22,000 (marketing) are expected to be incurred in the future. Development costs of $35,000 and marketing costs of $16,000 have already been incurred. They are both sunk costs and are not relevant to the decision. Note: the figure which should be inserted into the answer area is 50000	2
41	**A** **Material only** 30,000 units require: Material: (30,000 x 5) = 150,000 kg Labour: (30,000 x 11) = 330,000 hours With 340,000 hours of labour and 140,000 kg of material available, only material is a limiting factor.	2
42	**Data that follows a pre-defined model for format of collection, storage and processing – Structured** **Data that is collected from many sources and stored in a range of media – Unstructured** These are the correct descriptions of the types of big data.	2

43 **35%**

		$ per unit
Direct materials	2kg at $3.40 per kg	6.80
Direct labour	45 minutes at $12.80 per hour	9.60
Variable overheads	$4.00 per direct labour hour	3.00
Total variable cost	69,000	19.40
Contribution per unit	$30.00 - $19.40	10.60

C/S ratio = $10.6/$30 = 0.35333 = 35%

Note: the figure which should be inserted into the answer area is 35

2

44 **C and D**

If the cost of capital is lower than an investment's IRR, the investment should be accepted

The higher the discount rate used, the higher the likelihood that the NPV will be negative

If the cost of capital is lower than an investment's IRR, the investment should be accepted because it is exceeding the minimum return required by investors.

The higher the discount rate the lower the present value will be and hence the likelihood of a negative NPV increases.

Simple payback does not consider the time value of money.

Decisions recommended by IRR and NPV are not always in agreement.

2

45 **The break-even sales revenue is $50,000 so statement 1 is true**

The margin of safety % is 69% so statement 2 is false

Break-even point in sales revenue = fixed costs/contribution to sales (C/S) ratio.

The C/S ratio = ($16 - $8)/$16 = 50%.

Break-even point in sales revenue = ($2.50 x 10,000)/50% = $50,000.

Margin of safety % = (budgeted sales – break-even sales)/budgeted sales. This can be calculated in units or in $sales revenue.

Budgeted sales revenue = $16 x 10,000 = $160,000.
Margin of safety = ($160,000 - $50,000)/$160,000 = 68.75% (rounded to 69%)

2

Section B

Question	Correct Answer
46	**Task 1 (2 marks)** **The programmer's contract fee of $7,000 - Relevant** **The incurred design costs of $8,200 – Not relevant** The programmer's contract fee is to be paid in the future if the contract is obtained, therefore it is relevant. The design costs of $8,200 have already been incurred and so are a sunk cost and therefore are not relevant. **Task 2 (2 marks)** **$7,920** Number of components required = 64 Number of components in stock = 24. Original purchase cost is sunk so not relevant. Relevant cost is lost resale income of $105 x 24 = $2,520. Number of components to be purchased = 40. Relevant cost of purchase at current market price = $40 x 135 = $5,400. The total relevant cost of components is $7,920. Note: the figure which should be inserted into the answer area is 7920 **Task 3 (1 mark)** **B** **$900** Existing salary of $30,000 would be paid by Koola Co if the contract were not undertaken, so is not a relevant cost. Relevant cost is the increase in salary that has been awarded for the new system piece of work = $3,600 per year, so for the three months x 3/12 = $900

<table>
<tr><th>Question</th><th>Correct Answer</th></tr>
<tr><td>47</td><td>
Task 1 (4 marks)

$950,000 (to the nearest $'000)

PV of sales revenue in year 2 = 0.826 x $1,150,000 = $949,900

Note: the figure which should be inserted into the answer area is 950

$994,000 (to the nearest $'000)

PV of resale value of assets = $1,600,000 x 0.621 = $993,600

Note: the figure which should be inserted into the answer area is 994

$447,000 (to the nearest $'000)

<table>
<tr><th></th><th>Year 1 ($)</th><th>Year 2 ($)</th><th>Year 3 ($)</th><th>Year 4 ($)</th><th>Year 5 ($)</th></tr>
<tr><td>PV of marketing costs @ 10%</td><td>118,170</td><td>107,380</td><td>97,630</td><td>68,300</td><td>55,890</td></tr>
</table>

Total PV = $447,370

Note: the figure which should be inserted into the answer area is 447

Task 2 (1 mark)

Tong Co's directors will reject the investment as the actual payback period is less than the target payback period – False

The net present value and the internal rate of return results indicate the investment should be accepted - True

The payback period of 3 years and 3 months is less than the target 4 years and so is acceptable to the company.

The positive NPV, and the IRR exceeding the company's cost of capital, both indicate that the investment should be accepted.
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