Specimen Exam 1

Exam Name: Decision-Making with Data (F3)
Time allowed: 2 hours
Pass Mark: 50%

This exam contains 2 sections:

Section A:
45 questions, each worth 2 marks
90 marks in total

Section B:
2 questions, each worth 5 marks
10 marks in total

Section A

Question 1

The management of Ramy Co, a small company, is thinking of making changes to its holiday policy, which will apply to all employees.

The human resource manager feels that the policy will affect the senior management and the operational staff in different ways.

He has proposed that a random sample from each level of employees should be identified to carry out a survey before finalising the change.

Which of the following would be the MOST appropriate sampling technique in this situation?

A Systematic
B Stratified
C Quota
D Multistage

Question 2

Which TWO of the following statements relating to relevant cost concepts in decision-making are CORRECT?

A Labour can never be a sunk cost whereas material can
B The annual depreciation charge is not a relevant cost
C Fixed costs would have a relevant cost element if a decision causes a change in their total expenditure
D Materials already held in inventory never contribute to relevant cost

Question 3

Discounted cash flow analysis is being applied to a project with the following results:

Rate of interest (% per year)	Net present value ($)
13	9,362
19	(2,015)

Using the above results, what is the BEST approximation of the internal rate of return (IRR) of the project?

A 13.8%
B 14.1%
C 17.9%
D 20.6%

Question 4

Nagol Co requires 50 kg of chemical Gn for use in production. Gn can be purchased for $46 per kg. Alternatively chemical Lf, purchased at a cost of $42 per kg, can be converted into chemical Gn at a cost of $150 per 50 kg.

Identify whether each of the following statements relating to the relevant cost of chemical Gn is correct or incorrect.

		Correct	Incorrect
1.	The relevant cost to purchase Gn is $2,250		
2.	The relevant cost to purchase and convert Lf into Gn is lower than that of purchasing Gn		

Question 5

Identify the sampling technique which is being described in each of the following statements.

		Random sampling	Systematic sampling	Cluster sampling
1.	A sampling technique that involves selecting the first item randomly and then every nth item			
2.	A sampling technique that involves dividing the total population into small groups and then randomly selecting one group			

Question 6

Allyn Co is evaluating a project that requires 400 kg of raw material X. The company has 150 kg of X in inventory that was purchased six months ago for $55 per kg. The company no longer has any use for X. The inventory of X could be sold for $40 per kg. The current purchase price for X is $53 per kg.

Calculate the total relevant cost of raw material X for the project.

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Question 7

Alps Co has discovered that the cost of raw material will increase.

If nothing else changes, what is the effect of this on the margin of safety and the break-even point?

A The margin of safety will decrease and the break-even point will increase
B The margin of safety will increase and the break-even point will increase
C The margin of safety will decrease and the break-even point will decrease
D The margin of safety will increase and the break-even point will decrease

Question 8

The following figures relating to daily staff absence in a large supermarket have been analysed.

12, 13, 19, 11, 11, 20, 18, 11, 12

Identify whether each of the following statements regarding the absence statistics is correct or incorrect.

		Correct	Incorrect
1.	The median value for staff absence is higher than the mean value		
2.	The mode value for staff absence is higher than the median		

Question 9

Calculate the value after two years of $500 invested now at a compound rate of interest of 8% per year (to the nearest $).

$ [ ]

Question 10

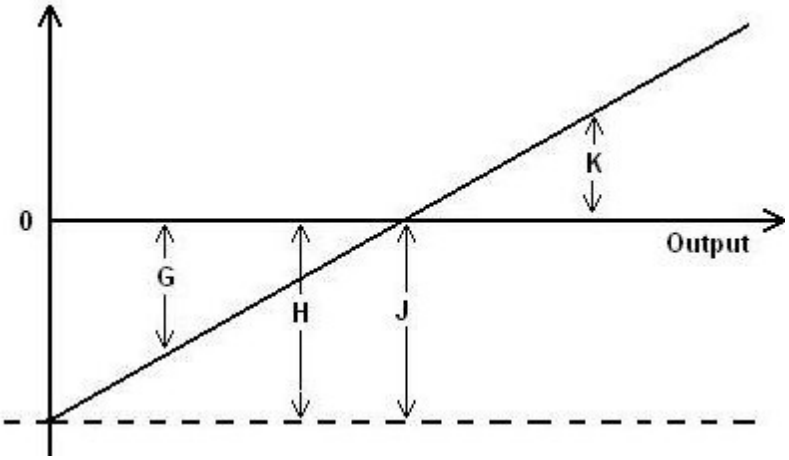
The correlation coefficient calculated for a set of data is 0.82.

Calculate the value of the coefficient of determination (expressed as a whole percentage).

[ ] **%**

Question 11

Four vertical lines have been labelled G, H, J and K at different levels of activity on the following profit/volume chart:



Which line represents the total contribution at that level of activity?

A Line G
B Line H
C Line J
D Line K

Question 12

Nox Co manufactures three sports balls using the same production process. The demand for the following month is predicted to be 300 rugby balls, 200 basketballs and 620 tennis balls. The production of these products will use the following resources:

Usage per ball	Rugby	Basket	Tennis
Direct materials (kg)	0.50	0.75	0.20
Direct labour (hours)	0.20	0.20	0.25
Machine time (hours)	0.80	0.60	0.40

Nox Co has a policy of holding no inventory of finished goods. In the next month Nox Co estimates that it will have 450 kg of materials, 250 labour hours and 650 machine hours available.

Which of the following will be the factor which will limit the number of balls that Nox Co can produce and sell next month?

A Kg of materials
B Hours of direct labour
C Machine hours
D Demand for the balls

Question 13

Work to derive the linear relationship between labour hours (Y) and output (X), in the form Y = aX + b, has commenced and the following summations are available for the five pairs of data utilised:

ΣX	197
ΣY	209
ΣXY	8,547
ΣX^2	8,305
ΣY^2	8,939

Using linear regression, what is the missing numerator in the following calculation of 'b'?

$$b = \frac{\_\_\_\_\_}{2{,}716}$$

A 1,562
B 32,626
C 352
D 39.4

Question 14

An investment made now would yield $15,972 in three years' time if compound interest is earned at an annual rate of 10%.

What is the current value of the investment?

A $12,000
B $13,200
C $10,909.10
D $11,643.59

Question 15

The forecast sales for June are 370 units, calculated using an additive time series model.

The trend for sales follows the pattern:

Trend = 175 + 25M, where M = month, with M = 1 representing January

What is the value of the seasonal variation for June?

A 1.14
B +45
C -45
D 0.88

Question 16

A sales assistant in a jewellery shop sold the following number of items per hour last weekend:

6, 4, 8, 7, 11, 6, 10, 9, 5, 7, 14, 4, 2, 6

Calculate the mean number of items that the assistant has sold per hour (to the nearest item).

[ ] **items**

Question 17

Costs have been recorded at the following three output levels:

Production output (units)	100,000	105,000	110,000
Total costs ($)	207,000	212,600	218,200

Using the high-low method, calculate the variable cost per unit (to two decimal places).

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Question 18

Which of the following describes a sunk cost?

A A cost which is an incremental cash flow
B A cost unaffected by fluctuations in the level of activity
C A potential cost to be spent in the current period
D A cost which has already been incurred

Question 19

The following figures show the number of warranty claims received over each of the last four months:

25, 33, 18, 45

The variance has been calculated to be 166. The production manager wishes to calculate the coefficient of variation.

What is the CORRECT NUMERATOR for the coefficient of variation calculation (to 1 decimal place)?

A 166.0
B 12.9
C 31.0
D 27,556.0

Question 20

An asset investment project requires an immediate investment of $120,000 followed by cash inflows of $30,000 at the end of each of the four years of the project's life. The project will have a residual value of $60,000.

Calculate the non-discounted payback period of the investment (to the nearest year).

[ ] **years**

Question 21

Night Co's production costs at two different levels are as follows:

Production level	Total cost
4,000 units	$22,000
34,000 units	$103,000

Total fixed costs increase by $6,000 once output exceeds 25,000 units.

Using the high-low method, calculate the variable cost per unit (to two decimal places).

$ [ ]

Question 22

Barrier Co manufactures and sells four products. Sales demand cannot be met owing to a shortage of skilled labour. Details of the four products are:

	Product A	Product B	Product C	Product D
Sales demand (units)	1,500	2,000	1,800	1,900
Contribution ($/unit)	2.80	2.60	1.90	2.40
Contribution/sales (%)	30	40	50	45
Skilled labour (hours/unit)	1.4	1.2	0.9	1.0

What order should the products be made in so that profit can be maximised?

A Product A, Product B, Product D, Product C
B Product B, Product D, Product C, Product A
C Product C, Product D, Product B, Product A
D Product D, Product B, Product C, Product A

Question 23

Gando Co is considering investing in a new machine to speed up the production process for frozen fish. The machine will cost $10,000 if purchased immediately and will generate cost savings of $6,500 at the end of the first year of use and $5,300 for the second year. After two years of use the machine will have to be scrapped for food hygiene reasons and it will have no resale value.

Gando Co uses a cost of capital of 8% in evaluating investment decisions. The following discount factors for 8% should be used:

Time	Discount factor at 8%
1	0.926
2	0.857
3	0.794

Which of the following net present value (NPV) results for the proposed investment is CORRECT?

A Positive NPV of $519
B Negative NPV of $519
C Positive NPV of $561
D Negative NPV of $561

Question 24

Which of the following describes the margin of safety?

A The total sales units up to the break-even sales volume
B The difference in units between the expected sales volume and the break-even sales volume
C The difference between sales value and variable costs
D The difference between total costs and the fixed costs at breakeven sales volume

Question 25

Which of the following statements relating to the line of best fit drawn on a scatter diagram is CORRECT?

A It will pass through every point plotted on the scatter diagram
B It will always show a positive correlation between two variables
C It will pass through the middle of the plotted points
D It will be influenced by the outliers when drawn

Question 26

Bulem Co orders a particular raw material in order quantities of 250 units. No safety inventory is held, the inventory holding cost is $3 per unit per year and the annual demand is 2,500 units.

What is the total annual inventory holding cost of the material?

A $375
B $750
C $3,750
D $7,500

Question 27

Games consoles are in a market of rapid innovation and fast-moving trends. Insights from data need to be provided in a timely manner to support decision-making.

Which of the following characteristics of big data is described by the above statement?

A Veracity
B Variety
C Velocity
D Volume

Question 28

An investor has the choice of two bank accounts in which to deposit funds for one year:

- Bank account Mega offers a deposit rate of 4.10% simple annual interest
- Bank account Ultra offers a deposit rate of 4.00% annual interest, compounded daily (365 days a year)

Identify whether each of the following statements regarding these accounts is correct or incorrect.

		Correct	Incorrect
1.	The equivalent annual interest rate of bank account Ultra is higher than that of bank account Mega		
2.	The equivalent annual interest rate of bank account Ultra is above 4.00%		

Question 29

The management accountant for an umbrella sales business has used the following to forecast sales patterns for each quarter of the year:

Trend = 20Q + 230
where Q represents the quarter with Q = 1 being the first quarter of 20X1.

Multiplicative seasonal variations as follows:

Q1	1.3
Q2	1.1
Q3	0.6
Q4	1.0

Which TWO of the following statements relating to the 20X1 forecast are CORRECT?

A The forecast sales figures will increase by 20 units every quarter
B The trend sales figure is increasing by 230 units per quarter
C The trend sales figure for Q3 is equal to 290
D The forecast sales figure for Q3 is equal to 174

Question 30

Frit Co has provided the following information for component BLX3 that is required for use in production:

Quarterly demand for component	625 units
Cost incurred per order placed	$64
Cost of holding one unit in inventory for a year	$2

What is the Economic Order Quantity (EOQ) for component BLX3 (to the nearest whole unit)?

A 200
B 283
C 400
D 566

Question 31

Royal Co, a luxury furniture manufacturer, is experiencing a shortage of a type of wood called mahogany which is used for many items within its product range such as chairs, tables, bookcases and cabinets. This shortage will limit the number of items that can be produced resulting in demand which cannot be met. Royal Co wishes to maximise profits.

Which of the following is the basis that Royal Co should use to rank its products for production from the limited supply of mahogany?

A Quantity of mahogany per unit
B Selling price per unit
C Contribution per unit
D Contribution per m^2 of mahogany

Question 32

Mac Co has collected the following cost information for its production of pressure washers over the last six months:

Month	Output (units)	Total cost ($)
June	215	36,816
July	360	40,064
August	250	37,600
September	320	39,168
October	285	38,384
November	290	38,496

The management accountant of Mac Co wishes to use the high-low method to forecast the production costs of pressure washers.

Using the high-low method, calculate the value of the fixed cost of pressure washer production (to the nearest $).

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Question 33

The production manager of an automotive parts producer wishes to purchase a new machine which will lead to significant savings in labour time and therefore costs.

This machine will cost $160,000 and is expected to generate the following savings in labour costs:

Year	Cost Savings ($)
1	30,000
2	45,000
3	69,000
4	54,000
5	44,000

What is the non-discounted payback period for the machine purchase (to the nearest month)?

A 3 years + 11 months
B 3 years + 4 months
C 3 years + 3 months
D 3 years + 2 months

Question 34

Product X requires 1.8 kg of a raw material in the manufacture of each finished unit. The material has a weight loss of 10% in preparation for manufacture. Inventory of the material is currently 420 kg but needs to be increased to 500 kg. 2,000 units of Product X are to be manufactured.

What amount of raw material in kgs needs to be purchased to satisfy the above requirements?

A 3,880
B 3,920
C 4,040
D 4,080

Question 35

Which TWO of the following are feasible values for the correlation coefficient?

A + 1.40
B + 1.04
C 0
D - 0.94

Question 36

Ordering lead times and weekly usage of a raw material are:

	Lead time	Weekly usage
Minimum	2 weeks	400 kg
Maximum	3 weeks	500 kg
Average	2½ weeks	450 kg

The economic order quantity of the material is 1,800 kg and the re-order level is 1,500 kg.

What is the minimum inventory control level?

A 300 kg
B 375 kg
C 675 kg
D 700 kg

Question 37

Which TWO of the following statements relating to investment appraisal techniques are CORRECT?

A Net present value is the present value of all future cashflows arising from an investment decision
B Internal rate of return is the number of years for investment cash outflow to be repaid by future cash inflows
C Return on capital employed is expressed as an absolute measure in monetary terms
D Payback period will be expressed as a time period

Question 38

Identify whether each of the following statements about establishing the trend of a time series is true or false.

		True	False
1.	Where the time series is approximately linear, the line of best fit can be estimated on a scatter graph		
2.	Where the time series is not approximately linear, moving averages can be calculated		

Question 39

A retail store manager has access to a significant amount of data collected from customer surveys, sales systems, website activity and store security television footage. He believes that this would be considered to be big data and hopes that it can be used to improve the profitability of the store.

Which TWO of the following would be a worthwhile use of big data for this retail store manager?

A Simulation of the outcome of a change to store opening times
B Negotiation of contract terms for new suppliers
C Prediction of customer visits to the store
D Planning of staff cover for unexpected absence

Question 40

Budawang Co is in the process of bringing a new product to market and has incurred development costs of $35,000 to date. Further costs of $28,000 will be required to complete the development of the product.

Marketing spend for the past six months was $16,000 and it is expected that expenses in this area will be $22,000 for the next six-month period.

Calculate the relevant cost for the decision on whether to continue with the development and marketing of the new product (to the nearest $).

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Question 41

The following cost details relate to a single product manufactured by Raltar Co.

	Per unit ($)
Direct materials (5 kg)	30
Direct labour (11 hours)	77
Production overheads	45

During the next period direct labour will be restricted to 340,000 hours and only 140,000 kg of material will be available. Demand is expected to be 30,000 units.

Which of the following will be the limiting factor for the next period?

A Material only
B Labour only
C Both material and labour
D Neither material nor labour

Question 42

Identify the CORRECT type of big data being described in each statement.

		Structured	**Semi-structured**	**Unstructured**
1	Data that follows a predefined model for format of collection, storage and processing			
2	Data that is collected from many sources and stored in a range of media			

Question 43

Snid Co produces a single product that is sold for $30 per unit. Information about the production cost of this product is as follows:

Direct materials	2kg at $3.40 per kg
Direct labour	45 minutes, paid $12.80 per hour
Variable overheads	$4.00 per direct labour hour

Calculate the contribution/sales (C/S) ratio for this product (to the nearest whole %).

[ ] **%**

Question 44

Which TWO of the following statements regarding investment appraisal techniques are TRUE?

A Simple payback accounts for the time value of money
B The decision recommended by IRR and NPV is always in agreement
C If the cost of capital is lower than an investment's IRR, the investment should be accepted
D The higher the discount rate used, the higher the likelihood that the NPV will be negative

Question 45

Pisces Co produces and sells a single product. The following unit cost information is available:

Variable cost	$8.00
Fixed cost	$2.50

The selling price of the product is $16.00 and budgeted production and sales are 10,000 units.

Identify whether each of the following statements relating to the single product produced and sold by Pisces Co is true or false.

		True	False
1.	Break-even sales revenue equals $50,000		
2.	Margin of safety equals 31%		

Section B

Question 46

Koola Co is pricing a contract for delivery of a new robotic system built to order for a customer. Some initial cost information has been collected for the contract.

(1) A specialised programmer will be hired on a contract basis for two months, for a total fee of $7,000, to ensure that the new system can fully integrate with the customer's own systems.
(2) The design costs of the new system include $8,200 which has been spent by the design department on the build of a prototype. A further $3,400 of design costs will be incurred.
(3) The new system will require 64 units of component Beta. The company has 24 units of Beta in inventory that was purchased two years ago for $150 per unit. The company no longer has any use for Beta. The inventory of Beta could be sold for $105 per unit. The current purchase price for Beta is $135 per unit.
(4) The build of this robotic system will be overseen by one of Koola Co's current production supervisors who will be transferred from another factory for three months. He will not be replaced at the factory where he is currently working. His current annual salary is $30,000. This will increase to $33,600 whilst supervising the build to compensate for additional responsibility.

Task 1

Identify whether each of the following would be considered a relevant or an irrelevant cost for the new robotic system.

		Relevant	Irrelevant
1.	The programmer's contract fee of $7,000		
2.	The incurred design costs of $8,200		

Task 2

Calculate the relevant cost of component Beta to be included in the cost estimate for the new robotic system.

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Task 3

What is the relevant cost to be included for a production supervisor who has been transferred from another factory?

A $0

B $900

C $3,600

D $8,400

Question 47

Tong Co is considering an investment in a new factory to produce a higher quality product. Tong Co's directors are assessing the investment over a five-year period. Details that are relevant to the investment include the following:

- The cost of the investment is $3.5m.
- Sales revenue estimates, marketing costs and management costs are provided in Table 1 below.
- The resale value of the investment assets at the end of the five years is estimated to be $1.6m.

Table 1: relevant cash flows

	Year 0 ($'000)	**Year 1 ($'000)**	**Year 2 ($'000)**	**Year 3 ($'000)**	**Year 4 ($'000)**	**Year 5 ($'000)**
Annual sales revenue		900	1,150	1,300	1,000	550
Marketing costs		(130)	(130)	(130)	(100)	(90)
Management costs		(45)	(50	(50)	(50)	(50)

Tong Co's directors have stated that they wish to maximise their shareholders' wealth. They have set a specific target for the investment of a payback period of four years. They will use a cost of capital of 10% when calculating the net present value of the investment. Discount factors are provided below:

Year	**10% discount factor**
1	0.909
2	0.826
3	0.751
4	0.683
5	0.621

Task 1

Calculate the following values of the project goes ahead, expressing your answers to the nearest $'000.

(Note: Assume all cash flows occur at the end of the year)

The present value of sales revenue in year 2 **$** [ ],000

The present value of the resale value of the factory assets in year 5 **$** [ ],000

The total present value of the marketing costs over the five-year period **$** [ ],000

Task 2

Tong Co has correctly calculated the following in relation to the investment:

Internal rate of return	16%
Net present value	+ $630,000
Payback period	3 years 3 months

Identify whether each of the following statements is true or false.

		True	False
1.	Tong Co's directors will reject the investment as the actual payback period is less than the target payback period		
2.	The net present value and the internal rate of return results indicate the investment should be accepted		