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CPA ADVANCED LEVEL

BUSINESS DATA ANALYTICS (PRACTICAL PAPER)

THURSDAY: 27 April 2023. Morning Paper.   **Time allowed: 3 hours.**

Answer ALL questions in SECTION I and any THREE (3) questions in SECTION II. SECTION I has twenty (20) Multiple Choice Questions each carrying two (2) marks. SECTION II has five (5) practical questions each carrying twenty (20) marks.

Under SECTION II, you are required to create Ms Excel Worksheets with the name of the entity in each question and input your workings and solutions. You may use the Excel template within the question.

SECTION I (40 MARKS)

Question One
The acronym "CRISP" stands for:
A.   Cross-industry standard process for data mining
B.   Cross-industry statistical process for data mining
C.   Cross-industry standard practice for data mining
D.   Cross-industry statistical package for data mining

Question Two
You are given the following formulas for computing variance and standard deviation of a population and sample:
1.   =VAR.S( )
2.   =VAR.P( )
3.   =STDEV.P( )
4.   =STDEV.S( )

Which of the following statements in **CORRECT?**
A.   Statements 1 and 3 contain the formulas for variance and standard deviation of a population
B.   Statements 2 and 4 contain the formulas for variance and standard deviation of a sample
C.   Statements 1 and 4 contain the formulas for variance and standard deviation of a sample
D.   Statements 2 and 3 contain the formulas for variance and standard deviation of a sample

Question Three
Which of the following focuses on the discovery of previously unknown properties on the data?
A.   Data mining
B.   Big data
C.   Data wrangling
D.   Data archiving

Question Four
A data analyst would like to determine the number of times revenues have exceeded Sh.10 million over the past 10 years. If the revenues are listed vertically in column A (From Cell A2 to Cell A11) of Excel, which of the following formulas will provide the correct output? :
A.   COUNTIF(A2:A11,"=10")
B.   COUNTIF(A2:A11,">10")
C.   COUNTIF(A2:J11, ">10")
D.   COUNTIF(">10", A2:A11)

Question Five

"Alteryx" is an example of a _____.

A.   Data management tool
B.   Data cleaning tool
C.   Data visualisation tool
D.   Data analysis tool

Question Six

Which of the following approaches to data collection will require **SIGNIFICANT** data cleansing?

A.   Online administered questionnaire
B.   Email administered questionnaire
C.   Physically administered questionnaire
D.   All of the above

Question Seven

Which of the following function can be used to find data with unique codes arranged in the top-most row of the dataset in MS Excel.

A.   MATCH
B.   HLOOKUP
C.   VLOOKUP
D.   SET UP

Question Eight

Which of the following reasons will make an organisation **AVOID** cloud computing as a means for data management?

A.   Data Costs
B.   Data Scalability
C.   Data Integrity
D.   Data Safety

Question Nine

Correlation analysis is an example of:

A.   Predictive analytics
B.   Prescriptive analytics
C.   Descriptive analytics
D.   Exploratory analytics

Question Ten

The following are the main examples of data visualisation:

1.   Comparison
2.   Composition
3.   Relationship
4.   Distribution

Which of the following summarises the order of the examples from simple to complex?

A.   Distribution, comparison, composition, relationship
B.   Distribution, composition, comparison, relationship
C.   Comparison, composition, distribution, relationship
D.   Relationship, composition, distribution, comparison

Question Eleven

One or more of the following activities is/are not from Phase 1 of Data Science Life Cycle.

A.   Learning the target domain
B.   Developing initial hypothesis
C.   Visualise initial hypothesis
D.   All of the above

Question Twelve
The following statements relate to the 'Vs' of big data:
1.   Variability is the evolving nature of data sources
2.   Variability is the different types of data structures

Which of the following statements is **CORRECT?**
A.   Only statement 1 is correct
B.   Only statement 2 is correct
C.   Both statements are correct
D.   Both statements are wrong

Question Thirteen
The following is considered by many to be the most important language for Data Science:
A.   Ruby
B.   R
C.   Java
D.   MS Excel 2010

Question Fourteen
Which of the following choices best represents the correct flow of data models:
A.   Conceptual, logical and physical
B.   Physical, logical and conceptual
C.   Logical, physical and conceptual
D.   None of the above

Question Fifteen
Choose the correct keyword for this definition: A graphical representation of a data set:
A.   Data Set
B.   Investigative Cycle
C.   Visualisation
D.   Data Plot

Question Seven

The_____ data model gives the data analyst the chance to gain an overview of the system to be analysed without being concerned with the details of how it will be analysed.

A.   Conceptual
B.   Logical
C.   Physical
D.   Rational

Question Seventeen
A bank collected data on visitors' viewing habits at the bank's website. Which technique can be best used to identify pages commonly viewed during the same visit to the website?
A.   Clustering
B.   Classification
C.   Association rules
D.   Panel analysis

Question Eighteen
The following statements apply to data mining:
1.   Predictive data mining is a type of analysis that extracts data that may be helpful in determining an outcome.
2.   Description data mining is a type of analysis that informs users of that data of a given outcome.

Which of the following is **CORRECT?**
A.   Only statement 1 is true
B.   Only statement 2 is true
C.   Both statements 1 and 2 are true
D.   Both statements are not true

Question Nineteen
Which of the following steps is performed by a data scientist after collecting the data?
A.   Data integration
B.   Data replication
C.   Data cleansing
D.   Data manipulation

Question Twenty
Which of the following best describes the work of a data architect?
A.   Utilise large sets of data to gather information that meets their company's needs
B.   Work with businesses to determine the best usage of the information yielded from data
C.   Develop data solutions that are optimised for performance and design applications
D.   Evaluate data to reach at logical conclusions

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SECTION II (60 MARKS)

Question Twenty One

Miwani Limited plans to invest in a 5-year project in the year 2024. However, the information on the project is not reliable. The company would wish to carry out a scenario analysis:

The following data is available given three scenarios. The optimistic and pessimistic scenarios reflect the % variance from expected.

	Expected Sh.	Scenario Optimistic	Pessimistic
Initial Investment	100,000,000.00	-20%	+30%
Before tax residual value	20,000,000.00	+10%	-10%
Initial working capital	15,000,000.00	-5%	+5%
Revenues	140,000,000.00	+10%	-15%
Direct costs	60,000,000.00	-20%	+20%
Incremental fixed costs	40,000,000.00	-10%	+10%
Capital allowance	30%	N/A	N/A
Inflation rate	5%	3%	8%
Tax rate	30%	30%	30%

Additional information:

1. The inflation rate applies to revenues, direct costs, incremental fixed costs and working capital. Working capital will be recovered at the end of the project.

2. Revenues and costs arise from year 1.

3. The capital allowance rate is on reducing balance basis.

4. Tax will be applied on the gain/loss on disposal of the asset.

5. The weighted average cost of capital for the company is 15%.

Required:

Compute the following for each of the three scenarios:

(a)	Net Present Value (NPV).	(10 marks)
(b)	Internal Rate of Return (IRR).	(10 marks)
		(Total: 20 marks)

Question Twenty Two

You work as the management accountant for Majani Limited which deals in tea production and export.
Before embarking on next year's budgeting, you are tasked with analysing past revenue and price trends.
As a starting point, your supervisor has provided you with historical price and production data as shown in the
worksheet mgt.xls.

Date	Production (million) Kgs	Price per kg
2010-01-01	32.80	182.39
2010-02-01	23.60	192.25
2010-03-01	15.00	192.19
2010-04-01	19.30	188.50
2010-05-01	26.00	182.09
2010-06-01	19.50	196.95
2010-07-01	18.90	204.48
2010-08-01	19.90	191.95
2010-09-01	26.40	195.41
2010-10-01	31.60	200.48
2010-11-01	27.00	200.00
2010-12-01	32.90	205.22
2011-01-01	31.10	202.82
2011-02-01	28.10	198.10
2011-03-01	28.90	191.78
2011-04-01	29.40	177.95
2011-05-01	28.40	186.62
2011-06-01	23.90	186.59
2011-07-01	18.60	190.73
2011-08-01	18.90	206.45
2011-09-01	23.00	240.73
2011-10-01	27.40	201.76
2011-11-01	32.00	192.50
2011-12-01	34.60	201.78
2012-01-01	34.10	236.67
2012-02-01	25.80	258.10
2012-03-01	24.80	241.52
2012-04-01	29.10	190.71
2012-05-01	28.80	200.32
2012-06-01	24.00	223.41
2012-07-01	20.80	201.38
2012-08-01	21.80	211.83
2012-09-01	26.90	224.41
2012-10-01	32.30	211.57
2012-11-01	30.00	194.77
2012-12-01	29.80	201.86
2013-01-01	17.90	225.00
2013-02-01	11.70	278.90
2013-03-01	19.90	259.74
2013-04-01	30.40	230.45
2013-05-01	26.40	238.26
2013-06-01	27.70	250.14
2013-07-01	23.80	263.81
2013-08-01	23.20	247.22
2013-09-01	28.60	229.81
2013-10-01	34.80	224.27
2013-11-01	31.60	213.23
2013-12-01	34.40	239.57
2014-01-01	41.60	249.70
2014-02-01	34.80	212.50
2014-03-01	32.20	203.27
2014-04-01	30.70	192.05
2014-05-01	32.10	190.04

2014-06-01	27.30	202.05
2014-07-01	22.70	211.91
2014-08-01	22.70	210.39
2014-09-01	28.90	231.25
2014-10-01	35.20	224.30
2014-11-01	32.30	209.64
2014-12-01	28.80	206.05
2015-01-01	29.70	229.70
2015-02-01	24.10	264.67
2015-03-01	16.90	246.29
2015-04-01	27.40	260.91
2015-05-01	36.40	265.14
2015-06-01	22.80	284.52
2015-07-01	24.20	287.48
2015-08-01	24.50	321.90
2015-09-01	32.00	321.59
2015-10-01	35.30	282.39
2015-11-01	34.40	241.00
2015-12-01	37.90	228.48
2016-01-01	25.50	261.59
2016-02-01	21.50	270.00
2016-03-01	18.80	262.86
2016-04-01	18.30	277.41
2016-05-01	29.80	288.00
2016-06-01	25.30	287.14
2016-07-01	21.50	337.65
2016-08-01	21.20	328.38
2016-09-01	27.40	374.41
2016-10-01	32.80	344.77
2016-11-01	35.90	361.05
2016-12-01	36.10	374.22
2017-01-01	37.70	338.67
2017-02-01	34.80	332.35
2017-03-01	39.20	332.61
2017-04-01	35.90	313.59
2017-05-01	35.60	286.14
2017-06-01	29.80	262.36
2017-07-01	24.40	259.18
2017-08-01	23.10	315.09
2017-09-01	28.80	337.18
2017-10-01	34.10	339.86
2017-11-01	37.00	331.68
2017-12-01	38.30	352.13
2018-01-01	35.90	368.10
2018-02-01	26.70	349.75
2018-03-01	22.40	330.65
2018-04-01	31.40	325.33
2018-05-01	32.80	327.68
2018-06-01	28.90	334.05
2018-07-01	26.30	356.14
2018-08-01	24.40	358.17
2018-09-01	30.50	362.27
2018-10-01	39.90	357.14
2018-11-01	36.80	351.27
2018-12-01	41.30	333.36
2019-01-01	36.20	337.27
2019-02-01	18.40	341.00
2019-03-01	17.80	341.00
2019-04-01	18.10	341.00
2019-05-01	37.30	341.00
2019-06-01	30.20	341.00

2019-07-01	24.30	345.59
2019-08-01	31.90	353.18
2019-09-01	33.50	358.23
2019-10-01	40.20	368.16
2019-11-01	39.90	368.11
2019-12-01	41.40	351.44
2020-01-01	45.30	338.87
2020-02-01	38.50	320.90
2020-03-01	33.30	297.40
2020-04-01	38.20	266.31
2020-05-01	39.60	272.37
2020-06-01	30.50	258.71
2020-07-01	26.20	256.16
2020-08-01	26.30	248.04
2020-09-01	32.80	230.49
2020-10-01	44.30	221.72
2020-11-01	35.50	235.26
2020-12-01	41.70	245.69
2021-01-01	44.90	249.00
2021-02-01	33.70	256.98
2021-03-01	33.30	237.73
2021-04-01	39.90	223.41
2021-05-01	41.10	219.52
2021-06-01	31.90	223.70
2021-07-01	30.80	232.39
2021-08-01	26.80	235.78
2021-09-01	33.30	232.95
2021-10-01	45.40	256.19
2021-11-01	38.60	243.34
2021-12-01	45.10	243.31
2022-01-01	41.70	269.62
2022-02-01	24.30	296.35
2022-03-01	15.70	307.56
2022-04-01	23.80	290.74
2022-05-01	37.50	313.81
2022-06-01	32.20	355.88
2022-07-01	30.94	403.03
2022-08-01	28.41	387.33
2022-09-01	36.84	371.21
2022-10-01	41.34	391.84
2022-11-01	40.38	353.77

Required:

(a)   Plot a line graph for price against time/dates. Insert a linear trend line displaying the equation and R-squared   (14 marks)
        on the chart. Briefly discuss your results.

(b)   Using a suitable MS Excel function, show that the coefficients shown in the trendline in (a) above are in   (2 marks)
        fact a result of a linear estimation between the historical prices and time.

(c)   You know that prices are affected by production. Because of this, you would like to run a regression between
        price, production and time. Use data analysis ToolPack to run regression analysis. Interpret your results.   (4 marks)
        Be sure to discuss the coefficients and parameters.   **(Total: 20 marks)**

Question Twenty Three

The following draft financial statements relate to H Ltd. and its investment companies S Ltd. and A Ltd. for the year
ended 31 December 2022:

	H Ltd. "Sh.000"	S Ltd. "Sh.000"	A Ltd. "Sh.000"
Non Current Assets:			
Property, plant and equipment	2,110,000.00	902,500.00	815,000.00
Intangible assets	50,000.00	5,000.00	-
Investments	1,125,000.00	10,000.00	-
	3,285,000.00	917,500.00	815,000.00
Current assets:			
Inventory	300,000.00	130,000.00	115,000.00
Trade receivables	175,000.00	70,000.00	80,000.00
Cash at bank	100,000.00	-	50,000.00
Total Assets	3,860,000.00	1,117,500.00	1,060,000.00
Ordinary shares (Sh. 5 par)	2,000,000.00	500,000.00	400,000.00
Retained profits	1,385,000.00	365,000.00	470,000.00
Shareholders' funds	3,385,000.00	865,000.00	870,000.00
Non Current liabilities			
10% Loan stock	100,000.00	75,000.00	25,000.00
Current liabilities:			
Trade payables	350,000.00	100,000.00	135,000.00
Bank overdraft	-	37,500.00	-
Current tax	25,000.00	40,000.00	30,000.00
Total Liabilities	475,000.00	252,500.00	190,000.00
Total Capital and Liabilities	3,860,000.00	1,117,500.00	1,060,000.00

1. The following details relate to the acquisitions:

Company	Date	Cost of investment "Sh.000"	Retained profits "Sh.000"	Percentage
S Ltd.	1 January 2019	750000.00	200000.00	80%
A Ltd.	1 January 2020	300000.00	300000.00	30%

H Ltd. also invested in Sh.25 million of the loan stock in S Ltd. on 1 January 2021.

On the dates of their acquisition, the value of buildings in S Ltd. and A Ltd. were Sh.50 million and Sh.25 million above their
carrying amounts. Buildings are depreciated at the rate of 2% per annum on reducing balance.

The fair value of the non controlling interest (Purchase consideration) can be estimated from the share price of S Ltd. that was
Sh.80 on 1 January 2019.

2. On 1 January 2021, H Ltd. sold S Ltd. an item of plant at a selling price of Sh.75 million, reporting a profit mark-up of 50%.
   Plant is depreciated at 20% per annum on reducing balance.

3. During the year, the companies traded as follows:
   (i) S Ltd. sold goods at a selling price of Sh.20 million to H Ltd. at the normal gross profit margin. One quarter of these goods
       remained unsold at the year end.

   (ii) H Ltd. sold goods at a selling price of Sh.40 million to A Ltd., reporting a profit of Sh.10 million. Half of the good sold to
        A Ltd. had been sold by the year end.

   At the beginning of the year, H Ltd. had goods to the value of Sh.10 million purchased from S Ltd. in the year
   ended 31 December 2021.

4. Included in the trade receivables and payables of each the respective companies are the following inter-company balances:

	"Sh.000"
● Due from H Ltd. to S Ltd.	25,000.00
● Due from A Ltd. to H Ltd.	25,000.00

   A close check in S Ltd.'s books revealed that the receivables of S Ltd. had Sh.30 million due from H Ltd. This anomaly arose because
   H Ltd. sent a cheque of Sh.5 million to S Ltd. on 29th December 2022 but had not been received by S Ltd. as at 31 December 2022.

   Meanwhile all the companies had paid their interest on loan stock by the year end.

5. Goodwill where relevant had been impaired by 20% on cost at the beginning of year 2022. An additional impairment of 20% of the
   initial cost was again reported in year 2022.

Required:
Prepare the consolidated statement of financial position as at 31 December 2022.   **(20 marks)**

QUESTION TWENTY FOUR

M Limited is currently making a bid for N Limited.

The following information has been provided to enable you determine the various prices that M Limited can offer the stakeholders of N Limited:

Statement of Profit or Loss (extract) for the year ended 31 December 2022:

	Sh."000"
Revenue	100,000.00
Cost of sales/administration and distribution costs	(80,000.00)
EBITDA	20,000.00
Depreciation and amortization	(4,000.00)
EBIT	16,000.00
Interest	(2,000.00)
EBT	14,000.00
Tax @30%	(4,200.00)
Net Income	9,800.00
Dividends	(4,000.00)
Retained Profit for the year	5,800.00
Retained profit b/f	14,200.00
Retained profit c/f	20,000.00

Statement of Financial Position as at 31 December 2022:

	Sh."000"
Non current assets (Book value)	56,000.00
Current assets	24,000.00
Total assets	80,000.00
Ordinary share capital	16,000.00
Retained earnings	20,000.00
Total equity	36,000.00
Non current liabilities	
Long-term debt	24,000.00
Current liabilities	20,000.00
Total liabilities	44,000.00
Total capital and liabilities	80,000.00

Additional information:

1. Currently N Limited has 4 million shares with a market price of Sh.15 per share.
2. The current market value of N Limited's debt is Sh.24 million.
3. N Limited's financial statements items are expected to grow as follows:
   (i) Revenue at 10% for the next five years.
   (ii) EBITDA/revenue margin is expected to remain the same.
   (iii) Depreciation/amortization to grow at the same rate as non-current assets, that is, 15%.
   (iv) Interest expense at about 10% of previous year's long-term debt which will grow at 20%.
   (v) Retention rate is 60%. Any balancing figure in the forecast statement of financial position is long-term debt.
   (vi) Current assets and current liabilities will grow at 10%.
4. The applicable weighted average cost of capital is 18%.
5. Assume that the free cash flows to the firm for N Limited will grow at 3% from year 2028.

Required:

Determine the value of N Limited using the free cash flows to the firm model. **(Total: 20 marks)**

Question Twenty Five

Mr Alex Mawezi, an audit client, has been trading for several years.

He has provided with you the following list of account balances as at 31 December 2022:

	Sh."000"
Capital	40,943,500.00
Revenue	129,935,000.00
Trade payables	9,920,000.00
Returns outwards	6,703,500.00
Expected credit loss as at 1 January 2022	1,256,000.00
Discounts allowed	1,153,000.00
Discounts received	875,000.00
Purchases	73,755,000.00
Returns inwards	2,812,000.00
Distribution costs	2,281,000.00
Drawings	9,220,000.00
Rent, rates and insurance	12,986,500.00
Heating and lighting	5,505,000.00
Postage, stationery and telephone	1,205,000.00
Advertising	2,990,000.00
Salaries and wages	19,260,500.00
Credit loss (bad debts)	1,004,000.00
Cash in hand	267,000.00
Cash at bank	2,220,000.00
Inventory as at 1 January 2022	7,827,000.00
Trade receivables	12,250,000.00
Property, equipment and furniture at cost	60,370,000.00
Accummulated depreciation as at 31 December 2022	31,510,000.00
Depreciation expense for the year	6,037,000.00

As you begin the audit process, you discover the following adjustments that should be made to finalise the financial statements as you carry out the substantive tests

	Sh."000"
1. Closing inventory	8,875,000.00
2. Insurance prepaid	560,000.00
3. Heating and lighting accrued	680,000.00
4. Prepaid rates	2,717,500.00
5. End year expected credit loss is estimated as	1,865,000.00

Errors/ommissions identified:	Sh."000"
1. An invoice for goods sold was not posted	2,640,000.00
2. Drawings of goods not reflected in drawings	450,000.00
3. An additional credit loss omitted	220,000.00
4. Depreciation expense for the year is understated	120,000.00

Required:

Prepare an audit schedule for eight columns with the following headings:

(i)   The original trial balance without adjustments.

(ii)   The adjustments.

(iii)   The draft profit or loss items.

(iv)   The draft statement of financial position.

Each section should have the debit and credit columns duly balanced.

(20 marks)