THE INSTITUTE OF CHARTERED ACCOUNTANTS OF NIGERIA

INSIGHT

SEPTEMBER 2024 ATSWA EXAMINATIONS PART II

Question Papers, Suggested Solutions and Examiners' Comments

TABLE OF CONTENTS

THE ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA

ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA
MARCH 2025 EXAMINATIONS (PART II)

FINANCIAL ACCOUNTING

PLEASE READ THESE INSTRUCTIONS BEFORE COMMENCEMENT OF THE PAPER

EXAMINATION INSTRUCTIONS

1. All solutions should be in ink. Any solution in pencil will not be marked.

2. Read all instructions on each part of the paper carefully before answering the questions.

3. Ensure that you do not answer more than the number of questions required for **Section B (The Essay Section).**

4. Check your pockets, purse and mathematical sets, etc to ensure that you do not have prohibited items such as telephone handset, electronic storage device, wrist watches, programmable devices or any form of written material on you in the examination hall. You will be stopped from continuing with the examination and liable to further disciplinary actions including cancellation of examination result if caught.

5. Do not enter the hall with anything written on your docket.

6. Insert your examination number in the space provided above.

TUESDAY, MARCH 25, 2025

DO NOT TURN OVER UNTIL YOU ARE TOLD TO DO SO

THE ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA
ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA
PART II EXAMINATIONS – MARCH 2025

FINANCIAL ACCOUNTING

Time Allowed: 3 hours

SECTION A: PART 1 MULTIPLE CHOICE QUESTIONS (30 MARKS)

ATTEMPT ALL QUESTIONS

Write ONLY the alphabet (A, B, C, D or E) that corresponds to the correct option in each of the following questions/statements.

1. Which of the following transactions result in an increase in cash position of a business?

   A. Payments to suppliers
   B. Goods sold on credit to customers
   C. Proceeds from disposal of non-current assets
   D. Intentional postings in the ledger
   E. Drawings from the business

2. If an entity paid the sum of ₦2,500,000 for company income tax during the year, how should the amount be classified in the statement of cashflows?

   A. Net cash outflows in cash and cash equivalent
   B. Cash outflows from operating activities
   C. Cash outflows from investing activities
   D. Cash outflows from financing activities
   E. Cash outflows in movement in working capital

3. Your firm bought a non-current asset for ₦5,000,000 on January 1, 2020 which had an expected useful life of four years and expected residual value of ₦1,000,000. The assets were to be depreciated on straight line basis. The firms policy is to charge depreciation in the year of disposal. On December 31, 2022 the asset was sold for ₦1,600,000
   What amount should be entered in the statement of profit or loss on the disposal?

   A. Profit of ₦600,000
   B. Loss of ₦600,000
   C. Profit of ₦400,000
   D. Loss of ₦400,000
   E. Profit of ₦350,000

4. Which of the following occurs if the cost of the computer stationery was debited into computer equipment account?

   A. An overstatement of profit and overstatement of non-current assets
   B. An understatement of profit and an overstatement of non-current assets
   C. An overstatement of profit and an understatement of non-current assets
   D. No overstatement of profit and an understatement of non-current assets
   E. An understatement of profit and an understatement of non-current assets

5. Where a transaction is posted into correct ledger accounts but the wrong amount is used, what is the error known as?

   A. An error of omission
   B. An error of original entry
   C. An error of commission
   D. An error of principle
   E. Complete reversal error

6. Which of the following calculations could produce acceptable figure for a trader`s net profit for a period if no accounting record had been kept?

   A. Closing net assets plus drawings minus capital introduced minus opening net assets
   B. Closing net assets minus drawings plus capital introduced minus opening net assets
   C. Closing net assets minus drawings minus capital introduced minus opening net assets
   D. Closing net assets plus drawings plus capital introduced plus opening net assets
   E. Closing net assets minus depreciation plus capital introduced minus opening net assets

7. In preparing a company's statement of cash flows in accordance with IAS 7 which of the following items could form part of the calculations of cash flows from financing activities?

   A. Proceeds of sales of property plant and equipment
   B. Dividend received
   C. Bonus issue of shares
   D. Loans granted to customers
   E. Profit from sales of assets

8. Which of the following items cannot be classified as reserves in a company's statement of financial position?

A. Share premium
B. Retained earnings
C. Revaluation surplus
D. Ordinary share capital
E. Statutory reserves

9. In accordance with IAS 1 – Presentation of financial statements, where should dividend paid during the year be disclosed?

A. Statement of profit or loss
B. Statement of other comprehensive income
C. Statement of changes in equity
D. Statement of financial position
E. Statement of value added

10. Which of the following is **NOT** a motivation for unethical financial reporting by companies to .....

A. achieve a reduction in tax liability
B. enable management receive higher bonus
C. improve market indicators
D. reduce value of assets of the company
E. cover up assets misappropriated by employees

11. In extended trial balance, adjustments for the following have to be made twice, **EXCEPT**

A. Closing inventory
B. Accrued electricity bill
C. Salaries and wages paid
D. Prepaid rent
E. Depreciation charged during the year

12. An expense incurred but not yet paid is called

A. Prepaid expense
B. Accrued expense
C. Unearned income
D. Asset
E. Equity

13. Which of the following transactions are **NOT** recorded in the receivables control account?

i. Cash sales
ii. Doubtful debt receivables
iii. Customer's cheque dishonoured
iv. Credit sales

A. i and ii
B. i and iii
C. ii and iii
D. ii and iv
E. iii and iv

14. In which of the following components of financial statements is proposed dividend reported?

A. Statement of changes in equity
B. Notes to the financial statement
C. Statement of financial position
D. Statement of comprehensive income
E. Statement of value added

15. The set-back associated with cash basis of accounting does **NOT** include;

A. Matching cost with income, in order not to distort profits
B. Unearned income and liability accounts are not reported
C. Non-disclosure of income that has not been invoiced or received
D. Disallow tracking actual sales and purchases
E. Non-current assets utilisation in form of depreciation is ignored

16. When a seller of goods receives damaged goods from the buyer and the goods are not replaced, the seller issues;

A. Pro-forma Invoice
B. Debit Note
C. Credit Note
D. Goods returned Note
E. Goods returned Inwards Note

17. Which of the information provided below cannot be found in Non-Current Assets Schedule?

A. Brief description of the assets
B. Maintenance cost
C. Total cost price
D. Accumulated depreciation
E. Date of purchase

18. The necessary Journal entries required to record decrease in the value of liabilities in the books of partnership business on admission of a new partner are;

A. Dr. Revaluation Account; Cr. Liabilities Account
B. Dr. Partners' Capital Account; Cr. Liabilities Account
C. Dr. Liabilities Account; Cr. Realization Account
D. Dr. Liabilities Account; Cr. Partners' Capital Account
E. Dr. Liabilities Account; Cr. Revaluation Account

19. Which of the following financial ratios indicates management efficiency in the utilization of resources?

A. Owners' Equity to fixed interest charge
B. Current assets to current liabilities
C. Quick assets to current indebtedness
D. Net profit to fixed interest charges
E. Net profit to capital employed

20. What is the cost of goods sold, given that the sales figure is ₦1,500,000 with a mark-up of 25%?

A. ₦300,000
B. ₦756,000
C. ₦960,000
D. ₦1,200,000
E. ₦1,500,000

21. Which of the following is **NOT** a classification of an expense according to their nature?

A. Changes in inventory of finished goods and Work in Progress
B. Finance costs
C. Raw materials consumable used
D. Employees benefit expenses
E. Depreciation expenses

22. The depreciation method that ensures that the depreciation charged against income reduces as the year of usage of the non-current assets increases is called?

A. Depletion method
B. Reducing balance method
C. Sinking fund method
D. Revaluation method
E. Straight line method

23. Which of the following statements is **NOT** true about the accounts of clubs and societies?

A. A deficit of income and expenditure account reduces accumulated fund
B. The excess of total assets over liabilities represents accumulated fund
C. Income and expenditure account does not contain capital receipts and expenditure
D. The closing balance of receipts and payments account is transferred to income and expenditure account
E. Both revenue and capital expenditure are posted into receipts and payment accounts

24. Which of the following is **NOT** a component of financial statements under IAS 1?

A. Statement of affairs
B. Statement of cash flows
C. Statement of financial position
D. Statement of profit or loss and other comprehensive income
E. Statement of changes in equity

25. Which of the following will decrease the balance revealed by trade receivables control account?

A. Dishonoured cheques
B. Debt recovery expenses
C. Credit sales to customers
D. Cash received from customers
E. Payables ledger debit balance transferred to receivable ledger

Use the following information to answer questions 26 and 27

The following information appear in the inventory records of Buba Ltd on December 31, 2021

Item	Quantity (units)	Cost per unit (₦)	NRV per unit (₦)
A	150	300	420
B	175	400	350

26. Under IAS 2, inventory, what amount should be reported as inventory in current assets in the Statement of Financial Position as at December 31, 2021?

A. ₦97,500
B. ₦106,250
C. ₦113,750
D. ₦124,250
E. ₦125,125

27. How much should be charged to the Statement of Profit or Loss during the reporting date December 31, 2021?

A. ₦8,750
B. ₦9,250
C. ₦18,000
D. ₦26,750
E. ₦57,500

28. Which of the following is **NOT** a cash flow from operating activities?

A. Cash payment of an insurance entity for premiums on claims, annuities and other policy benefits
B. Cash advances and loans made to other parties
C. Cash receipts from royalties, fees, commissions and other revenue
D. Cash payments or payments from contracts held for dealing or trading purposes
E. Cash receipts from the sale of goods and rendering of services

29. The Financial Statement extract of Cambel Ltd is as follows:

	₦'000
Property, plant and equipment	750,000
Other assets	120,000
Total liabilities	50,000
Ordinary share capital	500,000

What is the retained earnings in the Statement of Financial Position?

A. ₦170,000,000
B. ₦320,000,000
C. ₦370,000,000
D. ₦500,000,000
E. ₦550,000,000

30. In year 2021, the current ratio of Company XYZ Ltd is 2:1 and the acid test ratio is 0.9:1. However, by year 2022 the current ratio is now 1.5:1 while the acid test ratio is 0.2:1.
These changes is likely to be due to which of the following reasons?

A. Increased bank balance
B. Increased share capital
C. Decrease in inventories
D. Increase in inventories
E. Decreased share capital

SECTION A: PART II SHORT ANSWER QUESTIONS (20 MARKS)
ATTEMPT ALL QUESTIONS

Write the correct answer that best completes each of the following questions/statements

1. Two enhancing qualitative characteristics of financial information are the ..... and .....

2. In accordance with IAS '8', all material prior year errors should be corrected in the first set of financial statements following their discovery as .....

3. The profit as a percentage of cost is known as.....while profit as a percentage of sales is called.....

4. When the proprietor of a business withdraws cash from the organisation for private use, the double entry for this transaction is .....

5. Company XYZ Ltd purchases plant and equipment worth ₦2 million and the equipment is to be depreciated at 5% using reducing balance method of depreciation. The value of the assets of XYZ Ltd after 3 years will be .....

6. IAS 1 states that assets and liabilities as well as income and expenses should not be offset against each other in a financial statement. An exception to this rule is .....

7. One constraint on useful financial information in accordance with IASB Conceptual Framework for Financial Reporting is .....

8. The principle an entity relies on to treat ten staple machines it purchased for ₦15,000 as expenses is .....

9. A plant was paid for on March 25, 2020, delivered on August 30, 2020, installed on April 15, 2021, tested on June 30, 2021, commissioned and available for use on August 20, 2021 and put to use on October 31, 2021, depreciation should commence on the .....

10. Company income tax charged to the statement of profit or loss for the year is current year estimated tax plus previous year's ----------

11. Assets which an entity is expected to consume within 12 months is classified as ----------

12. The major tool that is used in the interpretation of accounts is ----------

13. The source of information of contra-entry posted into the trade receivable Control Account is .....

14. The appropriate journal entries necessary to record the share of loss in the partnership books are .....

15. Credit balance carried down in the subscription account of a not-for-profit organisation at the end of an accounting year is .....

16. The accounting entries for assets taken over by a partner at partnership dissolution are .....

17. In a non-profit-organisation, the excess of expenditure over income is called .....

18. Subsequent to its acquisition, two models specified for measurement of an item of property, plant and equipment are ..... and .....

19. Another name for purchase ledger control account is .....

20. When a partnership is converted to a company, purchase consideration could be in the form of ..... and .....

SECTION B: ATTEMPT ANY FOUR QUESTIONS (50 MARKS)

QUESTION 1

1a. A statement of financial position is a list of the assets and liabilities of an entity as at a particular date. It also shows the equity (capital) of the entity.

Required:

Define an asset and a liability as an element of financial statements and illustrate your definition with an example each. (5 Marks)

1bi. Explain working capital cycle. (1 Mark)

1bii. The financial statements of Jalopy Ltd for the year ended June 30, 2022 are as follows:

Statement of Profit or Loss for the year ended June 30 , 2022.

	GH¢'000
Revenue	450,265
Opening inventory	6,250
Purchases	125,750
Closing inventory	(75,075)

Gross profit	393,340
Admin exp.	(35,720)
Distribution costs	(105,280)
Net profit before tax	252,340
Tax expense	(7,520)
Profit for the year	**244,820**

Statement of Financial Position as at June 30, 2022

	GH¢'000
Property, plant and equipment (net)	765,250
Current assets	
Inventory	75,075
Trade receivables	125,055
Cash and cash equivalent	50,875
Total assets	**1,016,255**
Share capital	600,000
Retained earnings	85,265
Equity	685,265
Loan notes	170,000
Current liabilities	
Trade payables	107,990
Accruals	53,000
Total equity and liabilities	**1,016,255**

Required:

Calculate the working capital cycle of Jalopy Ltd. (6½ Marks)

(Total 12½ Marks)

QUESTION 2

Various documents are used in a system designed to account for purchases and sales.

You are required to:

Explain the contents and purpose of the following documents in the purchases cycle.

i. Purchases order
ii. Delivery note
iii. Goods received note
iv. Purchases invoice
v. Remittance advice **(Total 12½ Marks)**

QUESTION 3

a. Explain how the following activities could aid window dressing of financial information

i) Classification of liability as equity
ii) Recognising fictitious sales invoice
iii) Capitalising operating costs
iv) Failure to write-off doubtful receivables
v) Selling off assets that is not fully depreciated (5 Marks)

b. You have been assigned by the company's Accountant to supervise the Petty cashier. During your routine check, you discovered that the petty cashier had cash shortage.

(i) State how you discovered that the Petty cashier had a cash shortage (2 Marks)
(ii) State **TWO** causes of cash shortage (2 Marks)

c. A Petty cashier with authorised float of ₦5,000, disbursed the following expenses

	₦
Postages	1,190
Travelling	1,600
Stationery	850
Sundries	800

The content of the petty cash till were:- ₦100 (2 units); ₦50 (6 units) and ₦20 (10 units)

You are required to prepare a statement reconciling the content of the petty cash till with the Petty cash Book balance. Comment briefly on the result of the reconciliation. (3½ Marks)

(Total 12½ Marks)

QUESTION 4

List and define the **FIVE** major elements of financial statements in accordance with the IASB's framework with four examples of each. **(Total 12½ Marks)**

QUESTION 5

Kukah and Mattew have been partners for some time. On January 1, 2022, they decided to admit Ayo. The partners agreed to revalue the assets of the partnership.

The statement of financial position of Kukah and Mattew as at December 31, 2021 was as follows:

Non-Current Assets	Cost	Depreciation	Net book value
	₦'000	₦'000	₦'000
Freehold property	15,200	5,700	9,500
Plant & machinery	8,550	4,750	3,800
Motor vehicles	7,220	4,370	2,850
	30,970	14,820	16,150
Current Assets			
Inventories		2,660	
Receivables		2,280	
Bank and cash		14,250	
		19,190	
Current Liabilities			
Payables		8,970	10,220
			26,370
Capital Accounts			
Kukah			9,600
Mattew			9,600
			19,200
Current Accounts			
Kukah		3,170	
Mattew		4,000	7,170
			26,370

1. The new valuations were as follows:

	₦
Freehold property	19,000,000
Plant and machinery	2,850,000
Motor vehicles	2,280,000

2. It was also agreed that allowance for doubtful debts should be made to 2½% of receivables

3. Creditors agreed to receive ₦6,000,000 for full settlement of their interest.

You are required to:

a. Pass the necessary journal entries to give effect to the revaluation of the assets (5½ Marks)
b. Prepare the Partner's capital accounts (3 Marks)
c. Prepare the revaluation account (4 Marks)

(Total 12½ Marks)

QUESTION 6

The following are the assets and liabilities of Ikeja Ventures as at March 31, 2022

	L$'000
Rent payable	17,500
Bank	170,000
Furniture & fittings	36,000
Cash	11,000
Trade payable	46,500
Motor vehicle	240,000
Loan – finance coy Ltd	100,000
Inventory	14,500
Trade receivables	21,000

Additional information:

During the year, the business received additional resources of **L$**20 million from the proprietor and made a net profit of **L$**65 million within the same period. The proprietor made a drawings of **L$**15 million.

Required:

a. Prepare journal entries to incorporate the balances into the records and determine the opening capital of the business. (7½ Marks)

b. Prepare statement of financial position of Ikeja ventures as at March 31, 2022 (5 Marks)

(Total 12½ Marks)

SECTION A: PART I

MULTIPLE CHOICE SOLUTIONS

1. C
2. B
3. D
4. A
5. B
6. A
7. B
8. D
9. C
10. D
11. A
12. B
13. A
14. B
15. A
16. C
17. B
18. E
19. E
20. D
21. A
22. B
23. D
24. A
25. D
26. B
27. A
28. B
29. B
30. C

Workings

3. ₦5m – ₦3m = ₦2m – ₦1.6m = ₦400,000 loss
20. ₦1,500,000 / 125 x 100 = ₦1,200,000
26. 150 x ₦300 +175 x ₦350 = ₦106,250
27. 400 – 350 x ₦175 = ₦8,750
29. ₦750m + ₦120m – ₦50m – ₦500m = ₦320m

Examiner's comment

Being compulsory questions, all candidates attempted the questions and performance was good.

SECTION A: PART II

SHORT ANSWER SOLUTIONS

1. Comparability, verifiability, timeliness, understandbility
2. Errors should be corrected retrospectively
3. Mark up and profit margin
4. Dr. Drawings account, Cr Cash account
5. ₦1,714,750
6. When the offsetting is required or permitted by accounting standard/IFRS or when the offsetting reflects economic substance of the transaction.
7. (i) Cost Versus benefits (ii) Cost constraints
8. Materiality
9. August 2021, the date it was available for use
10. Underestimated tax/under provision
11. Current asset
12. Accounting ratios, Ratio Analysis
13. Sales Journal/Trade Receivable Account
14. Dr. Partner's current account, Cr Appropriation account
15. Subscription in arrears
16. Dr. Partner's capital account, Cr Realisation account
17. Deficit
18. Cost model and revaluation model
19. Total payable account
20. Cash and ordinary shares

Examiner's comment

Also as compulsory questions, all candidates attempted the questions but their performance was below average.

SECTION B

SOLUTION 1

a.

Element	Definition
Asset	A resource controlled by an entity as a result of past events and from which future economic benefits are expected to flow. Example: Cash, Accounts Receivable, Inventory, Property, Plant & Equipment
Liability	A present obligation of the entity arising from past events, the settlement of which is expected to result in an outflow of economic benefits. Example: Loans Payable, Accounts Payable, Accrued Expenses, Bonds Payable

bi. **Working Capital Cycle (WCC)**

It measures the number of days it takes a company to convert its investment in current assets into cash.

bii. **Calculation of working capital cycle of Jalopy Ltd.**

Inventory days + receivable days - Payable days
= 261 + 101 - 313 = 49 days

Workings:

Inventory days = (Average Inventory / Cost of goods sold) × 365days
Average Inventory = (Opening Inventory + Closing Inventory) / 2
= (6250 + 75,075) / 2 = 40,662

a) Inventory days = (40,662 / 56,925) × 365 = 261 days

b) Receivable days = (Receivable / Revenue) × 365 days
(125,055 / 450,265) × 365days = 101 days

c) Payable days = (Payable / Purchases) × 365 days
(107,990 / 125750) x 365 = 313 days

	GH¢'000
Revenue	450,265
Less: Cost of goods sold	
Opening Stock	6,250
Add: Purchases	125,750
Goods available for sales	132,000
Less: Closing Stock	75,075
Cost of goods sold	56,925
Trade Receivables	125,055
Trade Payable	107,990

Examiner's comment

The question tested candidates' understanding of the element of financial statements and the "B" part was on definition and calculation of working capital cycle.

The question was well attempted and about 70% scored above average mark.

SOLUTION 2

	Document	Contents	Purpose
(i)	**Purchase order**	• Details of supplier, such as name, address. • Quantity/description/details of goods required • Price • Terms and conditions of delivery and payment	• Sent to supplier as request for supply. • To check the quotation and • delivery note.
(ii)	**Delivery note (goods delivery note – GDN)**	• Details of supplier, such as, • Name and address. • Quantity and • Description of goods.	• Provided by supplier. • Checked with goods received and • purchase order.
(iii)	**Goods received note (GRN)**	• Quantity • Description of goods • Quality and • any discrepancies.	• Produced by company receiving the goods as proof of receipt. • Matched with delivery note and • Purchase order.
(iv)	**Purchase invoice**	• Details of supplier, such as, name and address. • Details of goods, such as quantity, • Price, value, VAT, • Terms of credit of payment.	• Issued by supplier as request for payment. • Cross checked with delivery note, and • Purchase order.
(v)	**Remittance advice**	• Method of payment • Invoice number, • Amount paid, • Account number, date, etc.	• Sent to supplier with, • or as notification of payment. • Amount

Examiner's comment

The question tested the knowledge of students on the content and purpose of purchase order and some financial documents. About 85% of the candidates attempted the question but did not give correct answers to the question.

About 50% of them scored above average mark allocated to the question.

SOLUTION 3

(A)

Activity	How it Aids Window Dressing
Classification of liability as equity	Overstates equity, making financial position appear stronger. Increasing net assets and reducing gearing.
Recognizing fictitious sales invoice	Boast income, creating a false impression of profitability.
Capitalizing operating Costs	Reduces expenses and increase profit
Failure to write-off doubtful receivables	Overstates assets and net income avoid reporting losses and making financial position appear better.
Selling off assets that are not fully depreciated	Generates temporary income, masking operational losses and earn one-off high gain.

Bi) The total amount disbursed by the Petty Cashier is deducted from the authorized float to arrive at the expected cash in hand (closing balance) which is reconciled with the physical cash (Cash in Hand) in the till. The expected cash in hand as per petty cash book and the physical cash available in the till must be equal. There is cash shortage when the physical cash in the till is less than the expected cash in hand as per petty cash book.

Bii) Causes of Cash Shortage

- Errors in recording expenses
- Pilfering of cash by the petty cashier
- Under cast of the petty cash book total
- Under recording of the amount paid on the petty cash voucher in the petty cash book
- Error in posting inflows
- Misappropriation of funds

c)

	₦	₦
Authorised float		5,000
Total Disbursement - (Note)		4,440
Expected petty cash book balance		**560**
Reconciliation Statement		
Balance as per petty cash book		560
Content of petty cash till		
₦100 X 2	200	
₦50 X 6	300	
₦20 X 10	200	
	700	
Surplus cash in the till		140

Comment: The petty Cashier had a cash surplus of ₦140.

Note: Total disbursement

Postages	1190
Travelling	1600
Stationery	850
Sundry	800
	4440

Examiner's comment

The question tested the candidates' knowledge on window dressing of financial information. Above 35% of the candidates attempted the question but their performance was poor. Many of them did not know the effect of creative accounting on an organisation.

The performance was very poor.

SOLUTION 4

Five major elements of financial statements

1. Assets
2. Liabilities
3. Equity
4. Income/Revenue
5. Expenses

Definition and examples

1. **Assets:** According to IASB's frame work for preparation and presentation of financial statements, are the resources controlled by the entity as the result of past events and from which the future economic benefits are expected to flow into the entity. In this context, it could mean the right to use or control the physical assets or the intellectual property or it could be linked to other entity's obligation to pay or transfer the asset to the entity.

   In accounting equation, Assets are calculated by the accumulation of equity and liabilities. Assets could be sub divided into;
   - Non-Current Assets
   - Current Assets

   Examples are; PPE, Land, building, property, machinery, investments, equipment, cash in hand & Bank, inventories, prepayment, receivables, Goodwill etc.

2) **Liabilities:** According to IASB's framework for preparation and presentation of financial statements, liabilities are the present obligations arising from

the past events, the statement of which is expected to result in an outflow from entity's resources embodying economic benefits.

Liabilities are classified into two different types namely;
- Current Liabilities
- Non- current Liabilities

In accounting equation, liabilities could be calculated as Total Equities less Total Assets or Total Current liabilities plus Total long-term liabilities.
Examples of Liabilities are - Bank loan, Overdraft, Interest payable, Account payable, Tax payable, Accruals, Arrears. Etc.

3) **Equity**: Equity is officially defined by IASB's framework for preparation and presentation of financial statement as the residual interest in the assets of the entity after deducting all its liabilities.

By accounting equations, Equities mean Assets less liabilities, which means, equity increases or decreases depending on the movement of assets and liabilities.

Examples of Equities are:
- Share Capital - Ordinary shares, Preference shares, etc.
- Retained Earnings/Reserves
- Share premium
- Revaluation

4) **Income:** In accordance to IASB's framework for preparation and presentation of financial statements, is an increase in the economic benefits during the accounting period in the form of inflow or enhancements of assets or decrease of liabilities that result in increase in equity, other than those relating to contributions from equity participants. Income includes Revenue and Gains.

Two accounting principles are used to record and recognize revenues in the income statement. They are cash basis and accrual basis. Cash basis is when income is recognized when the cash is received or collected while accrual basis is when income is recognized when risks and rewards are transferred from the seller to the buyer.

Examples of incomes are; Sales, fees, interests, dividends, royalties, rents, profit on sale of assets etc.

5) **Expenses:** IASB's framework for preparation and presentation of financial statements defined Expenses as decrease in the economic benefits during the accounting period in the form of outflows or depreciation of assets or incurred liabilities that result in decreases in equity other than those relating to distributions to equity participants.

Examples are; Cost of goods sold, Purchases, Rents, Salaries, Depreciation, tax expenses, interest expenses, utilities expenses, repairs, maintenance, marketing expenses, Admin expenses, etc.

Examiner's comment

The question tested candidates' knowledge on the five major elements of financial statements in accordance with the IASB's framework with four examples each.

About 90% of the candidates attempted the question and performance was good.

SOLUTION 5

a)		DEBIT	CREDIT
		₦	₦
i	Revaluation account	57,000	
	Allowance for doubtful debt account		57,000
	Being provision of 2½% on receivables		
Ii	Freehold property	3,800,000	
	Revaluation account		3,800,000
	Being revaluation of freehold property		
iii	Revaluation account	10,640,000	
	Plant and machinery		5,700,000
	Motor vehicles		4,940,000
	Being revaluation of plant and machinery and motor vehicle		
iv	Payables account	2,970,000	
	Revaluation account		2,970,000
	Being reduction in the payables		
v.	Provision for Depreciation Account - Freehold Property	5,700,000	
	Provision for Depreciation Account - Plant and Machinery	4,750,000	
	Provision for Depreciation Account - Motor Vehicles	4,370,000	
	Revaluation Account		14,820,000
	Being close up of depreciation account		
vi.	Revaluation account	10,893,000	
	Partners' account		10,893,000
	To close off revaluation account		

b. **Partners' Capital Account**

	Kukah	Mattew		Kukah	Mattew
	₦	₦		₦	₦
Bal. c/d	15,046,500	15,046,580	Bal. b/f	9,600,000	9,600,000
			Share of revaluation	5,446,500	5,446,500
	15,046,500	15,046,500		15,046,500	15,046,500
			Bal. b/d	15,046,500	15,046,500

c. **Revaluation Account**

	₦		₦
Allowance for doubtful debt	57,000	Freehold property	3,800,000
Plant & mach. / M.V.	10,640,000	Payables	2,970,000
Partner's sharing profit	10,893,000	Depreciation	14,820,000
	21,590,000		21,590,000

Examiner's comment

The question required the candidates to post journal entries to give effect to the revaluation of assets, and to also prepare Partner's capital accounts and revaluation account. Majority of them displayed shallow knowledge of raising journal entries. Also preparation of revaluation account was a problem to them.

About 35% of the candidates attempted the question and performance was poor.

SOLUTION 6

IKEJA VENTURES

(a)	Journal Entries	DR.	CR.
		L$'000	L$'000
	Bank	170,000	
	Furniture and fittings	36,000	
	Cash a/c	11,000	
	Motor vehicles	240,000	
	Inventory a/c	14,500	
	Trade receivable	21,000	
	Rent payble		17,500
	Trade payble		46,500
	Loan – finance company		100,000
	Capital (Bal. figure)		328,500
		492,500	492,500

Determination of opening capital

Opening Capital = Closing Capital – Net profit + drawings – Additional capital
= L$328,500 – L$65,000 + L$15,000 – L$20,000
= L$258,500

Opening Capital = L$258,500

(b) **IKEJA VENTURES**
Statement of financial position as at March 31, 2022

Non-Current Assets	L$'000	L$'000
Motor vehicle		240,000
Furniture & fittings		36,000
		276,000

Current Assets		
Inventory	14,500	
Trade receivables	21,000	
Bank	170,000	
Cash	11,000	
		216,500
		492,500
Equity:		
Share capital		258,500
Additional capital		20,000
Net profit	65,000	
Less: Drawings	(15,000)	50,000
		328,500
Non- current Liabilities		
Finance Co. Ltd.		100,000
Current Liabilities		
Trade payable	46,500	
Rent payable	17,500	64,000
		492,500

Examiner's comment

The question also tested candidates' knowledge on journal entries and preparation of statement of financial position. The journal entry preparation was a problem to many of them but they did well in the preparation of statement of financial position.

About 85% of the candidates attempted the question and their performance was good.

GENERAL

The performance of candidates this diet was very good. The lowest score is 11.5% while the highest score is 87.5%.

For better performance in future, candidates are advised to attend lectures, use the recommended textbooks and also read the study park of the Institute.

THE ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA

ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA
MARCH 2025 EXAMINATIONS (PART II)

PUBLIC SECTOR ACCOUNTING

PLEASE READ THESE INSTRUCTIONS BEFORE COMMENCEMENT OF THE PAPER

EXAMINATION INSTRUCTIONS

1. All solutions should be in ink. Any solution in pencil will not be marked.

2. Read all instructions on each part of the paper carefully before answering the questions.

3. Ensure that you do not answer more than the number of questions required for **Section B (The Essay Section).**

4. Check your pockets, purse and mathematical sets, etc to ensure that you do not have prohibited items such as telephone handset, electronic storage device, wrist watches, programmable devices or any form of written material on you in the examination hall. You will be stopped from continuing with the examination and liable to further disciplinary actions including cancellation of examination result if caught.

5. Do not enter the hall with anything written on your docket.

6. Insert your examination number in the space provided above.

WEDNESDAY, MARCH 26, 2025

DO NOT TURN OVER UNTIL YOU ARE TOLD TO DO SO

THE ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA
ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA
PART II EXAMINATIONS – MARCH 2025

PUBLIC SECTOR ACCOUNTING

Time Allowed: 3 hours

SECTION A: PART 1 MULTIPLE CHOICE QUESTIONS (30 MARKS)

ATTEMPT ALL QUESTIONS

Write ONLY the alphabet (A, B, C, D or E) that corresponds to the correct option in each of the following questions/statements.

1. Auditing is an independent appraisal process often governed by statute for the following reasons **EXCEPT**

   A. Examining
   B. Investigating
   C. Verifying
   D. Preparation
   E. Establish opinion

2. Which of the following is **NOT** the duty of the Auditor General?

   A. Financial Audit
   B. Financial control Audit
   C. Value for money Audit
   D. Appropriation Audit
   E. Audit of public quoted companies directly

3. Which of the following is **NOT** an objective of pre-payment audit?

   A. To guide against unreasonable expenditure
   B. To ensure compliance with budget, financial regulations, legislation, and other legal requirements on payment
   C. To ensure sufficient funds are available to enable payment to be effected
   D. To ensure that goods and services conform to the prescribed standards before payment
   E. To earmark much money for constituency projects

4. Which of the following does **NOT** interface with third party system to be provided by GIFMIS?

   A. SAP –Taxation –FIRS-Revenue
   B. CD –DRMS –Debt management, DMO – Debt payments
   C. ORACLE ERP – Banking interface –CBN-Bank statements
   D. ORACLE 9i – Medium Term Budget – BOF-Annual Budgets and ceiling
   E. MS word – word Art

5. The Financial Reporting Council Act 2011 (as amended) stipulates that the seat of a member of the board shall become vacant if the following exist **EXCEPT**

   A. He resigns
   B. Becomes disqualified from membership under section 4 of the Act
   C. He no longer holds office by virtue of which he became a member
   D. He has been absent from three consecutive meetings or three quarters of the meeting of the board
   E. He resigns his appointment by a verbal notice

6. Which of the following is **NOT** the implementation strategy for MDA category funded from Federation Account?

   A. All federation revenues generated by the Agencies is to be paid into Federation Account at CBN
   B. All independent revenue generated by these agencies to be paid into CRF/TSA
   C. Statutory approved cost of collection to be paid into sub accounts at CBN which is linked to TSA
   D. Platform will be configured to allow access to funds based on approved budget.
   E. MDAs to open additional bank accounts in commercial banks to pay in such revenues

7. Which of the following payment channels is available to a payer under the TSA?

   A. Bank branch
   B. Internet banking
   C. CBN Gateway platform
   D. Remita
   E. Service provider

8. Which of the following is **NOT** eligible to receive convening order with full terms of reference from the Officer convening the Board of Enquiry?

A. Auditor–General
B. Surveyor–General
C. Accountant–General
D. Chairman, Federal Civil Service Commission
E. Accounting Officer

9. Which of the following is **NOT** an objective of Cash Basis IPSAS?

A. Accountability regarding cash receipts, cash payments and cash balances
B. Recognises transaction when it occurs not minding when it is paid for.
C. Transparency on allocation of cash resources
D. Provide a sound basis for transition to the accrual basis.
E. Enhance comparability

10. The statement of financial performance, as a minimum requirement should include the following line items **EXCEPT**

A. Changes in cash and cash equivalents
B. Revenue from operating activities
C. Finance cost
D. Surplus or deficit from operating activities
E. Net surplus or deficit for the period

11. Which of the following is **NOT** among the contents of Local Government Financial Memoranda?

A. The financial responsibilities of Auditor-General for the Federation
B. The responsibilities of internal auditor as they relate to audit alarm
C. The financial responsibilities of the Chairman and other officers of the local government
D. The functions and operation of the Alarm Committee
E. The means of revenue collection and control

12. Application for license to act as a Pension Fund Custodian shall **NOT** be approved unless such applicant

A. Is a limited liability company incorporated under the Company and Allied Matters Act (CAMA) by a licensed financial institution with the sole object of keeping custody of pension fund and retirement benefit assets
B. Has a minimum paid capital of such sum that may be prescribed by the commission from time and is wholly owned by a licensed financial institution with a networth of a minimum of ₦25,000,000,000 or as

may be prescribed from time to time

C. Has never been a custodian of any fund which was mismanaged or has been in distress due to any default of the Pension Fund Custodian.

D. Satisfies such additional requirements as may be prescribed from time to time by the Commission

E. Must belong to tourist industry with a networth of not less than ₦10,000,000,000

13. Which of the following procedures does **NOT** affect transfer of stores?

A. The store officer making the request will raise a Store Transfer Requisition (STR)

B. The store transfer requisition will be prepared in duplicate

C. The original of Store Transfer requisition (STR) will be forwarded to the issuing store

D. The issuing store will issue a store issue voucher (SIV) also in duplicate, a copy of which will accompany the transfer stores.

E. Payment vouchers will be raised for the payment of transfer stores

14. Which of the following is **NOT** an objective of Local Government Financial Memoranda?

A. To serve as administrative guidelines which facilitate day to day running of Local government

B. To serve as a learning tool for officers on first appointment or on transfer to a new section

C. To expressly highlight the implication of disbursing government funds and property without proper authority, approval and unjustly

D. To facilitate recording of local government financial transactions in the appropriate accounting method

E. To assist in the calculation of staff turnover rates

15. A development plan spanning a period of **NOT** less or greater than five years is called .....

A. Planning, Programming and Budgeting System

B. Perspective Plan Budgeting System

C. Program Performance Budgeting System

D. Input Budgeting System

E. Input-Output Budgeting System

16. Which of the following is **NOT** a method of preparing budget by government in Nigeria?

A. Medium Term Expenditure Framework

B. Traditional/Line items/Incremental budgeting

C. 'Zero-Based Budgeting' technique (ZBB)

D. Planning, programming and budgeting System (PPBS)

E. Performance budgeting

17. Which of the following is **NOT** an advantage associated with the use of 'Zero Based' budgeting in Nigeria?

A. It results in continual growth in budget totals
B. It is good for profit-oriented projects
C. The technique allows for the participation of the various organs of the decision unit
D. It provides a better yardstick for the measurement of performance
E. It creates questioning attitude instead of assuming that current practice maximises expected money value. Wasteful spending is thereby reduced

18. The Minister of Finance is **NOT** authorised by law to

A. Manage the Consolidated Revenue Fund
B. Authorise issue from Consolidated Revenue Fund
C. Suspend issued warrant for statutory first line charges
D. Suspend issued warrant for appropriate expenditure
E. Correct erroneous receipts into the consolidated fund

19. Which of the following does **NOT** include the composition of Revenue in IPSAS Accrual basis of Accounting?

A. Transfer receipt
B. Aid and grants
C. Federal Government share of Federation Account Allocation Committee (FAAC)
D. Independent revenue
E. Research and development

20. Budgetary basis means which of the following?

A. Budget documents that may provide great detail about particular activities, programs or entities
B. Explanation between the original and initial budget
C. The disclosure of an explanation of the reasons for material differences between the budget and actual amount
D. The accrual, cash, or other basis of accounting adopted in the budget that has been approved by the legislative body
E. The approved budget for one year

21. Who approves the Medium–Term Expenditure Framework?

A. Auditor–General
B. Federal Executive Council and the National Assembly
C. National Assembly only
D. Accountant–General
E. The Minister

22. Which of the following is **NOT** a benefit of Fund Accounting?

A. It facilitates co-ordination and planning
B. It is simple to operate
C. It is used to highlight government policy
D. It does not provide information on debtors and creditors
E. It ensures financial control

23. Which of the following is **NOT** a function of the Accountant-General of the Federation?

A. Heads losses committee
B. Introduction of effective internal control system
C. Ensuring effective supervision over receipts of revenue as well as its prompt collections
D. Ensuring that no disbursement is made without proper authorisation
E. Budget preparation and implementation

24. Which of the underlisted is **NOT** a document that should accompany IPSAS Accrued Trial Balance or Monthly Returns?

A. Original cash book
B. List of outstanding vouchers
C. Breakdown of expenditures
D. The cash and bank balances certificate
E. Cheque books

25. Which of the following is **NOT** a standard provision contained in Appropriation Act?

A. The number of sittings by the Parliament before the Bill is passed
B. The introduction: comparing the present budget with that of previous year
C. A brief description of the services expected to be rendered
D. A detailed analysis of the amount provided
E. A detailed analysis of expected receipts during the year

26. Which of the following terms is **NOT** relevant with reference to Pension Reform Act 2014 as amended?

A. Retirement Benefit Plans
B. Defined Contribution Plans
C. Defined Benefit Plans
D. Funding
E. Actuarial Plans and Certificates

27. Which of the following is **NOT** the responsibility of a Store Keeper?

A. Safe keeping of store
B. Checking and handling of store issued
C. Checking the utility of store issued
D. Progression of issued stores to forestall store becoming obsolete
E. Maintenance of stores within the prescribed maximum and minimum level for avoiding wastage of Public Fund

28. Stores may be obtained from overseas suppliers by use of.....

A. Local Purchase Order
B. Overseas Purchase Order
C. Indents
D. Store Transfer Order
E. Store Import Order

29. In place of Local Purchase Order or Job Order, it is forbidden to use

A. Indent
B. Import order
C. Cash advance
D. Tender process
E. Across the counter purchase

30. The new Pension Reform Act 2014 as (amended) for both public and private sector pension schemes are now
i. Non contributory
ii. Pensionable
iii. Contributory

A. ii only
B. i & ii only
C. i only
D. ii & iii
E. iii only

SECTION A: PART II SHORT ANSWER QUESTIONS (20 MARKS)

ATTEMPT ALL QUESTIONS

Write the correct answer that best completes each of the following questions/statements

1. The TSA E-Payment scheme commenced in 2012 with the automation of payments and expenditures management using ..... and .....

2. The additional Federal Government official channel for financial reporting inaugurated in December 2019 by the President of Nigeria is known as ---- ----------

3. The account that is domiciled in the Central Bank of Nigeria (CBN) as a banker to the Government is called.....

4. The type of audit that determines whether an entity's financial information is presented in accordance with applicable financial reporting and regulatory framework is referred to as ----------

5. The assessment of whether programmes executed fulfil laid out policy goals and have achieved the set objectives is referred to as---------- audit.

6. The basis for the compilation and preparation of financial reports of the public sector enterprises are .....and.....

7. The officer that formulates the accounting policy of the Federal Government is .....

8. The guidelines that are issued by the Ministry of Budget and Planning or Finance for budget preparation is in form of a .....

9. The .....warrant allows an officer to spend more than the budgeted amount.

10. A budget method used by government to control aggregate demand and reduce inflationary pressure is called.....

11. Budgeting process is the government's key tool for implementing policy priorities and also serves as an economic and financial document. **(TRUE or FALSE)**

12. Another name for traditional budgeting method is .....

13. An authorisation granted by a legislative body to allocate funds for purpose specified by the legislature or similar authority is known as .....

14. Original budget is the final approved budget for the budget period. **(YES or NO).**

15. A medium-plan whereby projections are made and acted upon yearly in keeping with the state of the economy is called.....

16. The alignment of cash inflows with cash outflows of government within a given period of time is.....

17. In preparing Cashflow Statement for business enterprise, two sources of cash-in-flow from investing activities are ..... and .....

18. The Subventions which government gives may be ..... or .....in nature.

19. The method of accounting that segregates resources into specific or special purpose compartments treating each as an entity is known as .....

20. The board formed to develop and issue under its own authority financial reporting standards for application by public sector entities is the.....

SECTION B: ATTEMPT ANY FOUR QUESTIONS (50 MARKS)

QUESTION 1

a. What is the meaning of the acronym 'INTOSAI'? (½ Mark)
b. Explain **FIVE** basic postulates for the auditing standards as laid down by Supreme Audit Institutions. (5 Marks)
c. State **FIVE** codification of offences and the time limit for response arising from audit queries as stipulated in FR 2009 edition. (7 Marks)

(Total 12½ Marks)

QUESTION 2

GIFMIS is a component of Economic Reform and Governance Project (ERGP) which will support the public resource and target anti corruption initiatives through modernising fiscal processes using better methods, techniques and information technology.

a.
(i) What is the meaning of 'End–User roles at MDA on full GIFMIS level'? (1½ Marks)
(ii) State **FOUR** GIFMIS roles. (4 Marks)

b . Write short notes on the GIFMIS roles. (7 Marks)

(Total 12½ Marks)

QUESTION 3

Ebiano Nigeria Ltd is a newly established Parastatal under Akoko State Government. It commenced its operation in 2021.

Ebiano Nigeria Ltd imports goods from China and sells in the local market. It uses

FIFO method to value its inventory.
Listed below are the purchases and sales made by the entity during the year 2021:

Purchases	
January 2021	10,000 units @ ₦25 each
March 2021	15,000 units @ ₦30 each
September 2021	20,000 units @ ₦35 each
Sales	
May 2021	15,000 units
November 2021	20,000 units

Required:

a. Based on the **FIFO** cost flow assumption, compute the value of inventory at May 31, 2021, September 30, 2021, and December 31, 2021. (7½ Marks)

b. List **FOUR** methods of stock valuation. (5 Marks)

(Total 12½ Marks)

QUESTION 4

a. From the list of balances given below in respect of Kadeja State Government, prepare Statement of Financial Performance for the year ended 31 December 2020.

	₦'000
Statutory revenue	31,231,186
Tax revenue	6,059,810
Non tax revenue	5,088,079
Salaries and wages	20,067,091
Allowances paid	3,141,054
Social benefits and contributions paid	8,297,382
Investment Income	153,046,000
Overhead charges	12,833,276
Transfer to Local Government	1,704,828
Depreciation and impairment charges	169,055
Interest income	59,329
Aid, grant and capital receipts	10,458,996
Other revenue	19,431,923
Subsidies	1,879,810
Amortisation charges	13
Public debts charges	26,131,624

(10 Marks)

b. List Five Sources of State Government Revenue. (2½ Marks)

(Total 12½ Marks)

QUESTION 5

There are two groups of users of Public Sector accounting information. These are "Internal" and "External" users.

You are required to state and explain **THREE** users from each group and their areas of interest.

(Total 12½ Marks)

QUESTION 6

You are a qualified Associate Accounting Technician, the Director of Finance has assigned you with the roles and responsibilities of the Payroll or IPPIS or salary unit in your Ministry, Dr. Ademolu Ahmed Arinze (Chief Information Officer) provides you with the following information:

	₦
Basic Salary	175, 800
Cooperative (Contribution)	40,000
Taxable Allowance	65,450
Bank Loan – FCMB	45,000
Union Due	7,237.50
National Housing Funds (NHF)	2.5%
National Health Insurance Scheme (NHIS)	5.0%
Pay as You Earns (PAYE)	6.5%

You are required to:

a. Prepare Dr. Ademolu Ahmed Arinze's payroll for month of July, 2022; in line with Pension Reform Act 2014. (10 Marks)

b. (i) Estimate the percentage of consolidated basic salary for the month of July, 2022. (1 Mark)

(ii) Estimate the percentage of his cooperative contribution to his gross earnings and advise him accordingly? (1½ Marks)

(Total 12½ Marks)

SECTION A

PART 1: MULTIPLE CHOICE SOLUTIONS

1. D
2. E
3. E
4. E
5. E
6. E
7. D
8. B
9. B
10. A
11. A
12. E
13. E
14. E
15. A
16. A
17. A
18. C
19. E
20. D
21. B
22. D
23. A
24. E
25. A
26. E
27. C
28. C
29. C
30. E

SECTION A

PART II: SHORT ANSWER SOLUTIONS

1. GIFMIS and REMITA
2. Federal Government Transparency and Open Treasury Portal
3. TSA
4. Financial audit
5. Effectivenes Audit
6. Accrual/Commitment Basis and
   Cash Basis
7. Accountant-General of the federation
8. Call Circular
9. Supplementary Statutory General Warrant
10. Surplus Budget
11. False
12. Incremental budgeting/Line-Item budgeting system
13. Appropriation Act
14. No
15. Rolling plan
16. Cash Budgeting/Plan
17. The two Sources of Cash-in-flow investing Activities are:
    i. Proceeds fro sales or disposal of fixed assets
    ii. Proceeds from sales or disposal of fixed assets
    iii. Proceeds from sale of investment
18. Recurrent or capital
19. Fund Accounting
20. International Public Sector Accounting Standards Board (IPSASB)

SECTION B

SOLUTION 1

a. International Organisations of Supreme Audit Institutions.

b. FIVE POSTULATES OF ACCOUNTING STANDARDS AS LAID DOWN BY SAI

i. The supreme audit Institutions (SAI) postulates that the Auditor General should consider compliance with INTOSAI auditing standards in all matters are deemed material to ensure that it is of consistently high quality.

ii. The SAI should apply its own judgement to the diverse situations that may arise in the course of Government auditing.

iii. With increased public consciousness, the demand for public accountability of persons or entities managing public resources, it has become necessary that accountability process be put in place and operating effectively.

iv. The consistent application of acceptable accounting standard should result in the fair presentation of the financial position and the result of operations.

v. Development of adequate information, control evaluation and reporting systems within the Government will facilitate the accountability process.

vi. The existence of adequate system of Internal control minimises the risk of errors and irregularities, the Auditor should submit proposals and recommend where controls are found to be inadequate or missing.

vii. All audit activities should be within the SAI's audit mandate

viii. Legislative enactments who facilitate the cooperation of audited entitie in maintaining and providing access to all relevant data necessary for a comprehensive assessment of the activities under audit.

c. CODIFICATION OF OFFENCES

	AUDIT QUERY	TIME LIMIT TO RESPOND TO QUERY
i.	Inflation of contracts	5days
ii.	Unauthorised contract variation	21 days
iii.	Payment to contractor for job not executed	30 days
iv.	Payment to contactor on false certificate of completion	21 days
v.	Payment to contractor for job not executed due to fraudulent act of a public officer	N/A
vi.	Poor quality of work	42 days
vii.	Irregular/wrong payment	21 days
viii.	Shortage or loss of stores by storekeeper	14 days
ix.	Shortage or loss of cash by the Cashier	7 days
x.	Assets paid but not supplied	21 days

xi.	Payment for ghost workers	N/A
xii.	Overpayment of salaries and allowances to Staff	21 days
xiii.	Failure to collect Government Revenue	21 days
xiv.	Where an officer fails to give satisfactory reply for failure to account for Government revenue	7 days
xv.	Non payment for use of government property	30 days
xvi.	Non rendition of return	30 days
xvii.	Non rendition of trial balance	21 days
xviii.	Non retirement of advance and imprest	21 days
xix.	Offences under the Public Procurement Act 2007	N/A
xx.	Making payments with cash/cheque by Org.&Officer	N/A

SOLUTION 2

ai. End User roles at MDA Level for MDA on full GIFMIS (Government Integrated Financial Management Information System) means 'the MDA shall assign focal Officer that would be responsible for the management of GIFMIS. The focal persons to be assigned shall need to be sufficiently experienced in financial management and Internal controls. The end–user roles in GIFMIS span from: MDA DESK OFFICER - REVIEWER - FIRST APPROVER - FINAL APPROVER.

aii. GIFMIS roles refer to the various functions or responsibilities that the GIFMIS system performs or supports within the government financial management process. These roles include:

1. Budget preparation and implementation
2. Accounting and financial reporting
3. Cash management
4. Asset management

2b. GIFMIS Roles

Budget Preparation and Implementation

- Facilitates budget preparation, approval, and execution
- Ensures accurate budget tracking and monitoring

Accounting and Financial Reporting

- Automates financial transactions and accounting processes
- Generates financial reports for informed decision-making

Cash Management

- Manages cash flows, forecasting, and banking transactions
- Enhances cash flow visibility and control

Asset Management

- Tracks and manages government assets
- Ensures accurate asset valuation and reporting

Procurement and Inventory Management
- Streamlines procurement processes
- Manages inventory levels and tracking

Reporting and Analytics
- Provides real-time financial data and insights
- Supports informed decision-making and policy development

SOLUTION 3

A: Computation of value of inventory:

				₦
(a) January 2021:	Purchases:	10,000 units @ ₦25	=	250,000
March 2021:	Purchases:	15,000 units @ ₦30	=	450,000
	Total	25,000		700,000

				₦
(b) May 2021:	Sales:	(10,000) units@₦25	=	(250,000)
		(5,000) units @ ₦30	=	(150,000)
		(15,000)		(400,000)

(c) **Inventory Value on FIFO bases as at May 31, 2021**

10,000 units @ ₦30	=	**₦300,000**

(d) September 2021: Purchases: 20,000 units @ ₦35 = ₦700,000

(e) **Inventory Value on FIFO bases as at September 30, 2021**

		₦
10,000 units @ ₦30	=	300,000
20,000 units @ ₦35	=	700,000
30,000		**1,000,000**

			₦
(f) November 2021: Sales :	(10,000) units @ ₦30	=	(300,000)
	(10,000) units @ ₦35	=	(350,000)
	(20,000)		**(650,000)**

(g) **Inventory Value on FIFO bases as at December 31, 2021**

		₦
10,000 units @₦ 35	=	**350,000**

B: Methods of stock valuation
1. First In First Out (F I F O)
2. Last In First Out (L I F O)
3. Average Price Method.
4. Weighted Average Price Method.
5. Specific Identification Method
6. Standard Cost Method
7. Lower of cost or market price method
8. Net realizable value method

SOLUTION 4

KADEJA STATE GOVERNMENT
STATEMENT OF FINANCIAL PERFORMANCE
FOR THE YEAR ENDED 31 DEC. 2020

REVENUE	**₦(000)**
Statutory Allocation	31,231,186
Tax Revenue	6,059,810
Non-Tax Revenue	5,088,079
Investment Income	153,046,000
Interest Income	59,329
Other Income	19,431,923
Aid, grant and Capital Receipt	10,458,996
TOTAL REVENUE (A)	**225,375,323**
EXPENDITURE	
Salaries and Wages	20,067,091
Allowances	3,141,054
Social Benefits and Contributions	8,297,382
Overhead Cost	12,833,276
Transfer to Local Government	1,704,828
Depreciation and Impairment Charges	169,055
Subsidies	1,879,810
Amortization Charges	13
TOTAL EXPENDITURE (B)	**(48,092,509)**
Surplus (Deficit) from Operating Activities (A- B)	**177,282,814**
Public Debt Charges	(26,131,624)
Net Surplus (Deficit) for the Period	**(151,151,190)**

(B) SOURCES OF STATE GOVERNMENT REVENUE

i. Statutory Allocation from Federation Account
ii. Pay-as-you-earn (Payee of employees resident in the State)
iii. Business Premises Registration Fees
iv. Withholding Tax (Individual and Business Enterprise only)
v. Capital Gain Tax (Individual only)
vi. Stamp Duties (Individual only)
vii. Pool Betting Fees
viii. Road Taxes
ix. Lotteries Fees

SOLUTION 5

(a)i. **Internal Users and Interest Areas**:

This group of users includes:

i) **The Labour Union** in the public service which will press for improved conditions of employment and security of tenure for their members.

ii) **Members of the Executive Arm of Government** such as the President, Ministers and Governors, Commissioners and Chairmen of Local Governments. Their interest areas are to ensure probity and accountability through record keeping and performance control which are achieved through accounting information; and

iii) **Top management members** such as Permanent Secretaries of various Ministries and Chief Executives of Parastatals. They are the conduit of accounting information generation, transmission and serve as liaison officers between Government, employees and the public.

External users and areas of interest.

External users include:

i) **Members of the Legislature** at both National, State and Local Government levels. Information in the accounts of Governments is the major media through which politicians render stewardship to their constituencies and apprise them of the endeavours of governance.

ii) **The Members of the public**, to demonstrate accountability and assist the people to appreciate or otherwise the efforts of Governments.

iii) **Researchers and financial journalists**. Researchers are expected to develop new and better ideas of governance. Financial journalists cherish accounting information to advise existing and potential investors.

iv) **Financial institutions** such as the Commercial Banks, World Bankand International Monetary Fund (IMF). Accounting information assists them to evaluate the credit rating of a borrowing Nation.

v) **Governments, apart from the ones reporting**. Governments collaborate on ideas of investment and research. They require accounting information on the well beingor otherwise of each other.

vi) **Suppliers and contractors** Suppliers and contractors are eager to ascertain the ability of a government to pay for goods and services delivered. Only accounting information can be revealing.

vii) **Political Parties, Trade Unions and Civil Liberty Organisation.**

viii) **Foreign countries and foreign financial institutions** such as International Monetary Fund and World Bank. Like other external users, the foreign countries and financial institutions require accounting information to ascertain the financial viability of the public sector organisations and the efficiency and effectiveness of management. Also, they want to know whether the accounting information enhance the quality, consistency, and transparency of public sector financial reporting.

SOLUTION 6

(a). **DR. ADEMOLU AHMED ARINZE**
COMPUTATION OF PAYROLL FOR THE MONTH OF JULY 2022

	₦	₦
Basic Salary		175,800
Taxable Allowance		65,450
Consolidated Basic Salary		**241,250**
PenCom – Employer (10% @ 241,250)	24,125	
NHIS – (5% @ 241,250)	12,062.5	36,187.5
Gross Emolument or Basic Salary		**277,437.5**
Deduction:		
Cooperative (Contribution)	40,000	
Bank Loan – FCMB	20,000	
Union Due	7,237.50	
National Housing Funds (NHF) (2.5% @ 241,250)	6,031.25	
NHIS – (5.0% @ 24,1250)	12,062.50	
PAYE - (6.5% @ 241,250)	15,681.25	
PenCom – Employer (10% @ 241,250)	24,125	
Employee (8% @ 241,250)	19,300	
Total Deduction		144,437.50
Net Emolument or Basic Salary		**133,000.00**

(b). (i).

		AMOUNT (₦)		%
	Gross Emolument or Basic Salary:	277,437.5	=	100
Let:	Consolidated Basic Salary:	241,250	=	p

$$P = * \frac{241,250 \times 100\ \%}{277,437.5}$$

P = * 86.9% or 87% (approx.)

(ii)

		AMOUNT (₦)		%
	Gross Emolument or Basic Salary:	277,437.5	=	100
Let:	Cooperative:	40,000	=	T

$$T = * \frac{40,000 \times 100\%}{277,437.5}$$

T =* 14 .4% or 14% (approx.)

Comment or Advice or Decision:
Dr. Ademolu Ahmed Arinze has the lower rate of *14% on saving when compare with the 86% on expenditures or consumptions. Therefore, it will be advisable that Dr. Ademolu Ahmed Arinze should improve on his savings culture by reducing the expenditure pattern.

THE ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA

ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA
MARCH 2025 EXAMINATIONS (PART II)

QUANTITATIVE ANALYSIS

PLEASE READ THESE INSTRUCTIONS BEFORE COMMENCEMENT OF THE PAPER

EXAMINATION INSTRUCTIONS

1. All solutions should be in ink. Any solution in pencil will not be marked.

2. Read all instructions on each part of the paper carefully before answering the questions.

3. Ensure that you do not answer more than the number of questions required for **Section B (The Essay Section).**

4. Check your pockets, purse and mathematical sets, etc to ensure that you do not have prohibited items such as telephone handset, electronic storage device, wrist watches, programmable devices or any form of written material on you in the examination hall. You will be stopped from continuing with the examination and liable to further disciplinary actions including cancellation of examination result if caught.

5. Do not enter the hall with anything written on your docket.

6. Insert your examination number in the space provided above.

WEDNESDAY, MARCH 26, 2025

DO NOT TURN OVER UNTIL YOU ARE TOLD TO DO SO

THE ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA
ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA
PART II EXAMINATIONS – MARCH 2025

QUANTITATIVE ANALYSIS

Time Allowed: 3 hours

SECTION A: PART I MULTIPLE CHOICE QUESTIONS (30 MARKS)

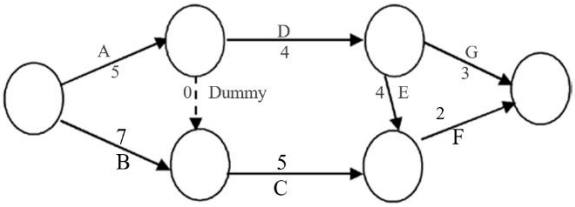
ATTEMPT ALL QUESTIONS

Write ONLY the alphabet (A, B, C, D or E) that corresponds to the correct option in each of the following questions/statements.

1. Linear programming heavily uses the inequalities of

   A. Less than
   B. More than
   C. Less than or equal to
   D. Equal to
   E. Less than or more than

   The diagram below shows the network diagram to complete a project. The durations are in weeks. **Use it to answer questions (2) and (3).**



2. The shortest time within which the project can be completed is

   A. 10 weeks
   B. 11 weeks
   C. 12 weeks
   D. 14 weeks
   E. 15 weeks

3. The number of paths of the network is

   A. 2
   B. 3
   C. 4
   D. 5
   E. 6

4. In a network diagram, two different activities must **NOT** have the same

   A. Duration
   B. Starting node
   C. Finishing node
   D. Starting and finishing nodes
   E. Preceding activity

5. Which of the following is **NOT** a resulting effect of gradual failure or deterioration of items?

   A. The output of the equipment
   B. The production capacity
   C. The maintenance and operating costs
   D. The value of the re-sale price of the item
   E. The efficiency of the equipment

6. The result emanating from the use of simulation is?

   A. exact
   B. always correct
   C. an approximation/
   D. always simplified
   E. always wrong

7. In a transportation problem, with 4 supply points and 5 demand points, how many constraints are required in its formulation?

   A. 20
   B. 9
   C. 1
   D. 1
E. 0

8. The demand for an item is 3,600 units per annum, the cost of an order is L$16 and holding cost per unit of an item is L$2 per annum. The number of orders per year is

   A. 240
   B. 225
   C. 220
   D. 25
   E. 15

9. Costs of production failure, error prevention and appraisals are classified as:

   A. Stocking costs
   B. Stock-out costs
   C. Costs of quality
   D. Stock-in costs
   E. Stocking quality

10. When the probability of failure reduces gradually, the failure mode is said to be

A. regressive
B. retrogressive
C. progressive
D. recursive
E. retroactive

Use the following information to answer questions 11 and 12.

Given the following failure rates of a certain item:

Month	1	2	3	4	5	6	7	8
Probability of failure	0.05	0.08	0.12	0.18	0.25	0.20	0.08	0.04
Cumulative probability	0.05	0.13	0.25	0.43	0.68	0.88	0.96	1.00

If the total number of items is 1,000 and the individual and group costs of replacement are ₦2.25 and ₦0.6 per item respectively, assuming a simultaneous replacement of all items at fixed intervals and the individual items replaced as they fail,

11. The average number of failures per month is:

A. 200
B. 216
C. 218
D. 219
E. 220

12. What is the average cost of individual replacement?

A. ₦420
B. ₦476
C. ₦480
D. ₦486
E. ₦489

13. Rejection of the null hypotheses, when it should have been accepted, is known as

A. Type II error
B. Standard error
C. Common error
D. Hypothesis error
E. Type I error

14. A card is drawn at random from a well-shuffled pack of cards numbered 1 to 20. Find the probability of getting a number divisible by 3.

A. 3/2
B. ½
C. 2/51
D. 1/3
E. 3/10

15. Which of the following is an example of a time series problem?

I. Estimating the number of hotel rooms to be booked in the next 6 months.
II. Estimating the total sales in the next 3 years of an insurance company.
III. Estimating the number of calls for the next one week.

A. III only
B. I and II
C. II and III
D. I and III
E. I, II, and III

16. Which of the following is **NOT** a component for a time series plot?

A. Seasonality
B. Trend
C. Cyclical
D. Noise
E. Irregular

Use the following table to answer Question 17

Items	2011		2016	
	Price	Quantity	Price	Quantity
X	80	50	100	60
Y	90	60	100	70
Z	100	70	120	90

17. Using year 2011 as base year, the Fisher's ideal price index of the above table is ....

A. 117.27%
B. 118.35%
C. 118.29%
D. 118.41%
E. 119.00%

18. In a group of kids, if one is selected at random, the probability that he/she likes oranges is 0.6, the probability that he/she likes oranges and apples is 0.3. If a kid, who likes oranges, is selected at random, what is the probability that he/she also likes apples?

A. 0.2
B. 0.3
C. 0.5
D. 0.6
E. 0.8

19. For monthly time series data, the order of the moving average is____

A. 2
B. 4
C. 6
D. 10
E. 12

Use the information to answer questions 20 and 21

The group frequency distribution below relates to the number of visits made to the doctor in a year by a sample of 25 patients.

Intervals	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24
No. of patients	2	6	10	4	3

20. Calculate the mean deviation for the distribution.

A. 3.4
B. 4
C. 4.44
D. 4.5
E. 5.0

21. Calculate the coefficient of variation for the distribution.

A. 44.10%
B. 45%
C. 45.67%
D. 45.572%
E. 46.57%

22. Calculate the coefficient of skewness for the following data: 1, 2, 3, 4, 5, 6, 7, 8, 9, 9.

A. 11
B. 5.5
C. 2.72
D. 0.11
E. -0.11

Use the following table to answer questions 23 and 24:

X	2	3	4
Y	6	4	2

23. Assuming variables x and y are ranked, the Spearman's rank correlation coefficient is .....

A. 1
B. 0.99
C. 0.85
D. -0.85
E. -1

24. Using the regression line $y = a + bx$, the value of b is .....

A. -3
B. 2.5
C. 2.5
D. 3
E. 4

25. The cost function of a company is $C(x) = 2x^2 + 5x$ while the revenue function is $R(x) = 3x^2 - 10x - 500$, where x is the number of items produced and sold.

The profit that will accrue from 500 items is

A. Le24,200
B. Le124,000
C. Le224,000
D. Le242,000
E. Le257,000

26. The selected amount (in thousands of Naira) of withdrawals from two different paying points of a particular branch of a bank, are as follows: $A = \{3, 5, 10, 15, 17, 21\}$ and $B = \{11, 15, 20, 21, 30\}$, then $n(A \cup B)$ is

A. 7
B. 8
C. 9
D. 10
E. 11

27. A fruit seller sold a basket of oranges for GH¢3,000 at a profit of 10%. What is the cost price of the basket of oranges?

A. GH¢300
B. GH¢700
C. GH¢2,700
D. GH¢2,727
E. GH¢3,300

28. If a financial group can make an investment of L$85m now and receives L$100m in 2 years' time, estimate the internal rate of return.

A. -0.084652
B. 0.084652
C. 0.0900
D. 0.8465
E. 0.9000

29. Which of the following set is infinite?

A. D = {all the days in a week}
B. S = {all the ICAN students in a tuition house}
C. T = {all the letters of alphabet}
D. V = {all even numbers}
E. P = $\{x: 1 \leq x \leq 77\}$

30. The demand function of a commodity is $y = 36 - x^2$. Find the consumer's surplus for $y_0 = 11$

A. $\frac{250}{3} Units$
B. $\frac{256}{2} Units$
C. $\frac{605}{3} Units$
D. $320\, Units$
E. $405\, Units$

SECTION A: PART II SHORT ANSWER QUESTIONS (20 MARKS)

ATTEMPT ALL QUESTIONS

Write the correct answer that best completes each of the following questions/statements.

1. Replacement theory is concerned with the determination of the most ..... replacement policy

2. A product, which is in process but is meant for sale in the market, is known as .....

3. From the table below, use the Least Cost Method to find the quantity which the source Z supplies to destination B.

Source	Destination			Supply
Demand				

4. The John Equipment company estimated its carrying cost at 15% and its ordering cost as ₦9 per order. The estimated annual requirement is 48,000 units at a price of ₦4 per unit. The economical number of units to order is .....

5. The critical path of a network is the path with the ..... duration.

6. A policy, in which an item is replaced immediately it fails, is known as .....

7. The demand for an item is 60,000 units per annum, the cost of an order is L$25 and the holding cost per unit of an item is L$2 per annum. The number of orders per year is .....

8. Two events are ..... if they cannot both occur at the same time.

9. The probability of rejecting a Null hypothesis, given that the Null hypothesis is true, is referred to as .....

10. Significance level is referred to as the risk of committing .....

11. The table below shows the income and expenditure (in GH¢000) of a man for 10 months:

Income(x)	8	18	52	38	26	60	40	50	82	75
Expenditure (y)	2	4	5	7	9	11	13	15	20	23

The simple linear regression line $y = a + bx$ where $a = -0.0915$ and $b = 0.2448$. When income is GH¢29,000, then the expenditure is .....

12. The set of values for the test statistic, for which the null hypothesis is rejected, is called .....

13. The following table gives the marks (based over 100) scored by 50 students in Statistics after sessional examination:

Mark scored	16 – 23	24 – 31	32 – 39	40 – 47	48 – 55	56 – 63
Number of students	6	9	12	13	6	4

The mode of the distribution is .....

14. In 100% of time, when the variables in question move together by exactly the same percentage and direction, it means the correlation is .....

15. Discount is the reduction given on the ..... of an item.

16. Age of an employee is an example of a ..... type of data.

17. In a class of 20 students, 12 offer physics, 9 offer chemistry while only 6 offer none of the subjects, the number of students offering both subjects is .....

18. Given the Universal set

$\mu = \{1 \leq x \leq 10\},$
$A = \{2 \leq x \leq 8\},$
$B = \{x : x \text{ is an even number between } 1 \text{ and } 10 \text{ inclusive}\}$
$A \cup B^C$ is .....

19. Assuming the demand function for an item is given by the equation: $q = 250 - 5p$, the price elasticity of demand function is .....

20. Jubril recently opened a bookshop. The demand function for the bookshop is given as $q = 400 - 2p^2$, where q is the quantity demanded and p is the unit price. The price for which he should sell the books in order to maximize revenue is .....

SECTION B: ATTEMPT ANY FOUR QUESTIONS (50 MARKS)

QUESTION 1

The following table lists all the activities that provide a small project together with their immediate predecessor activities and the estimated required duration for each activity.

ACTIVITY(DURATION)	IMMEDIATE PREDECESSORS
A(7)	-
B(5)	-
C(12)	-
D(4)	A
E(8)	B
F(15)	B
G(7)	C
H(3)	G
I(14)	D,E
J(6)	F,H

a. Use the above information to draw an arrow-on-activity network diagram.
(5 Marks)

b. Determine the Earliest Start Time, Earliest Finish Time, Latest Start Time and Latest Finish Time and hence, calculate the total float of each activity. (5 Marks)

c. Identify the critical path and calculate its duration. (2½ Marks)

(Total 12½ Marks)

QUESTION 2

a. The yearly costs of two machines A and B, when money value is neglected, are given below:

Year	1	2	3
Machine A(₦)	1200	900	1100
Machine B(₦)	23000	400	1200

If the money value is 11% per year, find the cost patterns of the two machines and find out which of the machines is more economical. (4 Marks)

b. A company is considering replacement of a machine which costs ₦70,000. The maintenance cost and resale values per year of the said machine are given below:

Year	1	2	3	4	5	6	7	8
Maintenance Cost(₦)	8000	1000	15000	2000	27000	36000	46000	58000
Resale Cost(₦)	30000	15000	11000	5000	4000	3000	3000	3000

When should the machine be replaced? (8½ Marks)

(Total 12½ Marks)

QUESTION 3

a. Consider a transportation problem in which supplies are $S_1 = 50$, $S_2 = 40$, $S_3 = 30$ and demands are $D_1 = 25$, $D_2 = 32$, $D_3 = 40$ and $D_4 = 25$. Its cost coefficients are $c_{11} = 8$, $c_{12} = 10$, $c_{13} = 7$, $c_{14} = 6$, $c_{21} = 12$, $c_{22} = 9$, $c_{23} = 4$, $c_{24} = 7$, $c_{31} = 9$, $c_{32} = 11$, $c_{33} = 10$ and $c_{34} = 8$.

(i) Construct a matrix table for the problem with the above pieces of information. (2½ Marks)

(ii) Hence, obtain the initial basic feasible total cost of transportation using the Least Cost Method. (5 Marks)

b. Use the North West Corner Method to obtain the initial basic feasible total cost of transportation for the table below:

From plant	W1	W2	W3	W4	Availability
P1	190	300	500	100	70
P2	700	300	400	600	90
P3	400	100	600	200	150
Requirement	50	80	70	140	

(5 Marks)

(Total 12½ Marks)

QUESTION 4

a. If the demand function for a commodity is $y = 120 + 4x - x^2$, find the Consumers' surplus when

(i) $x_0 = 4$ (2 Marks)

(ii) $y_0 = 24$ (4 Marks)

b. (i) What is the interest that will accrue on ₦40,000 at 13% simple interest at the end of 17 years? (1½ Marks)

(ii) How much will it amount to at the end of this period? (2 Marks)

(iii) How long will it take the money to double itself at 8.5% simple interest? (3 Marks)

(Total 12½ Marks)

QUESTION 5

a. SASO is a manufacturing company with 6,000 workers. The company is interested in knowing the average number of items sold per week per person by the company's workers. While the quality control manager thinks that the average number of items sold per worker per week is 11, the company secretary thinks that the true value should be more. The quality control manager subsequently selected 11 workers at random and got the following results as number of items sold in a week: 12, 3, 16, 8, 21, 19, 15, 11, 9, 17, 11.

You are required to set up a suitable hypothesis and test it at 5% level of significance. (9½ Marks)

b. It is desired to know if the population of all batches of a particular chemical formulation, which are on grade, is larger than 80%.
Samples of 100 batches of chemical are chosen and are 95 on-grade. At 5% level of significance, test if the claim is true. (3 Marks)

(Total 12½ Marks)

QUESTION 6

a. The following table contains the marks (based over 100) scored by 50 students in a particular subject after a sessional examination:

Marks scored	16-23	24-31	32-39	40-47	48-55	56-63
Number of students	6	9	12	13	6	4

Find the semi-interquartile range. (5½ Marks)

b. The following table shows the number of students admitted through JAMB by a university faculty in 3 consecutive years.

Department	**2016**	**2017**	**2018**
Business Administration	35	31	36
Accountancy	15	13	16
Insurance	16	18	12
Banking & Finance	12	08	10
Total	78	70	74

i. Draw a simple bar chart of 2016 Admission figures. (1½ Marks)

ii. Draw a component bar chart of 2016, 2017 and 2018 Admission figures. (1½ Marks)

iii. Draw a pie chart for:

a. 2018 admission figures (2 Marks)
b. The total admission figures (2 Marks)

(Total 12½ Marks)

FORMULAE

Sample variance, s^2 = $\dfrac{\sum(x-\bar{x})^2}{n-1}$

Economic Order Quantity

Q = $\sqrt{\dfrac{2cd}{n}}$

Z_{cal} = $\dfrac{\bar{x}-\mu}{\dfrac{\sigma}{\sqrt{n}}}$

Slope of a regression equation

b = $\dfrac{n\sum xy-\sum x\sum y}{n\sum x^2-\left(\sum x\right)^2}$

Elasticity of demand, $e=\left(-\dfrac{p}{q}\right)\left(\dfrac{dq}{dp}\right)$

The 95% confidence interval for μ

$=\bar{x}\pm t_{\frac{\alpha}{2},n-1}\dfrac{s}{\sqrt{n}}$

The trend equation, y = a + bt, where t = x_i - x_m

b = $\dfrac{\sum ty}{\sum t^2}$. **a =** $\bar{y}-bx_m$, **x_m = median of x values**

SARPI = $\dfrac{\sum\left(\dfrac{P_n}{P_o}\times 100\right)}{N}$

SAPI $=\dfrac{\sum P_{ni}}{\sum P_{oi}}\times 100$

$t = \dfrac{p}{\sqrt{\dfrac{pq}{n}}}$

EOQ with stock-out

$$Q = \sqrt{\frac{2cd}{h}} \times \sqrt{\frac{h + c_s}{c_s}}$$

$$LPI = \frac{\sum p_1 q_o}{\sum p_o q_o} \times 100$$

$$Z = \frac{p - \hat{p}}{\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}}$$

$$Q_i = L_{Q_i} + \left(\frac{\frac{iN}{4} - \sum f_{Q_i}}{f_{Q_i}} \right) c$$

$$D_i = L_{D_i} + \left(\frac{\frac{iN}{10} - \sum f_{D_i}}{f_{D_i}} \right) c$$

$$P_i = L_{P_i} + \left(\frac{\frac{iN}{100} - \sum f_{P_i}}{f_{P_i}} \right) c$$

Spearman's rank correlation coefficient

$$r = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$$

EOQ with gradual replenishment

$$Q = \sqrt{\frac{2cd}{h\left(1 - \frac{d}{r}\right)}}$$

$$\text{Length of Inventory cycle} = \frac{Q}{d}$$

$$\text{Number of } production\ runs = \frac{d}{Q}$$

$$\text{Production cost} = Ordering\ \text{cost} + Holdering\ \text{cost}$$

$$Mode = L_{mo} + \left(\frac{\Delta_1}{\Delta_1 + \Delta_2} \right) c$$

SECTION A: PART 1

MULTIPLE CHOICE SOLUTIONS

1. C
2. E
3. C
4. D
5. B
6. C
7. D
8. B
9. C
10. C
11. B
12. D
13. E
14. D
15. E
16. D
17. B
18. C
19. E
20. C
21. D
22. C
23. B
24. E
25. B
26. C
27. D
28. B
29. D
30. A

MCQ (Workings)

2. The paths with their durations are:

A, D, G	12 weeks
A, Dummy, C, F	12 weeks
A, D, E, F	15 weeks
B, C, F	14 weeks

Therefore, the shortest time is 5 weeks.

7. In a transportation problem with m supply points and n demand points

Number of constraints = $m + n$

Number of variables = $m \times n$

Number of equations = $m + n + 1$

$$m = 4, n = 5$$

Number of constraints = $m + n = 4 + 5 = 9$

8. $I_F = \sqrt{I_L \times I_P}$

$$I_f = \sqrt{\left(\frac{\sum p_1 q_0}{\sum p_o q_o} \times \frac{100}{1}\right) \times \left(\frac{\sum p_1 q_1}{\sum p_o q_1} \times \frac{100}{1}\right)} = 118.35\%$$

$$I_f = \sqrt{118.29 \times 118.41} = 118.35\%$$

$$Where \frac{\sum p_1 q_0}{\sum p0q0} \times \frac{100}{1} = \frac{19{,}400}{16{,}400} \times 100 = 118.29\%$$

$$and \frac{\sum p_1 q_1}{\sum p_0 q_1} \times \frac{100}{1} = \frac{23{,}800}{20{,}100} \times 100 = 118.41\%$$

11. $Expected value$

$$= (1 \times 0.05) + (2 \times 0.08) + (3 \times 0.12) + (4 \times 0.18) + (5 \times 0.25) + (6 \times 0.20) + (7 \times 0.08) + (8 \times 0.04)$$

$$= 0.05 + 0.16 + 0.36 + 0.72 + 1.25 + 1.2 + 0.56 + 0.32$$

$$= 4.62$$

$$\therefore Average number of failures per month = \frac{1000}{4.62} = \approx 216$$

12. Average cost of individual replacements = $\#(216 \times 2.25) = \#486$

14. $S = \{1 \ldots 20\}$

Let p represent numbers that are divisible by 3 between 1 to 20

Then $p = \{3, 6, 9, 2, 15, 18\}$

Then $p(p) = \frac{n(p)}{n(s)} = \frac{6}{20} = \frac{3}{10}$

17. $I_f = \sqrt{\text{IF}\left(\frac{\sum p_i q_0}{\sum p_0 q_0} \times \frac{100}{1}\right) \times \left(\frac{\sum p_i q_i}{\sum p_0 q_1} \times \frac{100}{1}\right)} = 118.35\%$

$I_f = \sqrt{118.29 \times 118.41} = 118.35\%$

$$I_f = \sqrt{\left(\frac{\sum p_i q_0}{\sum p_0 q_0} \times \frac{100}{1}\right) \times \left(\frac{\sum p_i q_i}{\sum p_0 q_1} \times \frac{100}{1}\right)} = 118.35\%$$

$$Where \frac{\sum y_1 q_0}{\sum p_1 q_0} \times \frac{100}{1} = \frac{14{,}400}{16{,}400} \times 100 = 118.29\%$$

$$and \frac{\sum p_1 q_1}{\sum p_0 q_1} \times \frac{100}{1} = \frac{23{,}800}{20{,}100} \times \frac{100}{1} = 118.41\%$$

18. Let event O represent kid that likes oranges and let event A represent the kid that likes apples

Given $P(O) = 0.6$

Given $P(AandO) = 0.3$

Now $P(A/O)$ i.e. the Conditional Probability that the kid likes Apple, given that he likes orange

$$P(A/O) = \frac{P(A \cap O)}{P(O)} = \frac{0.3}{0.6} = 0.5$$

20.

Intervals	x	f	fx	$x - \bar{x}$	$f\|x - 12\|$	$f(x_i - 12)^2$
0 – 4	2	2	4	10	20	200
5 – 9	7	6	42	5	30	150
10 – 14	12	10	120	0	0	0
15 – 19	17	4	68	5	20	100
20 – 24	22	3	66	10	30	300
		25	**300**		**100**	**750**

$$\bar{x} = \frac{300}{25} = 12$$

$$Meandeviation = \frac{\sum_{i=1}^{n} f_i |x_i - \bar{x}|}{\sum f_i} = \frac{100}{25} = 4$$

21. $$\sigma^2 = \frac{\sum_{i=1}^{n} f(x - \bar{x})^2}{\sum f_i} = \frac{750}{25} = 30$$

$$\sigma = \sqrt{30} = 5.477 \approx 5.48$$

$$C.V = \left(\frac{\sigma}{x} \times 100\right)\%$$

$$= \frac{5.48}{12} \times 100\% = 45.67\%$$

22. $$Mean = \frac{54}{10} = 5.4$$

$$S^2 = Variance = \frac{\sum(x - \bar{x})^2}{n-1}$$

$$= \frac{(1-5.4)^2 + (2-5.4)^2 + (3-5.4)^2 + (4-5.4)^2 + (5-5.4)^2 + (6-5.4)^2 + (7-5.4)^2 + (8-5.4)^2 + (9-5.4)^2 + (9-5.4)^2}{10-1}$$

$$S^2 = 7.44$$

$$S = \sqrt{7.44} = 2.73$$

$$\text{Median} = \frac{5+6}{2} = \frac{11}{2} = 5.5$$

$$\text{Coefficient of skewness} = \frac{3(\bar{x} - \text{median})}{s} = \frac{3(5.4 - 5.5)}{2.73} = -0.11$$

23. $$n = 3, \qquad R = 1 - \frac{6\sum di^2}{n(n^2-1)}$$

y	x	Rank of $Y(R_y)$	Rank of $X(R_x)$	$d_i = R_y - R_x$	d_i^2
6	2	3	1	2	4
4	3	2	2	0	0
2	4	1	3	-2	4
					8

$$\sum d_i^2 = 8$$

$$R = 1 - \frac{6(8)}{3(3^2-1)}$$

$$= 1 - \frac{48}{24}$$

$$= 1 - 2$$

$$R = -1$$

24.

x	y	xy	x^2
2	6	12	4
3	4	12	9
4	2	8	16
9	12	42	29

$$b = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2} = \frac{3(42) - (9)(12)}{3(29) - (9)^2} = \frac{126 - 108}{87 - 81} = \frac{18}{6} = 3$$

25. $Profit = R(x) - C(x)$

$= 3x^2 - 10x - 500 - 2x^2 - 5x$

$= x^2 - 15x - 500$

$if x = 500, \text{then profit} = (500)^2 - 15(500) - 500$

$= 242{,}000$

27. *S.P.* = ₦3,000;

% Profit = 10%

$$\text{Cost Price} = \frac{(\text{S.P.} \times 100)}{(100 + \%\text{Profit})}$$

Hence,

$$\text{Cost Price} = \frac{(3{,}000 \times 100)}{(100 + 10)} = \frac{300{,}000}{110} = 2{,}727.27$$

The cost price is ₦2,727.27

Alternative Method;

Let d Cost Price be x, then

(3,000-*x*)/*x* =10/100

(3,000-*x*)/*x* =1/10

10(3,000-*x*) =*x*

11*x* =30,000

x=30,000/11

x =2,727.27

28. $A_0 + \frac{A_1}{(1+i} + \frac{A_2}{(1+i)^2} + = 0$

Note that A_0 is negative because it is cash outflow

$$-85{,}000{,}000 + \frac{100{,}000{,}000}{(1+i)^2} = 0$$

$$\frac{100{,}000{,}000}{(1+i)^2} = 85{,}000{,}000$$

$$\frac{1}{(1+i)^2} = \frac{85{,}000{,}000}{1{,}000{,}000{,}000}$$

$$= \frac{100{,}000{,}000}{(1+i)^2} = \frac{100{,}000{,}000}{85{,}000{,}000}$$

$$(1+i)^2 = \frac{100{,}000{,}000}{85{,}000{,}000}$$

$$1 + i = \sqrt{\frac{100}{85}} => i = \sqrt{\frac{100}{85}} - 1 = 0.084652$$

30. Given $y = 36 - x^2 and y_0 = 11$

$$11 = 36 - x^2$$

$$x^2 = 25$$

$$x = 5$$

$$CS = \int_0^x (demand function)dx - (price \times quantity demanded)$$

$$= \int_0^5 (36 - x^2) - 5 \times 11$$

$$= \left(36x - \frac{x^3}{3}\right)\Big|_0^5 - 55$$

$$= (36x5) - \frac{5x5x5}{3} - 55$$

$$= 180 - \frac{125}{3} - 55 = \frac{250}{3} Units$$

Examiner's comment

Two thousand, two hundred and six (2,206) candidates attempted the questions in this part. This corresponds to 100% of all the candidates indicating full participation in this section A, Part I of the paper.

The average score was 11.51 with the lowest and highest scores of 3 and 25 respectively. This performance clearly shows that a significant number of

candidates might have struggled with this part.

Generally, the performance was a little bit below the overall average.

The identification major pitfalls of the candidates was their inability to correctly interpret worded questions.

Candidates are advised to make a very good use of the existing INSIGHT (prepared after every Diet and the QUANTITATIVE ANALYSIS STUDY TEXT to improve on their future performance in examinations.

SECTION A: PART II

SHORT ANSWER SOLUTIONS

1. Economic / Optimal
2. Inventory
3. ~~₦~~40
4. 1,200 units
5. Longest
6. Individual replacement policy
7. 49 orders
8. Mutually exclusive
9. Level of significance or significance level
10. Type I Error
11. ~~₦~~7,007.70
12. Critical Region or rejection region
13. 40.5
14. perfectly positive or perfectly negative or accept positive or negative
15. Marked price or Market price or retail price or list price
16. Continuous
17. 7 students offer both subjects
18. $A \cup B^c = \{1,2,3,4,5,6,7,8,9\}$
19. $E = \frac{p}{p-50}$
20. $p \approx 8.16$

SAQ (Workings)

3.

Source	Destination			Supply
	A	B	C	
X	4 [40]	5	~~1~~ [40] [20]	~~40 0~~
Y	60 [30]	4 [40]	~~3~~	~~60 0~~
~~Z~~	10	~~2~~	20	~~70 30 20 0~~
Demand	~~70 10 0~~	~~40 0~~	~~60 20 0~~	

Some ~~Z~~ to Destination B is 40

4. $$EOQ = \sqrt{\frac{2 \times AR \times OC}{CC}} = \sqrt{\frac{2 \times 48000 \times 9}{4 \times 15\%}}$$

$$= \sqrt{\frac{864000}{0.6}} = \sqrt{1{,}440{,}000}$$

$EOQ = 1{,}200 units$

7. $C = 25, d = 60{,}000, h = 2$

$$Q = \sqrt{\frac{2cd}{h}}$$

$$= \sqrt{\frac{(2)(25)(60{,}000)}{2}} = 1225 \ items$$

No. of orders per year is

$$\frac{Demand}{Q} = \frac{60{,}000}{1225} = 49 \ orders$$

11. $y = -0.0915 + 0.2448x$

$income of \ 29{,}000 \Rightarrow$

$y = -0.0915 + (0.2448)\ (29) = 7.0077$

$y = 7.0077 \times GHC1{,}000$

$= GHC7.007.70$

13.

Interval	Frequency	
16-23	6	
24-31	9	
32-39	12	
40-47	13	← Modal class
48-55	6	
56-63	4	

$$\text{Mode} = L_1 + \left(\frac{\Delta_1}{\Delta_1 + \Delta_2}\right) \times C$$

Modal class $= 39.5 - 47.5$

$L_1 = 39.5, \quad \Delta_1 = 13 - 12 = 1, \quad \Delta_2 = 13 - 6 = 7, \quad C = 8$

$$\text{Mode} = 39.5 + \left(\frac{1}{1+7}\right) \times 8$$

$$= 40.5$$

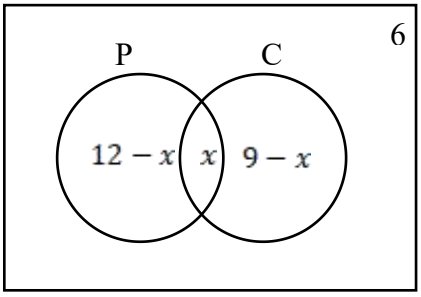
17. Let x students offer both physics and chemistry.

Physics only = $12 - x$

Chemistry only = $9 - x$

Neither subject = 6

$n(\mu) = 20$



$\therefore 12 - x + x + 9 - x + 6 = 20$

$=> 27 - x = 20$

$\therefore x = 7$

18. $\mu = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$A = \{2, 3, 4, 5, 6, 7, 8\}$

$B = \{2, 4, 6, 8, 10\}$

$B^c = \{1, 3, 5, 7, 9\}$

$A \cup B^c = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

19.

$$E = \frac{p}{q(p)} \times \frac{dq}{dp}$$

$$\frac{dq}{dp} = -5$$

$$E = \frac{p}{250 - 5p}(-5)$$

$$E = \frac{p}{p - 50}$$

20. $R = pq = p(400 - 2p^2)^t$

$R = 400p - 2p3$

$\frac{dR}{dP} = 400 - 6P^2$

$At\ stationary\ po\text{int}, \frac{dR}{dP} = O$

$400 - 6P^2 = 0$

$6P^2 = 400$

$P^2 = \frac{400}{6}$

$P = \sqrt{\frac{400}{6}} \quad = \sqrt{\frac{200}{3}}$

$P = \sqrt{66.66}$

$P = \pm 8.16 - 12P$

At maximum,

$\frac{d^2R}{dP^2} = -12P$

$\sin ce\ \frac{d^2R}{dP^2} \angle O$

$at \quad P = 8.16$

Revenue is maximised at

$P = 8.16$

Examiner's comment

All the 2,206 candidates are expected to answer all the 20 questions in this part of section A. Unfortunately, only about 97.5% of them attempted the questions in this part of section A.

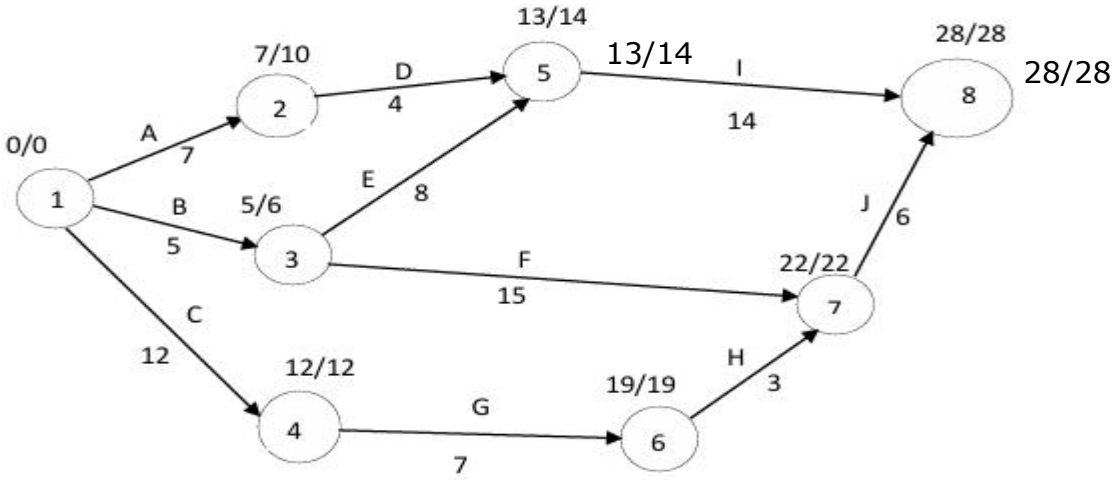
The average score was 5.1 with the lowest and highest scores of zero and 16 respectively. Despite the relatively high participation, a large percentage of the candidates scored below the overall average score reflecting the lack of mastery/understanding of some pertinent topics.

As in the case of the MCQ, candidates must study harder to improve on their performance in future examinations.

SECTION B

SOLUTION 1

(a)



(b)

Activity	Duration (D)	EST	LST	EFT	LFT	Total float LFT – EST -D	Total Slack LFT – EFT
A	5	0	0	7	10	10 – 0 – 7 = 3	10 – 7 = 3
B	5	0	0	5	6	6 – 0 - 5 =	6 – 5 = 1
C	12	0	0	12	12	1	12 – 12 = 0
D	4	7	10	13	14	12 – 0 -12 =	14 – 13 = 1
E	8	5	6	13	14	0	14 – 13 = 1
F	15	5	6	22	22	14 – 7 – 4 =	22 – 22 = 0
G	7	12	12	19	19	3	19 – 19 = 0
H	3	19	19	22	22	14 – 5 – 8 = 1	22 – 22 = 0
I	14	13	14	28	28	22 – 5 – 15 = 2	28 – 28 = 0
J	6	22	22	28	28	19 – 12 – 7 =0	28 – 28 = 0
						22 19 + 3 = 0	
						28 – 13 – 14 = 1	
						28 -22 – 6 = 0	

(c) A → D → I = 7 + 4 + 14 = **25**
B → E → I = 5 + 8 + 14 = **27**
B → F → J = 5 + 15 + 6 = **26**
C → G → H → J = 12 + 7 + 3 + 6 = **28**
Since 28 is the largest of them all, then
The Critical path is
C → G → H → J **with a duration of 28**

Examiner's comment

This question is on Network diagram. It tests the candidates' knowledge of project scheduling with emphasis on drawing the network Diagram (from a given set of relevant data) based on **Arrow-on-Activity Network Diagram**.

This is an Operations Research Question. Candidates are required to determine the critical path and its duration using the method of listing all possible paths and their durations. This critical path and its duration can also be deduced from the calculations of Earliest Start Time (EST), Earliest Finish Time (EFT), Latest Start Time (LST), Latest Finish Time (LFT) and Total Float.

ABOUT 52.5% of all the candidates attempted this question. The average score was 7.35. Candidates' scores range between 1.5 and 13. This suggests a moderate spread in performance. A considerable proportion of candidates scored below the average mark, through a fair number of them managed to score closer to the top of the scale.

SOLUTION 2

2a. The discount rate per year = (d) = $\frac{1}{1+0.11}$ = 0.90

The discount cost patterns for machines A and B are shown below:

Year	1	2	3	Total Cost (₦)
Machine A (Discounted Cost in ₦)	1200	900 x0.90 = 810	1100 x $(0.90)^2$ 890	2,900
Machine B (Discounted Cost in ₦)	23000	400 x0.90 = 360	1200 x $(0.90)^2$ 972	24,332

Decision: Machine A is more economical because its total cost is lower.

2b. From the table, it is observed that the average cost ATC (n) is minimum in the fifth year.

Year N	Maintenance Cost A	Cumulative Maintenance Cost B	Cumulative Capital Reduction c=70,000 p=c-r (resale value)	Cumulative Total Cost d= b+p	Average Cumulative Total e=d/n
1	8000	8000	70000 – 30000 = 40000	48000	48000 /1 = 48000
2	1000	9000	70000 – 15000 = 55000	64000	64000/2 = 32000
3	15000	24000	70000 - 11000 =59000	83000	83000/3 = 27667
4	2000	26000	70000 – 5000 = 65000	91000	91000/ 4 = 22750
5	27000	53000	70000 – 4000 = 66000	119000	119000/5 = 23800
6	36000	89000	70000 – 3000 = 67000	156000	156000/6 = 26000
7	46000	135000	70000 – 3000 = 67000	202000	202000/7 = 28857.
8	58000	193000	70000 – 3000 =67000	260000	260000/8 = 32,000

Hence, the machine should be replaced by the end of 5th year.

Examiner's comment

Candidates' knowledge in Cost Analysis and Machine Replacement Decision is tested in this question. Candidates are required to apply the Time Value of Money at 11% discount rate and cost patterns to determine the optimal replacement time for the machinery. About 46.12% of the total number of candidates attempted the question. The overall average score was 8.12 and the score spread ranged between zero (0) and 12.5. Despite a relatively strong average score, many candidates still scored below the average. This indicates challenges in mastering/understanding certain topics.

<u>The identified pitfalls include the following</u>:

(1) Many candidates failed to correctly interpret part (a) of the question by not applying the given discount rate of 11% to adjust future costs of the machines leading to inaccurate comparisms between the two machines A & R.

(2) Some candidates neglected the given discount rate, the maintenance costs and resale values for each year in the part (b) of the question. This is critical for determining the optimal time for machine replacement.

(3) In the part (b) of the question, many candidates struggled to understand the principle of comparing maintenance costs with resale values to determine the actual or optimal time when the machine should be replaced.

<u>It is recommended that candidates</u>:

i. are advised to revisit how to apply the TimeValue of Money to future costs and revenues, especially in determining Present Value.

ii. should ensure they substitute the correct values into the formula and use the current formula to calculate the Present Value and Cost Patterns.

iii. Need to master how to analyse maintenance costs versus resale value in order to make the optimal machine replacement decision.

SOLUTION 3

(3a i)

	D1	D2	D3	D4	Supply
S1	[8]	[10]	[7]	[6]	50
S2	[12]	[9]	[4]	[7]	40
S3	[9]	[11]	[10]	[8]	30
Demand	25	32	40	25	

(3a ii) By least cost method

Case 1: With Dummy allocation starting from column D1

Demand $\neq$ Supply

	D1	D2	D3	D4	Supply
S1	23 [8]	2 [10]	[7]	25 [6]	~~50~~ ~~25~~ 0
S2	[12]	[9]	40 [4] [10]	[7]	~~40~~ 0
S3	[9]	30 [11] [0]		[8]	~~30~~ 0
Dummy	~~2~~ [0]		[0]	[0]	~~2~~ 0
Demand	~~25~~ ~~23~~ 0	~~32~~ ~~30~~ 0	~~40~~ 0	~~25~~ 0	

$Totalcost(\#) = (8 \times 23) + (10 \times 2) + (6 \times 25) + (4 \times 40) + (11 \times 30) + (0\ X\ 2) \quad = 184 + 20 + 150 + 160 + 330 + 0$

$= ₦844$

Case 2: With Dummy allocation starting from column D2

Demand ≠ Supply

	D1	D2	D3	D4	Supply
S1	25 [8]	[10]	[7]	25 [6]	~~50~~ ~~25~~ 0
S2	[12]	[9]	40 [4] [10]	[7]	~~40~~ 0
S3	[9]	30 [11]		[8]	~~30~~ 0
Dummy	[0]	~~2~~ [0]	[0]	[0]	~~2~~ 0
Demand	~~25~~ 0	~~32~~ ~~30~~ 0	~~40~~ 0	~~25~~ 0	

$Totalcost(\#) = (8 \times 25) + (6 \times 25) + (4 \times 40) + (11 \times 30) + (0\ X\ 2) \quad = 200 + 150 + 160 + 330 + 0$

$= ₦840$

Case 3: With Dummy allocation starting from column D3

Demand ≠ Supply

	D1	D2	D3	D4	Supply
S1	25 [8]	[10]	[7]	25 [6]	~~50~~ ~~25~~ 0
S2	[12]	2 [9]	38 [4]	[7]	~~40~~ ~~2~~ 0
S3	[9]	30 [11]	[10]	[8]	~~30~~ 0
Dummy	[0]	[0]	2 [0]	[0]	~~2~~ 0
Demand	~~25~~ 0	~~32~~ ~~30~~ 0	~~40~~ ~~38~~	~~25~~ 0	

$Totalcost(\#) = (8 \times 25) + (6 \times 25) + (9 \times 2) + (4 \times 38) + (11X30) + (0\ X\ 2) \quad = 200 + 150 + 18 + 152 + 330 + 0$

$= \text{₦}850$

Case 4: With Dummy allocation starting from column D4

Demand ≠ Supply

	D1	D2	D3	D4	Supply
S1	25 [8]	2 [10]	[7]	23 [6]	~~50~~ ~~27~~ ~~2~~ 0
S2	[12]	[9]	40 [4]	[7]	~~40~~ 0
S3	[9]	30 [11]	[10]	[8]	~~30~~ 0
Dummy	[0]	[0]	[0]	2 [0]	~~2~~ 0
Demand	~~25~~ 0	~~32~~ ~~30~~ 0	~~40~~ 0	~~25~~ ~~23~~ 0	

$Totalcost(\#) = (8 \times 25) + (10 \times 2) + (11 \times 30) + (4 \times 40) + (6X23) + (0\ X\ 2) \quad = 200 + 20 + 330 + 160 + 138 + 0$

$= \text{₦}848$

(3b)

From plant	W1	W2	W3	W4	Availability
P1	(50) 190	(20) 300	500	100	70 70 0
P2	700	(60) 300	(30) 400	600	90 60 30 0
P3	400	100	(40) 600	(110) 200	150 40 0
Dummy	0	0	0	(30) 0	30 0
Demand	50 0	80 60 0	70 70 0	140 30 0	

The initial basic feasible total cost of transportation

$= (190 \times 50) + (300 \times 20) + (300 \times 60) + (400 \times 30) + (600 \times 40) + (200 \times 110) + (0 \times 30)$

$$= 9500 + 6000 + 18000 + 12000 + 24000 + 22000 + 0$$

$$= \#91{,}500$$

Examiner's comment

This is a question on an unbalanced transportation problem. This is an important topic in Operations Research.

Part (a) of the question tests candidates' knowledge of how to construct transportation table from the given data and to apply the Least Cost Method to calculate the initial basic feasible total cost of transportation.

In part (b), candidates are required to balance the unbalanced problem by introducing a horizontal dummy and to apply the North-West Corner Method to calculate the initial basic feasible total cost of transportation.

About 70.6% of all the candidates attempted the question.

The average score was about 10.3 and the candidates' scores ranged between 0.5 12.5. Higher percentage of candidates scored well above the average score compared with those candidates scoring below it, thus reflecting the relative accessibility or easier understanding for the majority of candidates.

<u>The identified pitfalls are as follows</u>:

(1) Many candidates were unable to construct the required transportation matrix/table in part (a) of the question. They mixed up the supply and demand values or failing to organize the cost coefficients properly to form the desired matrix table.

(2) Many of the candidates failed to balance the problem, thus resulting in wrong answer.

(3) Several candidates in part a(ii) failed to identify the least cost at each step or make correct allocations, leading to inaccurate calculation of the initial basic feasible total transportation cost.

(4) In part (b) of the question, many candidates made allocations errors when using the North-West Corner Method, such as wrong supplies and demands or failing to adjust supplies and demands or failing to adjust the supply and demand values correctly after each allocation. This led to wrong total transportation cost.

I will recommend that candidates should carefully follow the North-Wesst Corner method step by step ensuring correct allocation, updating of the remaining supply and demand and proper verification at each stage.

SOLUTION 4

4(a)

i. $y = 120 + 4x - x^2$

when $x_0 = 4$, $y_0 = 120 + 4(4) - (4)^2$

$$y_0 = 120 + 16 - 16 = 120$$

$$Consumer's\ surplus = \int_0^4 (120 + 4x - x^2)dx - x_0 y_0$$

$$= \left(120x + \frac{4x^2}{2} - \frac{x3}{3}\right) - 4(120)$$

$$= \left(120(4) + \frac{4(4)^2}{2} - \frac{(4)^3}{3}\right)\Big|_0^4 - 0 - 480$$

$$= (120 \times 4) + \frac{4(4 \times 4)}{2} - \frac{4 \times 4 \times 4}{3} - 0.480$$

$= 480 + 32 - 21.33 - 480$

$= 10.7$

ii. $y = 120 + 4x - x^2$

When $y_0 = 24$, $24 = 120 + 4x - x^2$

i.e. $x^2 - 4x - 96 = 0$

$x^2 - 12x + 8x - 96 = 0$

$x(x - 12) + 8(x - 12) = 0$

$(x + 8)(x - 12) = 0$

$x = 12$ or -8.

As explained earlier, x cannot be negative and therefore,

$x_0 = \underline{\underline{12}}$.

$$i.e. when y_0 = 24, \quad x_0 = 12, \qquad then$$

$$Consumer supplies = \int_0^{12}(120 + 4x - x^2)dx - x_0y_0$$

$$\left[120x + 2x^2 - \frac{x^3}{3}\right]_0^{12} - (12 \times 24)$$

$$= 120 \times 12 + 2(12 \times 12) - \frac{12 \times 12 \times 12}{3} - 288$$

$$= 1440 + 288 - 576 - 288$$

$$= 864$$

(b i)

$$I = Pr.n$$

$$P = 40{,}000, \quad r = 0.13, \quad n = 17$$

$$I = 40{,}000(0.13)(17)$$

$$I = \#88{,}400$$

(b ii)

$$Amount = A_{17} = P + I = 40{,}000 + 88{,}400$$

$$= \#128{,}400$$

Or

$$If the interest is not required, then$$

$$A_{17} = P(I + r.n)$$

$$40{,}000\big(1 + (0.13)(17)\big)$$

$$= \#128{,}400$$

(b iii) If P is to double itself, it becomes 2P, $A_n = P(1 + r.n)$

i.e. $2P = P(1 + 0.085n)$

$2 = (1 + 0.085n)$

$1 + 0.085n = 2$

$0.085n = 2 - 1$

$0.085n = 1$

$n = \frac{1}{0.085} = 11.765$ years

$\cong$ 12years.

Examiner's comment

This question is on Consumers Surplus calculation. This is part (a) of the question.

Part (b) of the question requires the candidates to calculate Simple Interest and the Amount at given duration of time.

It was observed that part (a) of the question was not generally attempted by some of the candidates simply because they were unable to carry out the integration function involved and their inability to assign the integral limits appropriately. On the other hand, part (b) was well attempted and the majority of the candidates scored higher marks.

Overall, about 75% of the candidates attempted the question. The average score for the question was about 5.24 with lowest score of 0.5 and the highest score was 11.

<u>The pitfalls identified are</u>:

(1) Candidates, in part a(i) of the question, were unable to correctly calculate the consumer's surplus particularly in evaluating the integral or not being able to correctly identify the demandfunctions. In part a(ii), candidates had difficulty in solving for $x_o$and interpret the demand function correctly, leading to inaccurate consumers surplus value.

(2) Candidates in Part b (iii) had difficulty in calculating the time it would take for money to double itself at a given interest rate. Many candidates missed the direct relationship between the Principal and doubling time in the context of simple interest. It is recommended that candidates, in future examinations, should ensure that they are familiar with how to calculate the consumers' surplus using demand function and ability to carry out simple definite integration.

SOLUTION 5

(5a)

Ho: $\mu = 10$ vs H_i: $\mu > 10$

$\alpha = 5\% = 0.05$, $\mu_0 = 10$, $n = 11$

Since the sample size is small (i.e. $n = 11 < 20$),

We use the t = test.

$t_{cal} = \frac{\bar{x}-\mu 0}{\frac{S}{\sqrt{n}}}$

where $\bar{\chi} = \sum \frac{\chi}{n}$ and $S^2 = \frac{\Sigma(\chi-\bar{\chi})^2}{n-1}$

Case 1: AIl the eleven given sample values used

mean, $\bar{x} = \frac{12+3+16+8+21+19+15+11+9+17+11}{11}$

$= \frac{142}{11} = 12.91$

The computation of S^2 is

X	x - $\bar{x}$	$(x - \bar{x})^2$
12	-0.91	0.828
3	-9.91	98.208
16	3.09	9.548
8	-4.91	24.18
21	8.09	65.448
19	6.09	37.088
15	2.09	4.368
11	-1.91	3.648
9	-3.91	15.288
17	4.09	16.728
11	-1.91	3.648
		$\sum(x - \bar{x})^2 = 278.908$

$$S = \sqrt{\frac{(X-Xbar)^2}{n-1}} = \sqrt{\frac{(X-Xbar)^2}{11-1}} = \sqrt{\frac{278.9091}{10}} = 5.2812$$

Case 2 All the eleven given sample values used but taking as 10 values

$$S = \sqrt{\frac{(X-Xbar)^2}{n-1}} = \sqrt{\frac{(X-Xbar)^2}{10-1}} = \sqrt{\frac{297.24}{9}} = 5.7469$$

Case 3 The first 10 given sample values used

$$S = \sqrt{\frac{(X-Xbar)^2}{n-1}} = \sqrt{\frac{(X-Xbar)^2}{10-1}} = \sqrt{\frac{278.05}{9}} = 5.5582$$

t-cal and **t-tab** for the three cases are tabulated as follows:

Case	t-calculated	t-tabulated	Decision
1. n = 11	$t = \frac{(12.91-10)}{5.2812}\sqrt{10} = 1.8275$	$t_{0.05,10} = 1.812$	Reject H_o
2. n = 10	$t = \frac{(14.2-10)}{5.7469}\sqrt{10} = 2.3110$	$t_{0.05,9} = 1.833$	Reject H_o
3. n = 10	$t = \frac{(14.2-10)}{5.5582}\sqrt{10} = 1.7637$	$t_{0.05,9} = 1.833$	Accept H_o

(5b) H_0 : P = 0.80

H_1 : P > 0.80 (One tail test)

α = 0.05

n = 10

p = 0.95

$$Z\ cal = \frac{p-P}{\sqrt{\frac{P((1-P)}{n}}} = \frac{0.95-0.80}{\sqrt{\frac{0.80(1-0.80)}{100}}} = 3.75$$

Critical value, $Z_{tab} = Z_{0.05} = 1.645$

Accept Reject

1.645

Decision: Since 3.75 > 1.645 we reject Ho and conclude that the grade chemical formulation batches are not larger than 80%.

Examiner's comment

Hypothesis testing, based on t and Z tests, is the main focus of this question.

This is in the context of business and quality control. This is a topic in the Statistics part of the syllabus.

Part (a) of this question involved setting up and testing a hypothesis regarding the average number of items sold by workers, while part (b) tests a claim about the proportion of chemical batches that meet the required grade.

This question had the lowest participation with about 15.87% of the candidates attempting it. It has the lowest average share of 3.09 with candidates' scores ranging between zero and 7. Many candidates that attempted the question scored well below the average marks because of the perceived difficulty of the question.

The identified pitfalls of the candidates are as follows:

(1) In part (a) of the question, some candidates failed to correctly set up the null and alternative hypotheses. They confused the direction of the alternative hypothesis leading to an incorrect test setup.

(2) Some candidates had difficulty in calculating the required test statistic for the simple mean in the part (a) of the question. Even, some failed to incorrectly apply the correct formular for the t-statistic and they misinterpreted the same data, thus leading to inaccurate result.

(3) Some candidates, in part (a), did not correctly apply the 5% significance level to the critical value for the t-distribution or they misjudged the critical region resulting in incorrect decision about rejecting or failing to reject the null hypotheses.

(4) Some candidates failed to correctly setup the hypothesis for testing the proportion.

It is recommended that candidates should:

(1) Practise setting up the appropriate null and alternative hypotheses and ensure that they understand the difference between one-tailed and two-tailed tests based on the context of the question.

(2) Thoroughly understand how to calculate the test statistic for both sample means (using t-distribution) and sample proportion (using the z-distribution) paying attention to the correct formulae and the underlying assumptions.

(3) Review how to apply the significancelevel (5% in this case) and understand how to find the critical value or rejection region for hypothesis tests using the appropriate statistical tables of t-and z-distributions.

SOLUTION 6

(6a)

Class Interval	Frequency	Cf
16-23	6	6
24-31	9	15
32-39	12	27
40-47	13	40
48-55	6	46
56-63	4	50

Total number of students = 50,

Q_1 position = $\left(\frac{50X1}{4}\right)^{th}$ = 12.5th position

1st Quarter Class = 24-31

L_1 = 23.5, Fc = 6, Fj = 9, C = 8

$Q_1 = 23.5 + \left(\frac{12.5-6}{9}\right) X\ 8$

= 27.5 + 5.778 = 29.28

Q_3 Position = $\left(\frac{50X3}{4}\right)^{th} = \left(\frac{150}{4}\right)^{th}$ = 37.5th

∴ Third quartile class = 40 – 47

L_1 = 39.5, Fc = 27, Fj = 13, C = 8

$Q_3 = 39.5 + \left(\frac{37.5-27}{13}\right) X8 = 39.5 + \left(\frac{10.5}{13}\right) X8$

= 39.5 + 6.462 = <u>45.96</u>.

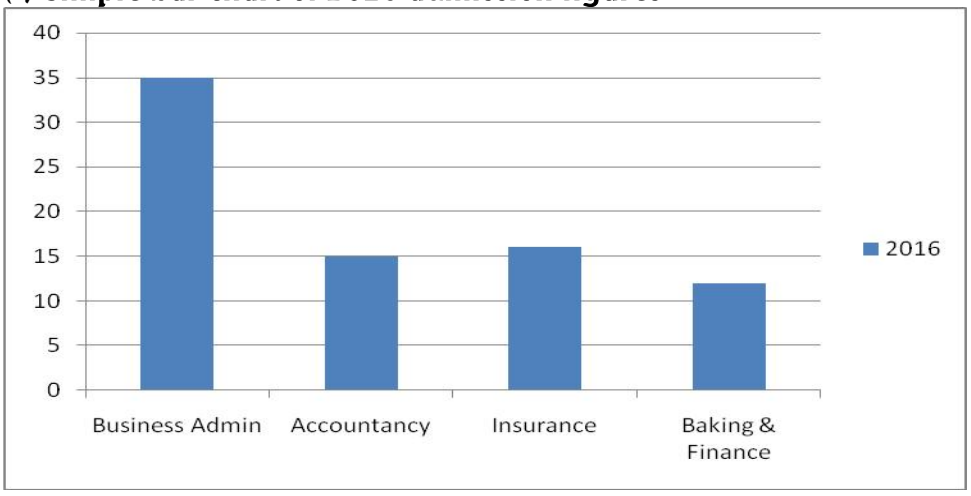
∴ Semi – Interquartile Range or Quartile Deviation is

$\frac{Q_3-Q_1}{2} = \frac{45.96-29.28}{2} = \frac{16.68}{2}$

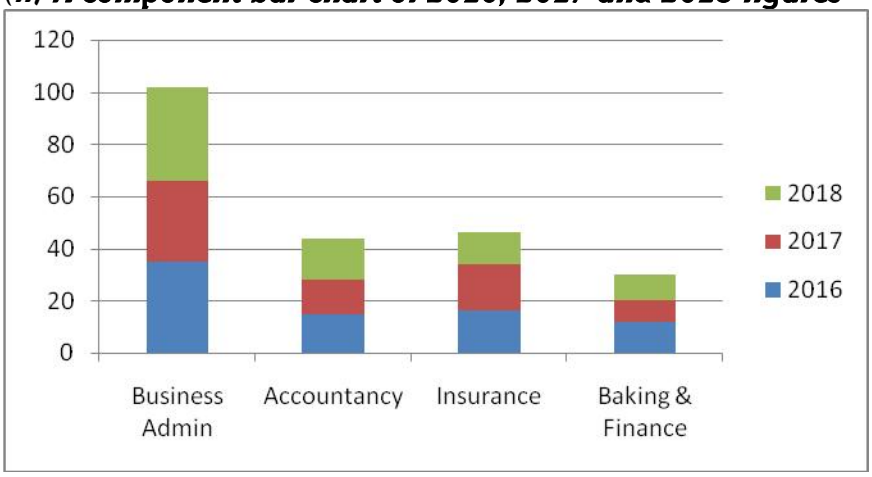
= <u>8.34</u>.

(6]b)

(i) Simple bar chart of 2016 admission figures



(ii) **A component bar chart of 2016, 2017 and 2018 figures**



(iii)

Pie chart of 2018 admission

Number of students admitted in 2018=36+16+12+0=74 students

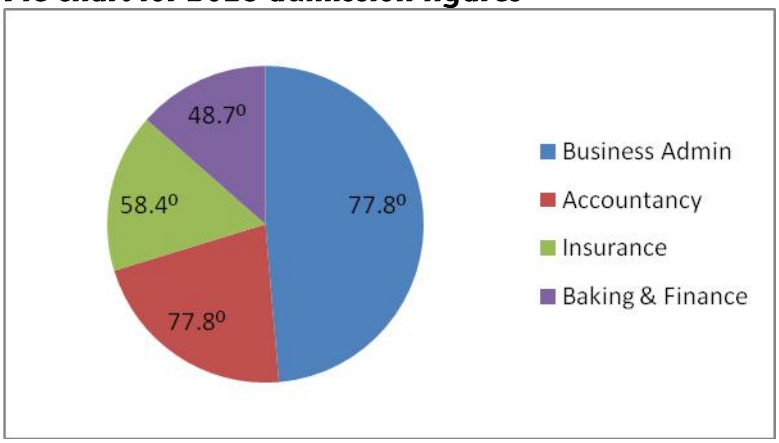
Angle of sector for Business Administration Department = $\frac{36}{74} \times 360^0 = 175.1^0$

Angle of sector for Accountancy = $\frac{16}{74} \times 360^0 = 77.8^0$

Angle of sector for Insurance = $\frac{12}{74} \times 360^0 = 58.4^0$

Angle of sector for Banking & Finance = $\frac{10}{74} \times 360^0 = 48.7^0$

Pie chart for 2018 admission figures



Pie chart of the total admission figures

Total Number of students admitted = 102 + 44 + 46 + 30 = 222

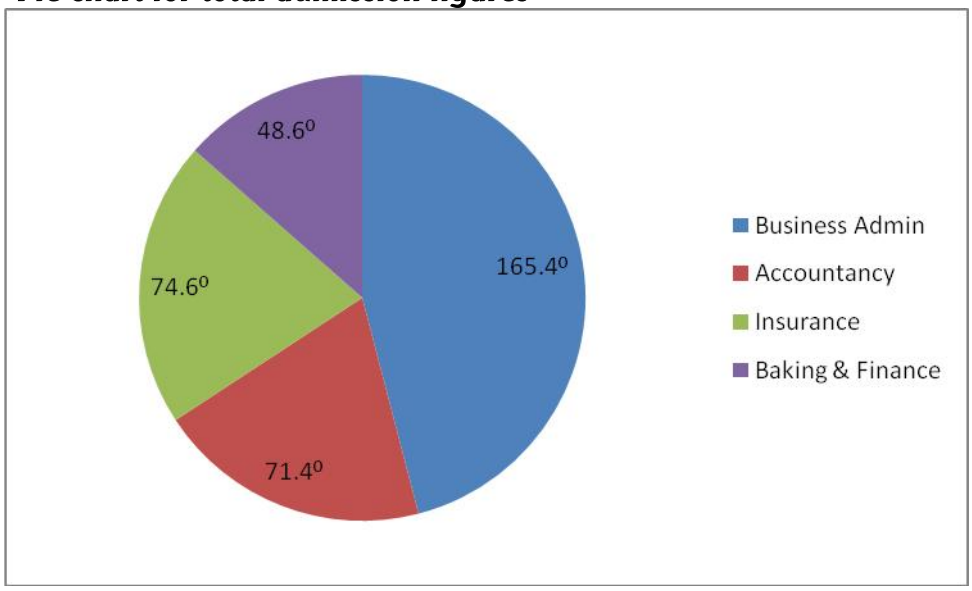
Angle of sector for Business Administration = $\frac{102}{222} \times 360^0 = 165.4^0$

Angle of sector for Accountancy = $\frac{44}{222} \times 360^0 = 71.4^0$

Angle of sector for Insurance $= \frac{46}{222} \times 360^0 = 74.6^0$

Angle of sector for Banking & Finance $= \frac{30}{222} \times 360^0 = 48.6^0$

Pie chart for total admission figures



Examiner's comment

Candidates' knowledge of statistical charts is tested in this question.

The question involves statistical analysis and data visualization.

Part (a) of the question requires candidates to calculate the semi-interquartile range, while part (b) involves creating various types of charts, includinga simple bar chart, component bar chart and pie charts, based on admission data.

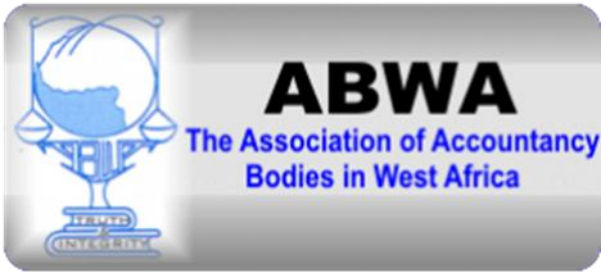
About 90% of the candidates attempted the question. The average score was 7.5 while the candidates' scores ranged between 0.5 and 12.5. A larger percentage of the candidates scored below the average mark compared with those above it.

The identified pitfalls of the candidates are as follows:

(1) Some candidates failed to correctly identify the quartile value from the grouped frequency data. This could be due to errors made in interpolating the cumulative frequencies or misunderstood the formula for calculating the semi-interquartile range as required in the part (a) of the question.

(2) Some candidates did not understand the plothing of component bar charts and their failure to correctly label the drawn pie charts.

THE ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA



ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA
MARCH 2025 EXAMINATIONS (PART II)

INFORMATION TECHNOLOGY

PLEASE READ THESE INSTRUCTIONS BEFORE COMMENCEMENT OF THE PAPER

EXAMINATION INSTRUCTIONS

1. All solutions should be in ink. Any solution in pencil will not be marked.

2. Read all instructions on each part of the paper carefully before answering the questions.

3. Ensure that you do not answer more than the number of questions required for **Section B (The Essay Section).**

4. Check your pockets, purse and mathematical sets, etc to ensure that you do not have prohibited items such as telephone handset, electronic storage device, wrist watches, programmable devices or any form of written material on you in the examination hall. You will be stopped from continuing with the examination and liable to further disciplinary actions including cancellation of examination result if caught.

5. Do not enter the hall with anything written on your docket.

6. Insert your examination number in the space provided above.

TUESDAY, MARCH 25, 2025

DO NOT TURN OVER UNTIL YOU ARE TOLD TO DO SO

THE ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA
ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA
PART II EXAMINATIONS – MARCH 2025

INFORMATION TECHNOLOGY

Time Allowed: 3 hours

SECTION A: PART 1 MULTIPLE CHOICE QUESTIONS (30 MARKS)

ATTEMPT ALL QUESTIONS IN THIS SECTION

Write ONLY the alphabet (A, B, C, D or E) that corresponds to the correct option in each of the following questions/statements.

1. Which of the following differentiates subsystems from each other?

   A. Function
   B. Space
   C. Time
   D. People
   E. Value

2. Which of the following is **NOT** a basic element of control in a business system?

   A. Controlling
   B. Planning
   C. Collecting facts
   D. Comparison
   E. Corrective Action

3. Which of the following is **NOT** true about information?

   A. Information is an organised and sorted facts
   B. It serves as an output from the computer system
   C. Analysis of data are done to obtain information
   D. Information is the second level of knowledge
   E. Information is not significant

4. Which of the following is **NOT** a feature of the first generation computers?

   A. They supported machine language only
   B. They were very costly
   C. They generate a lot of heat
   D. They were portable
   E. They were very unreliable for data processing

5. Which of the following is **NOT** a type of microcomputer?

   A. Desktop Computers
   B. Mini Tower
   C. Workstation
   D. Pen Computers
   E. Line Computers

6. Which of the following is an indirect input device?

   A. Optical Character Reader (OCR)
   B. Chip and Pin Reader
   C. Optical Mark Reader (OMR)
   D. Magnetic Stripe Reader (MSR)
   E. Bar Code

7. Which of the following functions cannot be performed by a mouse?

   A. Click
   B. Right Click
   C. Double Click
   D. Edit
   E. Drag & Drop

8. Which of the following is **NOT** a disadvantage of Display equipment?

   A. Allows easy access to a vast amount of data
   B. Output cannot be removed from the screen
   C. The amount of output that can be handled at any one time is limited by the size of the screen and by the rate at which one can flip through screen-sized pages.
   D. One cannot write with a pencil or pen
   E. One must be physically present at the display device site to see the output it provides.

9. Which of the following is **NOT** an example of magnetic storage media?

   A. Video tape recorder
   B. Winchester disk
   C. Streaming Tape
   D. Cartridge disk
   E. Magnetic CD

10. SVGA is an acronym for

   A. Special Video Graphic Adapter
   B. Special Video Graphic Array
   C. Super Video Graphic Adapter
   D. Super Visual Graphic Array
   E. Special Visual Graphic Array

11. Which of the following is **NOT** an operation performed by the Control Unit (CU)?

    A. Receives instruction in a program one at a time from the main memory
    B. Interprets the instructions
    C. Sends out control signals to the peripheral devices
    D. Stores instructions
    E. Coordinate all the activities

12. Which of the following is **NOT** the function of an Operating System?

    A. Resource Sharing
    B. Memory Management
    C. Filing System
    D. Input and Output handling
    E. Compilation

13. Utility programs perform the following operations, **EXCEPT**:

    A. File Copy
    B. Sorting
    C. File Maintenance
    D. Branching
    E. Housekeeping operations

14. Which of the following cannot be done by a database system?

    A. Data processing
    B. Avoid data duplication
    C. Make data independent of the programs which use it.
    D. Ensure consistency in an organisation's use of data
    E. Avoid data redundancy

15. Which of the following is **NOT** a feature of high-level programming languages?

    A. It is easier to write and understand
    B. It is machine dependent
    C. It is problem oriented
    D. It is a procedure-oriented language
    E. It speeds up the program, testing, and error correction

16. Which of the following is **NOT** an example of branching control structures?

    A. If-Then
    B. If Statement
    C. For Loop
    D. If-Then-Else
    E. Case

17. Which of the following can be used as a secondary key?

A. Customer number in a customer ledger record
B. Stock code number in a stock record
C. Employee PIN in payroll record
D. Matriculation number of a student
E. State of origin of the customer

18. Which of the following is **NOT** a disadvantage of the decentralised processing method?

A. Complexity of coordinating data among the departments
B. Increase in administrative cost
C. Increase in hardware cost
D. Greater difficulty in implementing effective control
E. No departmental secrecy

19. A processing technique in which all processing is done in a single place and results are later distributed to the various departments is called .....

A. Batch processing
B. Remote Job Entry processing
C. Centralised processing
D. On-line processing
E. Distributed processing

20. The processing technique in which each department does its own processing using its own IT staff within the department is called .....

A. On-line processing
B. Real time processing
C. Centralised processing
D. Decentralised processing
E. Distributed processing

21. An Interconnection of a number of computers, telephones, and other shared devices in various ways so that users can process and share information is called _____

A. Internet
B. Computer network
C. Communication
D. Intranet
E. Extranet

22. Which of the following is **NOT** a disadvantage of networks?

A. There is no need for compatibility of equipment in the network
B. There is duplication of data on files of different computers on the network
C. There is difficulty in administration and control especially for large combination
D. Failure of the server
E. Cable break may stop the entire network

23. HTTP is an acronym for

A. Hypertext Transfer Protocol
B. Hypertext Transfer Package
C. Hypertext Total Protocol
D. Hypertext Total Package
E. Hypertext Total Packet

24. The 3rd layer of the OSI model is

A. Physical
B. Network
C. Session
D. Transport
E. Application

25. Internet can be used for the following, **EXCEPT**

A. Dissemination of information
B. Product/service development
C. Transaction processing
D. Relationship enhancement
E. Input Data

26. Which of the following is **NOT** a One-off cost of an Information System (IS) project?

A. Cost of hardware, software and other equipment
B. Cost of producing documentation
C. Training cost
D. Cost of installing the system
E. Maintenance Cost

27. Which of the following is **NOT** an operating cost of an Information System (IS) project?

A. Staff Salaries
B. Cost of installing the system
C. Overheads
D. Maintenance
E. Insurance and Financing

28. Which of the following is **NOT** a fact finding method used to investigate an existing system?

    A. Interview
    B. Questionnaire
    C. Observations
    D. Organisation Chart
    E. Communication

29. Which of the following must be avoided during the conduct of an interview?

    A. Plan for the interview
    B. Make appointments and be committed to meeting them
    C. Use highly technical details
    D. Listen carefully since the exercise is meant to be used to learn about the system in use.
    E. Use the local terminology appropriate to the type of job.

30. Who is the right person to write the feasibility study of a system?

    A. Administrative Officer
    B. Project Manager
    C. Programmer
    D. Data Processing Manager
    E. System Analyst

SECTION A: PART II SHORT ANSWER QUESTIONS (20 MARKS)

ATTEMPT ALL QUESTIONS

Write the correct answer that best completes each of the following questions/statements.

1. A measure of the degree or extent of the dependency of the subsystem on one another is called .....
2. A system that does not interact with its environment either for the exchange of information or business transaction is called .....
3. The representation of data in the usual normal language of the user is .....
4. The standard coding form in which each character is coded using 8 bits is known as .....
5. The standard coding form in which each character is coded using a string of 4 bits is called .....
6. The technology used for the 2nd generation computers is .....
7. Suites of programs that are processed by the hardware and allow the hardware to function effectively and efficiently are .....
8. A unit that consists of the processor and the primary memory is called .....

9. Compiler, Interpreter, and Assembler are examples of .....
10. A program that converts a source program written in high level language into machine code is called .....
11. A company that operates computer services to process data for other companies particularly those which cannot justify acquiring a computer system is called .....
12. A place where files to be deleted are dumped is called .....
13. A unique identifier of a record is known as .....
14. An office with staff using a number of telephones and hotlines to receive various users' complaints and requests is called .....
15. The management and operation of part or all of an organisation's Information System (IS) services by an external source at an agreed service level and agreed time period is called .....
16. A conceptual model that characterises and standardises the communication functions of a telecommunication or computing system without regard to their underlying internal structure and technology is .....
17. Transmission of data through a channel in only one direction is called .....
18. The process through which users or organisations send files and documents to the internet for authorised users to access is called .....
19. An internet-based computing where shared resources, software and information are provided to computers and other devices on demand, like a public utility is called .....
20. The detailed documentation of a proposed new system is called .....

SECTION B: ATTEMPT ANY FOUR QUESTIONS (50 MARKS)

QUESTION 1

a. What is a Computer? (½ Mark)

b. Briefly describe the following computers and identify one major feature in each:

i. Super Computers (3 Marks)
ii. Mainframe (3 Marks)
iii. Mini Computers (3 Marks)
iv. Microcomputers (3 Marks)

(Total 12½ Marks)

QUESTION 2

a. Define and give **TWO** examples of each of the following:

i. Direct Input devices (3 Marks)

ii. Indirect Input devices (3 Marks)

b. List **FIVE** examples of input devices (2½ Marks)
c. State **TWO** benefits of Display equipment (4 Marks)

(Total 12½ Marks)

QUESTION 3

a. What is an application package?, Give **TWO** examples (2½ Marks)
b. Enumerate **FIVE** sources of application packages (5 Marks)
c. List **FIVE** factors to consider when acquiring an application package (5 Marks)

(Total 12½ Marks)

QUESTION 4

a. What is an E-mail? (2½ Marks)
b. State **FIVE** advantages of E-mail (5 Marks)
c. State **FIVE** disadvantages of E-mail (5 Marks)

(Total 12½ Marks)

QUESTION 5

a. What is Cloud computing? (2 Marks)
b. List and describe any **THREE** technologies used in Cloud computing (10½ Marks)

(Total 12½ Marks)

QUESTION 6

a. What is prototyping? (1½ Marks)
b. Enumerate **THREE** benefits of prototyping (3 Marks)
c. Enumerate **THREE** challenges of prototyping (3 Marks)
d. State **FIVE** reasons for computer forensics (5 Marks)

(Total 12½ Marks)

SECTION A: PART I

MULTIPLE CHOICE SOLUTIONS

1. A
2. A
3. E
4. D
5. E
6. E
7. D
8. A
9. E
10. C
11. D
12. E
13. D
14. A
15. B
16. C
17. E
18. E
19. C
20. D
21. B
22. A
23. A
24. B
25. E
26. E
27. B
28. E
29. C
30. E

Examiners' Comment

This part consists of 30 compulsory questions which are drawn from all the sections of the syllabus. The performance is most encouraging with over 70% of the candidates scoring over 60% of the allotted marks.

SECTION A: PART II

SHORT ANSWERS SOLUTIONS

1. Coupling
2. Closed
3. External
4. EBCDIC (Extended Binary Coded Decimal Interchange Code)
5. BCD (Binary Coded decimal)
6. Transistor
7. System Software
8. CPU (Central Processing Unit)
9. Language Translator / Language Processor
10. Compiler / Interpreter
11. Computer Bureau
12. Recycle Bin
13. Primary Key
14. Help Desk / Call Centre
15. Outsourcing
16. OSI – 7 Layered Model
17. Simplex
18. Uploading
19. Cloud Computing
20. System Specification

Examiners' Comment

This part consists of 20 compulsory questions. The performance is far below average as less than 50% of the candidates scored below 40% of the allotted marks. This has been the usual trend in this section of the paper.

Candidates need to be more familiar with basic concepts in Information Technology.

SECTION B:

SOLUTION 1

a. **Computer** is an electronic device that accepts data as input, processes the data and gives desired result as output under the control of a stored program.

b.

i. **Supercomputer**

This is the largest, fastest and most expensive computer. Such a computer is a technological improvement on the mainframe computer. It is used in a very complex scientific environment such as space studies and weather forecast. Examples include CRAY – 1 and CRAY – 2.

The Features include:

- They make use of parallel processing
- They are more expensive than the mainframe computer
- Can work at extraordinarily fast speed
- Are exceptionally accurate
- It is used to generate movies and commercials
- It is used for weather forecasting and structural modelling
- It requires highly trained staff for its operation and its software is expensive.

ii. **Mainframe**

These are computers that are less powerful than supercomputer and are primarily used by large organizations to process large information processing jobs such as bulk data processing, large scale transaction processing jobs, census taking, Enterprise Resource Planning etc.
Examples include: NCK 8000, IBM370, CDC, Cyber 72

The Features include:

- It is very expensive;
- It is a large system;
- It is used mainly by large multinational companies;
- It is capable of handling multiple simultaneous functions such as batch-processing, and interactive processing under the control of operating system;
- It supports a wide range of peripheral equipment e.g. high-speed storage devices and communication lines;
- It generates a large quantity of heat;
- It is normally housed in air-conditioned rooms surrounded by security measures and run by a team of professional operators;
- It can run for several uninterrupted hours;
- It is operated by a high-level professional

iii. Mini Computers

These are medium sized general purpose digital computers which are intermediate in size, processing power, speed, storage capacity etc between the mainframe and the micro computer. They are used by medium sized organisation and recently used as servers.

Examples Include: Data general c/150, Honeywell – DPS6, Texas Instruction DS990, IBM8100 etc.

The Features include:

- Smaller in size than a mainframe;
- It has a low cost compared to the mainframe;
- It is easier to install but still by a professional;
- Used by medium-sized companies;
- Its use has no complex management structure;
- Can be used in networking;
- It is used for engineering and scientific applications.
- Its capabilities are lower than those of a mainframe but higher than those of a microcomputer.

iv. Microcomputer

This is the smallest general-purpose digital computer consisting of a processor on a single silicon chip mounted on a circuit board together with memory chips, Read Only Memory (ROM) and Random Access Memory (RAM) chips e.t.c. It is the smallest, cheapest, slowest and easiest to operate. It is a single user and single task-oriented system that supports a wide range of applications and can operate under normal office condition. Examples are IBM- International Business Machine, PCS- Personal Computers, APPLE II, COMPAQ PCS, laptop, palm top, notebook, and hobby computer.

The Features Include:

- It is used as part of a network;
- It is very small in size (usually placed on table), but now in smaller sizes in the form of laptop, pocket form etc;
- Consists of a processor on a single silicon chip mounted on a circuit board together;
- It has a keyboard to enter data and instructions;
- It also has a screen called monitor, or VDU (Video Display Unit) to display Information;
- Has interfaces for connecting peripherals (e.g. graph plotters, cassette units, disc drivers, light pen, mouse, joystick etc.);
- Has a small word length size (32 bits);
- It is the cheapest in the range of computers;
- It operates under normal room condition;
- It can be operated and installed by unskilled users; and
- It is used as stand-alone computer.

Examiners' comment

This tests the candidates' knowledge on the category of General Purpose Digital Computers. It demands for the definitions and special features of these computer systems.

Majority of the candidates answered this question and the performance is very good as over 70% of those that answered the question scored above 60% of the allotted marks.

SOLUTION 2

a. i. Direct Input Devices

Direct input devices are devices that can send data into the computer without intermediaries. It is also known as an automatic input device. The devices interface with computer systems without intermediary device, that is, they accept data in machine readable form. They can also be called Direct Data Entry (DDE)

Examples include:

- Bar code reader
- Optical Character Reader (OCR)
- Optical Mark Reader (OMR)
- Magnetic Ink Character Reader (MICR)
- Magnetic Stripe Reader
- Card reader
- Paper tape reader
- Biometric Scanner
- Keyboard
- Mouse
- Touch screen
- Tracker ball
- Joystick
- Graphic Tablet

ii. Indirect Input Devices

These are the devices that can capture data from source and send it to the computer for processing through intermediary devices. In these systems, the data they contain is usually converted to magnetic media prior to being input for processing.

Examples Include:

- Bar code
- Punched Card
- Tag and Paper tape

b. Examples of input devices include:

- Keyboard
- Mouse
- Touch screen
- Tracker ball
- Joy stick
- Graphic Tablet
- Scanner
- Bar code reader
- Optical Character Reader (OCR Reader)
- Optical Mark Reader (OMR Reader)
- Magnetic Ink Character Reader (MICR Reader)
- Magnetic Stripe Reader
- Card reader
- Paper tape reader
- Digital camera
- Microphone
- Video digitizer

c. Benefits of display equipment include:

- It presents clear visual representation of data and images.
- It enhances productivity due to high resolution screen.
- It enhances easy communication through video conferencing and presentations.
- It offers direct interaction through touch screen feature.
- It makes features accessible through contrast adjustment, magnification and screen reader assistance.
- It enhances gaming and watching movies.

Examiners' comment

This question is badly structured. It consists of three parts but the first two parts are just the same questions. It demands for the definitions and categories of input devices. It also demands for the benefits of Display Equipment.

This is a very cheap question and it is answered by almost all the candidates and the performance is very good as over 70% of those that answered it scored over 70% of the allotted marks.

SOLUTION 3

a. Application Package

Application package consists of software developed to solve specific user's problems. It consists of programs which direct the computer system to solve specific data processing activities of the user.

Examples of Application Packages Include:

- **Accounting software (package)** such as Peach tress accounting, Daceasy accounting, SAGE accountant e.t.c.
- **Word Processing Packages** such as Microsoft word, page maker, word perfect e.t.c
- **Spreadsheet application packages** such as Lotus 1-2-3, Microsoft Excel, MS Multiplan, and Informix e.t.c.
- **Integrated packages such as** Office writer, Logistic Symphony, Framework, Enable, Ability, Smart ware II, Microsoft Publishers, Avard Graphics, graphics writer e.t.c
- **Graphic packages such as** Corel Draw, instant Artist, Microsoft Publisher, Avard graphic e.t.c.
- **Database packages** such as Dbase II, III, IV, Foxbase, Data perfect, paradox III, Revelation Advanced.
- **Statistical packages** such as statgraphic (SPSS).
- **Desktop Publishing Packages** such as PageMaker, Ventura, Fantasy, Corel paint, Microsoft Publisher, Corel Draw e.t.c.
- **Games packages** such as Chess, Scrabble, Monopoly, Tune Trivia, Soccer games, War games Paratrooper e.t.c.
- **Communication packages** such as carbon copy, Data talk, Cross talk, data soft e.t.c.

b. Sources of Application Package Include:

- Software developer or software houses
- Internet – downloading software from the internet
- Developed by In-house programmers
- Computer bureau
- Computer manufacturers who also develop software
- It can be bought over the counter from retail shops i.e. off-the-shelf
- Mail order sources when advertised in computer magazines / journals
- Micro computer dealers who also sell software.

c. Factors To Be Considered When Acquiring Application Package Include:

- Availability of documentation for the user.
- The availability of a new version of the application.
- Vendor's or developer's reputation.
- Whether the application package meets user's requirements.
- Whether the application package can cause changes to user's organization.
- Availability of after sales support services provided by the vendor.
- Can the application package be used elsewhere i.e whether it is transferable.
- The processing time of the package.
- The capabilities of the available hardware for the package in terms of memory capacity (RAM, hard disk etc.), speed of the processor.
- Provision for alternative package in case the one chosen by the user fail.
- Flexibility of the package.
- User's friendliness.

Examiners' comment

This tests the candidates' understanding on Application Packages. It demands for the definition, examples and sources of this software.

It is very popular among the candidates and the performance is very good as over 70% of those that answered the question scored above 70% of the allotted marks.
All the same, candidates need to master the exact technical terms that describe Application Packages.

SOLUTION 4

a. **Electronic mail** systems are intended to replace the movement of paper messages with the electronic transmission of coded, graphic or textual information. A mail can be sent to or received by several people at different locations and within different time zones using computers or telephones.

b. **Advantages of emails include:**
- Emails are easy to use. Daily correspondence can be organised, send and receive electronic messages and save them on computers.
- Emails are fast. They are delivered at once around the world. No other form of written communication is as fast as an email.
- The language used in emails is simple and informal.
- It allows the original message to be attached to a response
- Emails do not use paper (paperless).
- Emails can also have pictures in them. Birthday cards or newsletters can be sent as emails.
- Products can be advertised with email. Companies can reach a lot of people and inform them in a short time.
- It is economical.
- It is efficient. A message prepared once can be transmitted several times and to several people.
- Security Access is generally restricted by the use of passwords.
- Attachment can be used to send documents and reports as well as memoranda.
- Instant delivery of messages.

c. **Disadvantages of emails include:**
- Emails cannot really be used for official business documents.
- Mailbox may get flooded with messages after a certain time, so there is need for deletion from time to time.
- Email bankruptcy also known as "email fatigue", which occurs when large messages are ignored
- Speed of correspondence cannot be controlled
- Attachment size limitation
- Information overload
- Spamming and computer virus

- Email spoofing: This is when the header information of an email is altered to make the message appear to come from a known or trusted source. It is often used as a ruse to collect personal information.
- The nature of the message may demand detailed discussion of a problem, but e-mail is best suited to short messages.
- No face-to-face communication.

Examiners' comment

This tests the candidates' understanding on the phenomenon of email. It demands for the definition, advantages and disadvantages of the email.
Email is a concept being used by all literate people, so almost all the candidates answered the question and the performance is very good as over 60% of those that answered the question scored above 70% of the allotted marks.

SOLUTION 5

a. **Cloud Computing**
Cloud computing is an internet-based computing whereby shared resources, software and information are provided to computers and other devices on-demand, like a public utility. It allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralised storage, memory, processing and bandwidth.

b. **Technologies used in Cloud Computing**
i. Software-as-a-Service (SaaS)
ii. Platform-as-a-service (PaaS)
iii. Infrastructure – as – a – service (IaaS)
iv. Serverless computing is also known as Function-as-a-Service (FaaS).

i. **Software-as-a-Service (SaaS)** - In the past, the end-user would generally purchase a license from the software provider and then install and run the software directly from on-premises servers. Using on-demand service, the end-user pays the software a subscription fee for the service. The software is hosted directly from the software provider servers and is accessed by the end-user over the internet. Some of the companies that offer SaaS business include Sales force.com, Google, NetSuite, Info Technologies, Canada software.net.

ii. **Platform-as-a-Service (PaaS)** – The platform segment of cloud computing refers to products that are used to deploy applications. Platforms serve as an interface for users to access applications provided by partners or in some cases the customers. Examples of platforms are salesforce.com platform, NetSuite, Amazon, Google, Sun Oracle, Microsoft, etc.

iii. **Infrastructure-as-a-Service (IaaS)** – The backbone of the entire concept; the vendors provide the physical storage space and processing capabilities that allow for all the services described above. Major infrastructure vendors are:
   i. Google – managed hosting, development environment
   ii. International Business Machine (IBM) – managed hosting
   iii. Terremark – managed hosting
   iv. Amazon.com – cloud storage
   v. Rackspace Hosting – managed hosting and cloud computing

iv. **Serverless Computing is also known as Function-as-a-service:** This is a cloud computing execution model where the developers build and run applications without managing the servers. The cloud provider handles infrastructure provisioning, scaling and maintenance, allowing developers to focus on code and pay only for resources used. Serverless computing is also known as Function-as-a-service (Faas). Examples of Serverless computing include Google Cloud Functions and Azure Functions.

Examiners' comment

This tests candidates' knowledge on cloud computing techniques. It demands for the definition and the technologies employed in cloud computing. Although, this concept is popular among the candidates, but the performance is poor as less than 50% of those that answered the question scored less than 40% of the allotted marks.

The major pitfall is the inability to specify the technologies exactly and give the explanations. For future examinations, reliable textbooks like the ICAN Study text should be consulted.

SOLUTION 6

a. **PROTOTYPING**
Prototyping can be defined as an approach to develop a small or pilot version of a system called a prototype of an entire system or a part of it. It is simply the process of developing a prototype. It is an act of using 4th generation language (4th) development tool to quickly produce a simulation of the output required from a proposed system.

b. **Advantages of prototyping include:**
- Early visibility of the prototype gives users an idea of what the final system looks like.
- Encourages active participation among users and producers.
- Enables a higher output for the user.
- Cost effective (Development costs reduced).
- Increases system development speed.
- Assists to identify any problems with the efficacy of earlier design,

requirements analysis and coding activities.

- Help to refine the potential risks associated with the delivery of the system being developed.
- Various aspects can be tested, and quicker feedback can be got from the user.
- Helps deliver the product in quality easily.
- User interaction is available during development cycle of prototype.

c. **Challenges of Prototyping include:**

- Producers might produce a system inadequate for overall organization needs.
- Users can get too involved whereas the program cannot be to a high standard.
- The structure of the system can be damaged since many changes could be made.
- Producer might get too attached to it (might cause legal involvement).
- Not suitable for large applications.
- Over long periods, it can cause a loss in consumer interest and subsequent cancellation due to a lack of market for the product (for commercial products).

d. **Reasons for computer forensics include:**

i. Need for digital evidence in a legal case.
ii. To extract data from digital systems even if the system is damaged by forces of nature or perpetrators leading to legal cases.
iii. In legal cases, computer forensics techniques are frequently used to analyse computer systems belonging to defendants (in criminal cases) or litigants (in civil cases)
iv. To recover data in the event of hardware or software failures
v. To analyse a computer system after a break-in e.g. to determine how the attackers gain access and what the attackers did
vi. To gather evidence against an employee that an organisation wishes to terminate
vii. Identifying and investigating cybercrimes.

Examiners' Comment

This tests candidates' understanding on the concepts of Prototyping and Computer Forensics. It demands for the definition, benefits and challenges of Prototyping. It also demands for the purpose of Computer Forensics.

Only few candidates attempted this question and the performance is poor, as less than 50% of those that attempted the question scored less than 30% of the allotted marks.

The major pitfalls are:

- Inability to define Prototyping correctly;

- Benefits of the technique of Prototyping to system development;
- Disadvantages of this technique to system development
- The reasons for the use of computer forensics.

For further examinations, reliable textbooks like ICAN Study text should be consulted.