

**ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA
ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA
PART II EXAMINATIONS – SEPTEMBER 2020**

PRINCIPLES AND PRACTICE OF FINANCIAL ACCOUNTING

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

Use the following information to answer questions 1 and 2.

A non-current asset cost ₦50,000,000, it is depreciated using reducing balance method at the rate of 15% yearly. Calculate;

1. The cumulative depreciation as at the end of the 3rd year
 - A. ₦36,125,000
 - B. ₦30,706,000
 - C. ₦27,815,000
 - D. ₦22,185,000
 - E. ₦19,294,000

2. The carrying amount as at the end of the 5th year
 - A. ₦36,125,000
 - B. ₦30,706,000
 - C. ₦27,815,000
 - D. ₦22,185,000
 - E. ₦19,294,000

3. Additional requirement of IAS 1, on each component of the financial statements must be properly identified with the following information prominently shown
 - A. Currency of the figures reported
 - B. Date of the end of the reporting entity or the period covered
 - C. Name of the reporting entity
 - D. Level of rounding up of the figures used
 - E. List of the major shareholders

4. For an asset to be classified as current asset, it must be
- A. Held for trading purposes
 - B. Realisable within 12 months after reporting
 - C. Reasonably earned
 - D. Sold or consumed in the normal operating business cycle
 - E. Cash or cash equivalent without any restriction of its being used within 12 months after the reporting date
5. In the circumstance of an inflated closing figure in the inventory of an organisation, what is the effect on the profit?
- A. Increase the profit
 - B. Reduce the profit
 - C. Undercast the profit
 - D. No particular effect on the profit
 - E. Brings the profit to equilibrium
6. A statement of financial position is usually prepared with
- A. Liabilities and sales at the end of the period
 - B. Assets and liabilities at the end of the period
 - C. Assets and liabilities at the beginning of the period
 - D. Assets and equities at the beginning of the period
 - E. Inventories and payables at the end of the period
7. ABC has payables control account balance of Le125,000 at 31 December, 2019, however, the extract of balances from the payables ledger totals Le128,000. Investigations reveals the following errors:

Purchases for week 52 of Le12,000 had been omitted from the control account, while a supplier account of Le9,000 had been omitted from the list of balances

What is the correct payable balance at 31 December, 2019?

- A. Le146,000
- B. Le137,000
- C. Le134,000
- D. Le128,000
- E. Le125,000

8. Which of the following is **NOT** a classification of cash inflows in IAS 7?
- A. Administration
 - B. Operating
 - C. Investing
 - D. Cash and Cash equivalent
 - E. Financing
9. A company has the following information about property, plant and equipment

	2019	2018
	₦'000	₦'000
Cost	1,875	1,500
Accumulated depreciation	625	375
Net book value	1,250	1,125

Plant with a net book value of ₦187,500 (original cost ₦225,000) was sold for ₦75,000 during the year.

What is the cash flow from investing activities for the year?

- A. ₦75,000 inflow
 - B. ₦75,000 outflow
 - C. ₦525,000 outflow
 - D. ₦525,000 inflow
 - E. ₦625,000 inflow
10. A company has the following extract from a statement of financial position

	2019	2018
	₦'000	₦'000
Share capital	6,000	3,000
Share premium	1,500	-
Loan stock	2,250	3,000

What is the cash flow from financing activities for the year?

- A. ₦3,000,000 inflow
- B. ₦3,750,000 outflow
- C. ₦3,750,000 inflow
- D. ₦5,250,000 outflow
- E. ₦5,250,000 inflow

11. The following costs are directly related to specific contract, **EXCEPT**
- Cost of materials used for construction
 - Depreciation of idle plant and equipments of the company
 - Cost of hiring plant and equipment for contract
 - Depreciation of plant and equipment used for the contract
 - Cost of design and technical assistance related to the contract work
12. What is the double entry required to record the total sales day book figure in the normal ledger of a company?
- | Dr | Cr |
|-------------------------------|----------------------------|
| A. Receivable control account | Revenue account |
| B. Receivable ledger | Receivable control account |
| C. Receivable control account | Receivable ledger |
| D. Revenue account | Receivable control account |
| E. Receivable control account | Bank account |
13. Where a transaction is entered into the correct ledger account, with a wrong amount, this error is known as
- An error of omission
 - An error of principle
 - An error of commission
 - Complete reversal error
 - An error of original entry
14. A suspense account shows a credit balance of GH¢260, which of the following could have caused the difference in the suspense account?
- Omitting a sales of GH¢260 from sales ledger
 - Recording a purchase of GH¢260 twice in the purchase account
 - Failing to write off a bad debt of GH¢260
 - Recording electricity bill paid of GH¢130 by debiting the bank account and crediting electricity account.
 - Understating sales of GH¢130 in the sales ledger

15. Which of the following may appear as an item in the statement of changes in equity of a company?

- A. Property, plant and equipment (PPE)
- B. Dividend
- C. Interest income
- D. Loan notes
- E. Inventory

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

- | Dr | Cr |
|---------------------------------|------------------------------|
| A. Revaluation Account | Liabilities Account |
| B. Liabilities Account | Revaluation Account |
| C. Liabilities Account | Realisation Account |
| D. Liabilities Account | Old Partners Capital Account |
| E. Old Partners Capital Account | Liabilities Account |

17. Opening inventory, purchases, carriage inwards and closing inventory are accounting information which can be used to compute

- A. Working Capital ratio
- B. Acid test ratio
- C. Trading Account ratio
- D. Cost of Sales ratio
- E. Stock Turnover ratio

18. Using cost price method, the necessary accounting entries required to record goods returned from branch to Head office at cost are

- | Dr | Cr |
|-------------------------------------|------------------------------|
| A. Branch inventory account | Goods sent to branch account |
| B. Branch inventory account | Branch adjustment account |
| C. Goods sent to branch account | Branch inventory account |
| D. Branch trade receivables account | Branch inventory account |
| E. Branch adjustment account | Goods sent to branch account |

19. In amalgamation of partnership, the necessary accounting entries required to record the value of the assets not taken over by the new business are

Dr	Cr
A. Assets account	Realisation account
B. Partner capital account	Assets account
C. Realisation account	Assets account
D. Assets account	Revaluation account
E. Partner capital account	Revaluation account

20. On dissolution of partnership, when settlement of partnership debts is borne by a partner, the double entry is

Dr	Cr
A. Partner's capital account	Credit realisation
B. Realisation	Partner's capital account
C. Partner's capital account	Loan account
D. Loan account	Partner's capital account
E. Loan account	Cash account.

21. The account to be debited when the purchase consideration is paid in a conversion of partnership to limited liability company is

- A. Share capital account
- B. Realisation account
- C. Business purchase account
- D. Assets account
- E. Vendor company account

22. An entity that is zero VAT was invoiced ~~N~~45,000 for repairs of Motor vehicle at a 5% VAT, how much is charged to repairs account?

- A. ~~N~~42,750
- B. ~~N~~42,857
- C. ~~N~~45,000
- D. ~~N~~47,143
- E. ~~N~~47,250

23. Which of the following topic is featured in the IFRS for SMEs?
- A. Related party disclosures
 - B. Segment reporting
 - C. Interim financial statement reporting
 - D. Earnings per share
 - E. Assets held for sale
24. Which of the following accounting treatments is **NOT** allowed under IFRS for SMEs?
- A. First-in First-out method for inventory valuation
 - B. Temporary difference for deferred tax
 - C. Amortisation of goodwill
 - D. Revaluation of property, plant and equipment
 - E. Cost model for associates

Use the following information to answer questions 25-26

Prepare statement of cash flows extract of Keyword Enterprises Limited for the year ended 31 December, 2019 with the following information.

	N'000
Profit on Revaluation of Non-current Assets	2,440
Provision for Depreciation for the year	840
Loss on sale of machinery	140
Total of Adjustments for non-cash items	(2,080)
Cash generated from operation before working capital changes	3,540

25. The net profit of Keyword Enterprises Limited for the year ended 31 December 2019 is
- A. ~~N~~5,620,000
 - B. ~~N~~5,600,000
 - C. ~~N~~5,000,000
 - D. ~~N~~3,540,000
 - E. ~~N~~500,000

26. The profit on sale of investment is

- A. ₦700,000
- B. ₦620,000
- C. ₦600,000
- D. ₦540,000
- E. ₦520,000

27. The accounting entries necessary to record the amount of calls on ordinary shares **NOT** paid by the shareholders is

Dr	Cr
A. Call on ordinary shares in arrears account	Call on ordinary shares account
B. Call on ordinary shares in arrears account	Call not paid account
C. Call on ordinary shares not paid account	Call on ordinary shares account
D. Call on ordinary shares account	Capital reserve account
E. Capital reserve account	Call on ordinary shares account

28. The information which must be provided so as to properly identify each component of a set of financial statements include the following, **EXCEPT** the

- A. Level of rounding error
- B. Name of the reporting entity
- C. Country in which the entity operates
- D. Presentation currency used
- E. Date of the end of the reporting period

29. What does a credit balance of income and expenditure account represent?

- A. Accumulated fund
- B. Surplus
- C. General reserve
- D. Gross profit
- E. Deficit

30. Which of the following represent capital receipts of a club?

- A. Sales of tickets for raffle draw
- B. Donation received
- C. Annual subscription
- D. Life membership subscription
- E. Interest on investment.

ATTEMPT ALL QUESTIONS

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

1. The accounting principle or convention that demands caution from an Accountant in recognising revenue is.....
2. The necessary accounting entries required to write-off loss on disposal of a Non-Current Assets from the books of an economic entity is.....
3. The profit mark-up percentage of a commodity with a profit margin of one-ninth ($\frac{1}{9}$) is..... (Answer to 1 decimal place)
4. In terminating partnership business, there may be provision for realisation expenses, due to inaccurate estimate, realisation expenses can be over or under provided for in the business books. The necessary accounting entries required to write-off the excess provision for realisation expenses from the partnership books is.....
5. The amount by which the minimum rent exceeds the actual royalty is.....
6. Where goods on consignment are partly unsold, the unsold stock will be valued at..... plus.....
7. The ideal ratio to measure the ability of a company to settle its short-term indebtedness is.....
8. Under IAS 16, if an asset is exchanged at an arm's length commercial transaction, it is measured at
9. Royalty paid on sales is debited to.....account
10. In autonomous branches, depreciation charged is debited to profit or loss and credited to.....account in branch books
11. The **TWO** items in lease, reported in statement of profit or loss are and.....
12. The claim admitted in respect of inventory destroyed by fire will be reported as.....in the statement of financial position

13. The aggregate amount of cost incurred and recognised profit less cash received and receivable is.....
14. Where the branch maintains the books of account, the goods received from head office will be recorded in.....branch books?
15. The accounting concept used to classify into operation and finance lease, is.....
16. In a memorandum joint venture accounts, sales is..... entry?
17. A company has the following capital structure; Share capital ₦100,000, share premium ₦50,000, loan notes ₦60,000, working capital ₦120,000. The company equity will be.....while the capital employed will be.....
18. The double entry required to record goods taken from inventory by the owner of a business is..... and
19. The specific principles, bases, conventions, rules and practices applied by an entity in preparing and presenting financial statements is known as.....
20. **TWO** fundamental qualitative characteristics of financial statements are..... and

SECTION B: THEORY**ATTEMPT ANY FOUR QUESTIONS****(50 Marks)****QUESTION 1**

On 1 January, 2019, two identical enterprises commenced business. During the year each entity entered into identical transactions. At the end of the year 31 December, 2019 the two enterprises presented the following Statements of Financial Position.

	Crain	Arc
Assets	₦'000	₦'000
Goodwill	500	-
Motor Vehicle	1,100	800
Office Equipment	200	250
Trade Receivables	300	300
Bank Balance	350	250
	<u>2,450</u>	<u>1,600</u>
	₦'000	₦'000
Capital	2,225	1,375
Trade payables	225	225
	<u>2,450</u>	<u>1,600</u>

A thorough review of the books of the two businesses revealed that:

- (i) Crain Enterprises included ₦100,000 in its bank balance, a personal investment savings account with a new generation bank.
- (ii) Rent of ₦150,000 paid in cash by both Crain and Arc Enterprises on 1 September, 2019 for the next six (6) months.
- (iii) At the year end, Motor Vehicle that cost ₦950,000 for the two businesses was valued by Crain Enterprises at ₦1,100,000, an amount reflecting the effects of inflation on the economy. However, Arc Enterprises valued the Motor Vehicle at ₦800,000, the amount it would cost at the year end to replace the asset.
- (iv) Office Equipment costing ₦200,000 was valued by Arc Enterprises at ₦250,000 representing the amount offered to Arc if it decides to sell the equipment.
- (v) Crain Enterprises recorded ₦500,000 as Goodwill on 1 October, 2019. This amount represents the proprietor's best unbiased estimate of his superior management talent.

You are required to:

State and briefly explain the Generally Accepted Accounting Principles violated by the two businesses and re-draft the Statements of Financial Position as at 31 December, 2019.

(Total 12½ Marks)

QUESTION 2

PARTNERSHIP

Duru, Dike and Cosmos are in partnership. The partnership agreement provides that:

- (i) Partners are to be credited at the end of each year with salaries of ₦1,000,000 to Duru, and ₦500,000 each to Dike and Cosmos, and with interest at the rate of 5% per annum on the balances at the credit of their respective capital accounts at the commencement of the year.
- (ii) No interest is to be charged on Drawings.
- (iii) After charging partnership salaries and interest on capital, Profit or losses are to be shared in the ratio of Duru 5: Dike 3: and Cosmos 2, with the provision that Cosmos's share in any year (exclusive of salary and interest) shall not be less than ₦1,000,000, any deficiency to be borne in profit sharing ratio by the other two partners.

The Trial Balance of the firm as at 31st December 2019 was as follows:

	DR ₦'000	CR ₦'000
Partners' Capital Account:		
Duru – Balance as at January 1 st 2019		8,000
Dike - Balance as at January 1 st 2019		5,000
Cosmos – Balance as at January 1 st 2019		3,000
Partners' Current Account:		
Duru – Balance as at January 1 st 2019		1,600
Dike - Balance as at January 1 st 2019		1,200
Cosmos – Balance as at January 1 st 2019		800
Sales		46,500
Payables		3,700
Shop fitting at cost	3,600	
Shop fitting provision for depreciation as at January 2019		1,400
Freehold Premises – Cost	6,000	
Leasehold Premises – Purchased during year	4,500	
Leasehold Premises – Additions and Alterations	2,500	
Purchases	28,000	
Stock on hand – 1 st January 2019	4,200	
Salaries and Wages	6,400	
Office and Trade Expenses	4,520	
Rent, Rates and Insurance	1,050	

Professional Charges	350	
Receivables	2,060	
Provision for Doubtful Debts – January 1 st		50
Balance at Bank	4,370	
Drawings – Other monthly payment:		
Duru	1,700	
Dike	1,100	
Cosmos	900	
	<u>71,250</u>	<u>71,250</u>

You are given the following additional information:

- (i) Closing inventory was valued at ₦3,600,000
- (ii) A debt of ₦60,000 is to be written off and the provision against the remaining Debtors should be 5%
- (iii) Salaries and wages include the following monthly drawings by the partners; Duru ₦50,000, Dike ₦30,000, Cosmos ₦25,000.
- (iv) Partners had during the year been supplied with goods from stock as follows; Duru ₦60,000, Dike ₦40,000.
- (v) As at year end, Rates in advance was ₦250,000 while office and trade expenses owing was ₦240,000
- (vi) Shop fitting is to be depreciated at the rate of 5% per annum on cost.
- (vii) Professional charges include ₦250,000 in respect of acquisition of the leasehold premises which fees are to be capitalised.
- (viii) The cost, additions and alterations to the leasehold premises were to be written off over twenty five years commencing from January 1st in the year in which the premises were acquired.

You are required to prepare:

Statement of Profit or Loss for the year ended 31st December 2019 and Partners' Current accounts in columnar form for the year ended 31st December 2019.

(Total 12½ Marks)

QUESTION 3

Nwadike retired from ABC Transport Limited where she has served for 30 years. She decided to go into transport business under the name Nwadike Express.

She acquired five new 18 seater Toyota buses on January 1, 2017 for ₦6,457,500. The cash price of the buses was ₦4,500,000. The deal was financed by Trust Microfinance bank Limited and the terms of the hire purchase contract require that:

1. Nwadike Express to deposit ₦1,500,000 on delivery of the buses
2. **THREE** instalments to be paid on 31/12/17, 31/12/18 and 31/12/19 of ₦1,650,000, ₦1,650,000 and ₦1,657,500 respectively.
3. The business adopted a policy to write off its vehicles over a period of 5 years at straight line method without assuming any residual value.
4. The rate of interest was 30% per annum.

Required:

Prepare appropriate accounts in the books of Nwadike Express to record the above transactions. **(Total 12½ Marks)**

QUESTION 4

- a. In accordance with IAS 2 on inventories.
 - i. Define inventories and explain how inventories are measured
 - ii. State **THREE** examples of costs which are specifically excluded from the cost of inventories. **(4½ Marks)**
- b. ECOWAS Limited has three items of inventories whose costs and net realisable value are as follows:

Items	Cost	Net Realisable Value (NRV)
	L\$'000	L\$'000
X	576	640
Y	448	384
Z	736	768

Required:

- Calculate the closing value of each item of inventory and total value of the closing inventory of ECOWAS Limited. **(4 Marks)**
- c. Jagajaga Limited's closing inventories as at 31 December 2019 is L\$6,956,820. This includes L\$92,800 for items accidentally destroyed on 31 December, 2019, after the inventory count. Also, included is L\$59,600 which relates to the cost of inventory damaged in October 2019, which can be recovered at a cost of L\$13,600 and be sold for L\$48,200.

Required:

Calculate the closing value of inventory at the year end.

(4 Marks)

(Total 12½ Marks)

QUESTION 5

The following comparative information has been extracted from the financial statements of Anjo Limited.

	31 March 2020	31 March 2019
	₦	₦
Revenue	329,459	385,945
Cost of sales	224,925	239,212
Gross Profit	104,534	146,733
Profit before interest and taxation	6,440	30,519
Interest	14,300	10,200
Retained Profit	8,232	16,092
Non Current Assets	73,298	63,108
Current Assets	25,000	32,000
Current liabilities	17,000	13,500
Non-current Liabilities	50,114	46,780
Equity	12,199	23,312

- Calculate gearing ratio and interest cover for Anjo Limited for 2020 and 2019.
(6 Marks)
 - Comment on the changes in gearing ratio and interest cover of Anjo Limited.
(6½ Marks)
- (Total 12½ Marks)**

QUESTION 6

The balances in respect of Contract No.245 extracted from the books of No-regret Engineering Limited for the year ended 31 August, 2019 were:

	₦'000
Contract Price	4,725
Cash Received	4,275
Inventories of materials -1 Sept. 2018	22.5
Plant value – 1 September 2018	450
Labour charge during the year	225
Plant value – 31August, 2019	90
Work certified by Architects	4,500
Work-in progress 1 September, 2018	3,375

Profit on work- in progress 1 September, 2018	112.5
Materials charged during the year	202.5
Overheads charged during the year	112.5
Accrued Expenses	22.5

Additional information:

The contract will be completed on 30 September, 2019

Required:

- a. Prepare the Contract Account in the books of No-regret Engineering Limited for the year ended 31 August, 2019.
- b. Using cost and architectural method, determine the value of Work-in-Progress to be included in the Statement of Financial Position as at 31 August, 2019.

(Total 12½ Marks)

Show all workings.

PPFA - SOLUTIONS – Multiple Choice Question

1. E
2. D
3. E
4. C
5. A
6. B
7. B
8. A
9. C
10. C
11. B
12. A
13. E
14. B
15. B
16. B
17. E
18. C

19. B
20. D
21. D
22. E
23. B
24. C
25. A
26. B
27. A
28. C
29. B
30. D

Workings

Question 1 and Question 2

YEAR	COST/CARYN AMT N'000	DEPRNTN N'000	CUM DEP N'000	CARYN AMOUNT N'000
1.	50,000	7,500	7,500	42,500
2.	42,500	6,375	13,875	36,125
3.	36,125	5,419	19,124	30,706
4.	30,706	4,606	23,900	26,100
5.	26,100	3,915	27,815	22,185

Q7

Payables control account	or	Payables ledger current list	
Balance b/d	125,000	Original list	128,000
Add: Week 52 purchases omitted	<u>12,000</u>	Omitted supplier	<u>9,000</u>
Balance C/d	<u>137,000</u>	Correct list	<u>137,000</u>

Q9

Property, Plant and Equipment Account			
	N'000		N',000
Opening balance	1,500	Disposal	225
Purchases	<u>600</u>	Closing	<u>1,875</u>
(Balancing)	<u>2,100</u>	balance	<u>2,100</u>
Purchase of PPE		600,000	
Proceed of sales of PPE		<u>(75,000)</u>	
Net cash flow		<u>525,000</u>	

Q10	Issue of share capital (6,000 + 1,500 – 3,000)	4,500
	Repayment of loan stock (3,000 – 2,250)	<u>750</u>
	Net cash inflow	<u><u>3,750</u></u>

22.	Amount of invoice		₦45,000
	Input VAT due	5/100 * ₦ 45,000	<u>(2,250)</u>
			<u><u>47,250</u></u>

25-26)

	₦'000	₦'000
Adjustment for non-cash items:		
Profit on Revaluation		2,440
Provision for Depreciation		(840)
Loss on sale of machinery		(140)
Profit on Sale of investment		<u>620</u>
Adjustment for non-cash items		<u>2,080</u>
Cash generated from operation before		
Add: Working capital changes		<u>3,540</u>
Profit for the year		<u><u>5,620</u></u>

Profit on sale of investment: $-2,440 + 840 + 140 + x$
 $-2,440 + 980 + x = -2,080$
 $-1,460 + x = -2,080$
 $x = -2,080 + 1,460$
 $x = -620$

Examiner's Report

The questions covered the entire subject syllabus. This section was well attempted by all the candidates as it was made compulsory for all of them.

SHORT ANSWER SOLUTION

1. Prudence
2. Dr. Profit or loss account; Cr. Non-Current Asset Disposal Account
3. 12.5%
4. Dr. Realization Expenses Account; Cr. Realization Account.
5. Short Workings
6. Purchase price plus Percentage of delivery expenses
7. Current ratio
8. Fair Value
9. Statement of profit or loss
10. Provision for depreciation on Non-Current Asset
11. Interest and depreciation
12. Current assets/Receivable
13. Work-in-progress
14. Branch Inventory Account
15. Substance over form
16. Credit
17. Equity = ₦150,000 and capital employed = ₦210,000
18. Dr: Drawings Cr Purchases
19. Accounting policies
20. Relevance and faithful representation

Workings

Q3 Profit margin = $\frac{1}{9}$
 Mark up = $\frac{1}{9} - 1$
 = $\frac{1}{8} \times 100$
 = 12.5%

Examiner's Report

The questions in this section were within the syllabus. It tested major knowledge on the Principle of Accounting

SECTION B SOLUTION

SOLUTION 1

The gap violated is:

- (i) Entity Concept- Every economic unit regardless of its legal form of existence, is treated as a separate entity from parties that have proprietary economic interest in it. Crain Enterprises violated concept by including in its bank balance personal investment made by the proprietor.
- (ii) Realization Principle- Profit or loss Account of a business enterprise should be prepared on accrual basis and not on cash basis. Crain and Arc Enterprises failed to recognize rent paid in advance.
- (iii) Historical Cost Principle- Cost is the appropriate objective basis for initial accounting recognition of all assets acquisitions. It also holds that subsequent to acquisition cost value are retained throughout the accounting process. Crain Enterprises using inflation accounting and Arc Enterprises using replacement cost violated historical cost principle.
- (iv) Historical cost principle. Break up or forced sale basis violated the cost principle. Arc enterprises using forced or break-up basis for the equipment violated cost principle.
- (v) Historical Cost Principle. The objective principle establishes the reason for recording assets at cost. The value of goodwill in the books of Crain Enterprises is the opinion of the proprietor and it is subjective and not objective. The subjectivity of value of goodwill means it rest upon the opinion of the one making the estimate.

Statement of Financial Position (Re-drafted) as at 31 December 2019

	Crain	Arc
	₦'000	₦'000
Motor Vehicle	950	950
Office Equipment	200	200
Trade Receivables	300	300
Prepayments	50	50
Bank Balance	250	250
	<u>1,750</u>	<u>1,750</u>
Capital	1,525	1,525
Trade Payables	225	225
	<u>1,750</u>	<u>1,750</u>

Schedule of Adjustment to the Statements of Financial Position

	Crain		Arc	
	N'000	N'000	N'000	N'000
Goodwill	500	-	-	
Goodwill rejected	<u>-500</u>		-	
Motor vehicle(MV)	1100		800	
Overvalued MV	-150			
Undervalued MV	-		<u>+150</u>	
		950		950
Office Equipment (OE)	-		250	
Over Valued OE			<u>-50</u>	200
Prepayments		50		50
Bank Balance	350		-	
Savings	<u>-100</u>		-	
		250		
Capital	2,225		1,375	
Goodwill	-500		-	
Overvalued MV	-150		-	
Undervalued MV	-		+150	
Savings	-100		-	
Overvalued OE			-50	
Prepayment	<u>+50</u>		<u>+50</u>	
	<u>1,525</u>		<u>1,525</u>	
Prepayments: (N 150,000/6) x 2 months = N 50,000				

Examiner's Report

The theoretical part of the question tests application of Generally Accepted Accounting Principles (GAAP) while the other part tests the combination of two enterprises statement of financial position.

About 70% of the candidates attempted the question and their performances were below average.

The major pitfalls of the candidates were their inability to properly understand the principle of GAAP. Candidates are advised to prepare well for the Institute future examination.

SOLUTION 2

Duru, Dike and Cosmos

Statement of Profit or Loss for the year ended December 31, 2019

	N'000	N'000	N'000
Revenue			46,500
<u>Cost of Sales:</u>			
Opening Inventory		4,200	
Purchases (W3)		<u>27,900</u>	
Available for Sales		32,100	
Closing Inventory		<u>(3,600)</u>	
Cost of Inventory Sold			<u>(28,500)</u>
Gross Profit			18,000
<u>Less: Operating Expenses</u>			
Depreciation on Shop Fittings (W10)		180	
Depreciation on Leasehold premises (W10)		290	
Salaries and Wages (W1)		5140	
Office and Trade Expenses (W7)		4,760	
Rent, Rates and Insurance (W6)		800	
Professional Charges (W9)		100	
Irrecoverable Debts (W4)		60	
Increase in Provision for Doubtful Debts (W5)		<u>50</u>	
Total Operating Expenses			<u>(11,380)</u>
Net Profit			6,620
<u>Appropriation:</u>			
Partner's Salary – Duru	1,000		
- Dike	500		
- Cosmos	<u>500</u>	<u>2,000</u>	
Interest on Capital:			
Duru (5% x 8,000)	400		
Dike (5% x 5,000)	250		
Cosmos (5% x 3,000)	<u>150</u>	<u>800</u>	<u>(2,800)</u>
Divisible Profit			3,820
<u>Share of Profit:</u>			
Duru - $5/10 \times 3,820 = 1910 - 148$		1,762	
Dike - $3/10 \times 3,820 = 1146 - 88$		1,058	
Cosmos - $2/10 \times 3820 = 764 + 236$		<u>1,000</u>	<u>(3,820)</u>
			NIL

Partner's Current Account

	Duru	Dike	Cosmos		Duru	Dike	Cosmos
	N'000	N'000	N'000		N'000	N'000	N'000
Drawings	2,360	1,500	1,200	Balance b/f	1,600	1,200	800
				Partner's Salary	1,000	500	500
				Interest on Capital	400	250	150
Balance c/d	2,402	1,508	1,250	Share of Profit	1,762	1,058	1,000
	4,762	3,008	2,450		4,762	3,008	2,450
				Balance b/d	2,402	1,508	1,250

Working Notes

Wk 1: Salaries & Wages **N'000**

Bal. as per Trial Balance	6,400
Drawings – Duru	(600)
Drawings – Dike	(360)
Drawings – Duru	<u>(300)</u>
Balance to SOPL	<u>5140</u>

Wk 2: <u>Drawings</u>	Duru	Dike	Cosmos
	N'000	N'000	N'000
Bal. as per T.B.	1,700	1,100	900
Salaries & Wages	600	360	300
Purchases	<u>60</u>	<u>40</u>	<u>-</u>
	<u>2,360</u>	<u>1,500</u>	<u>1,200</u>

Wk 3: <u>Purchases</u>	N'000
Bal. as per Trial Balance	28,000
Drawings – Duru	(60)
Drawings – Dike	<u>(40)</u>
Balance to SOPL	<u>27,900</u>

Wk 4: <u>Receivables</u>	N'000
Bal. as per Trial Balance	2,060
Irrecoverable Debt – SOPL	<u>(60)</u>
Balance to SOFP	<u>2,000</u>

Wk 5: <u>Provision for Doubtful Debts</u>	N'000
Bal. as per Trial Balance	50
Bal. c/f (5% x 2,000)	<u>100</u>
Increase in Provision to SOPL	<u>50</u>

Chief Examiner's Report

The question tests candidates' ability to prepare simple profit or loss statement and the Partners' Current Account, given a partnership business trial balance with other information.

About 80% of the candidates attempted the question and their performance were below average. Candidates' major pitfalls was their inability to treat goods withdrawn by partners for personal use. They are advised to practice many questions before sitting for the future examination.

SOLUTION 3

MOTOR VEHICLE ACCOUNT

		₦			₦
1/1/17	Trust MFB Ltd	<u>4,500,000</u>	31/12/17	Balance c/f	<u>4,500,000</u>
1/1/18	Balance b/f	<u>4,500,000</u>	31/12/18	Balance c/f	<u>4,500,000</u>
1/1/19	Balance b/f	<u>4,500,000</u>	31/12/19	Balance c/f	<u>4,500,000</u>

TRUST MICROFINANCE BANK LTD

		₦			₦
1/1/17	Bank (Deposit)	1,500,000	1/1/17	Motor vehicle a/c	4,500,000
31/12/17	Bank (1 st instalment)	1,650,000	31/1/17	H.P interest	900,000
31/12/17	Balance c/d	<u>2,250,000</u>			
		<u>5,400,000</u>			<u>5,400,000</u>
31/12/18	Bank (2 nd instalment)	1,650,000	1/1/18	Balance b/d	2,250,000
31/12/18	Balance c/d	<u>1,275,000</u>	31/12/18	H. P. interest	<u>675,000</u>
		<u>2,925,000</u>			<u>2,925,000</u>
31/12/19	Bank (3 rd instalment)	1,657,500	1/1/19	Balance b/d	1,275,000
		<u>1,657,500</u>	31/12/19	H.P. interest	<u>382,500</u>
					<u>1,657,500</u>

HIRE PURCHASE INTEREST

		₦			₦
31/12/17	Trust MFB Ltd	<u>900,000</u>	31/12/17	Profit or loss a/c	<u>900,000</u>
31/12/18	Trust MFB Ltd	<u>675,000</u>	31/12/18	Profit or loss a/c	<u>675,000</u>
31/12/19	Trust MFB Ltd	<u>382,500</u>	31/12/19	Profit or loss a/c	<u>382,500</u>

DEPRECIATION ACCOUNT

		<u>₦</u>			<u>₦</u>
31/12/17	Prov. for depreciation	<u>900,000</u>	31/12/17	Profit or loss a/c	<u>900,000</u>
31/12/18	Prov. for depreciation	<u>900,000</u>	31/12/18	Profit or loss a/c	<u>900,000</u>
31/12/19	Prov. for depreciation	<u>900,000</u>	31/12/19	Profit or loss a/c	<u>900,000</u>

PROVISION FOR DEPRECIATION ACCOUNT

		<u>₦</u>			<u>₦</u>
31/12/17	Balance c/d	<u>900,000</u>	31/12/17	Depreciation	<u>900,000</u>
31/12/18	Balance c/d	1,800,000	1/1/18	Balance b/d	900,000
			31/12/18	Depreciation	<u>900,000</u>
		<u>1,800,000</u>			<u>1,800,000</u>
31/12/19	Balance c/d	2,700,000	1/1/19	Balance b/d	1,800,000
			31/12/19	Depreciation	<u>900,000</u>
		<u>2,700,000</u>			<u>2,700,000</u>
			1/1/2020	Balance b/d	2,700,000

BANK ACCOUNT (Extract)

		<u>₦</u>
	1/1/17 Nwadike express	1,500,000
	31/12/17 Nwadike express	<u>1,650,000</u>
		<u>3,150,000</u>
	31/12/18 Nwadike express	<u>1,650,000</u>
	31/12/19 Nwadike express	<u>1,657,000</u>

PROFIT OR LOSS (Extract)

		<u>₦</u>
31/12/17	H.P. interest	<u>900,000</u>
31/12/18	H.P. interest	<u>675,000</u>
31/12/19	H.P. interest	<u>382,500</u>

Examiner's Report

The question tests candidates' knowledge on how to prepare appropriation accounts under Hire purchase contract in the books of the Hirer. About 50% of the candidates attempted the question. Their performance was very poor. Major pitfalls of the candidates were poor understanding of this topic. Candidates are advised to prepare very well for future examination.

SOLUTION 4

- a. Inventories are described as assets that are held for sale in the ordinary course or consumed in the production process or in rendering of services. Examples are finished goods, raw materials and work-in-progress and stores, spare parts and consumables.

According to the provision of IAS 2 on Inventory, Inventories are required to be measured at lower of cost and net realizable value.

Inventory costs do not include:

- i) General and administration cost
- ii) Selling and distribution cost,
- iii) Abnormal cost of wastage material, labour and other production overheads,
- iv) Storage cost that are not related to production.
- v) Interest and other borrowing costs
- vi) Foreign exchange fluctuation on inventories purchased with foreign currency,
- vii) The difference between the cost of purchase and the normal credit terms.

- b. ECOWAS Limited

<u>Computation of Value of Closing Inventory</u>			
Items	Cost	Net Realisable Value (NRV)	Lower of Cost and NRV
	L\$'000	L\$'000	L\$'000
X	576	640	576
Y	448	384	384
Z	736	768	<u>736</u>
			<u>1,696</u>

- c. Jagajaga Limited

Computation of closing value of inventory at the December 31, 2019

	L\$	L\$	L\$
Balance as per the account			6,956,820
Less:			
Inventory destroyed after the inventory count		92,800	
Written down of Inventory damaged:			
Cost (A)	<u>59,600</u>		
Expected Selling Price	48,200		
Expected further cost to enable sales	<u>(13,600)</u>		
Net Realisable Amount (B)	<u>34,600</u>		
Written down value (A-B)		<u>25,000</u>	<u>(117,800)</u>
Revised Value of Closing Inventory			<u>6,839,020</u>

Examiner's Report

The question tests candidates' knowledge on IAS 2, particularly on valuation of inventories at the year end, while the (a) part of the question tests their knowledge on the definition and identification of relevant inventory costs.

About 90% of the candidates attempted the question and their performances were very poor. Major pitfalls of the candidates were poor preparation for the examination. Candidates are advised to always prepare adequately before sitting for the examination.

SOLUTION 5

<u>Anjo Limited</u>			
<u>Computation of Gearing Ratio and Interest Cover for the year 2020 and 2019</u>			
		<u>2020</u>	<u>2019</u>
(i) Gearing Ratio = $\frac{\text{Long term Debt}}{\text{Long Term Fund}} \times 100$		$\frac{50,114}{70,545} \times 100$	$\frac{46,780}{86,184} \times 100$
		= <u>71.04%</u>	= <u>54.28%</u>
(ii) Interest cover = $\frac{\text{Profit Before Interest and Tax}}{\text{Interest charged for the year}}$		$\frac{6,440}{14,300}$	$\frac{30,519}{10,200}$
		= <u>0.45 times</u>	= <u>2.99 times</u>

b. Comment on the changes in gearing ratio and interest cover of Anjo Limited

Gearing ratio measures the degree of financial risk a company is exposed to. It is a measure of ownership control risk. Anjo Limited been a lowly geared company has it's gearing ratio increase from 54.28% in 2019 to 71.04% in 2020 due to an increase in the company Non-Current Liabilities and a decrease in the equity and reserve of the company for the same year.

Interest cover measures the ability of the company to meet its obligations to pay interest. It shows the average number of times interest expenses is covered by available earning. From the above interest cover computation, the average number of times interest expenses is covered decrease from 2.99 times in 2019 to 0.45 times in 2020 which suggests that the company could be at risk from too much debt in relation to the amount of profits it is earning.

Examiner's Report

The question tests candidates' knowledge on computation of accounting ratios with simple interpretations. About 40% of the candidates attempted the question and their performances were poor. Candidates' major pitfalls were poor understanding on how to compute the required accounting ratios and poor interpretations.

Candidates are advised to prepare adequately before writing future examinations.

SOLUTION 6

No-Regret Engineering Limited

Contract Account No 245

	₦'000		₦'000
Work in progress b/f	3,375.00	Plant value - 31 August, 2019	90.00
Inventories of materials - 1 Sept. 2018	22.50	Work certified	4,500.00
Plant value - 1 Sept. 2018	450.00	Work in progress c/d	93.50
Labour charge during the year	225.00		
Materials charged during the year	202.50		
Overheads charged during the year	112.50		
Accrued Expenses c/d	22.50		
Profit taken	273.50		
	<u>4,683.50</u>		<u>4,683.50</u>
Plant value - 31 August, 2019	90.00	Accrued Expenses b/d	22.50
Work in progress c/d	93.50		

Working Notes

Wk 1: Determination of Notional Profit

₦'000

Contract Price	4,725
Cost to date (4,410 – 90)	<u>4,320</u>
Notional Profit	<u>405</u>

Wk 2: Determination of Profit to date

Lower of:

(a) Profit to date = Cost to date/Total Cost x Notional Profit

$$= 4,320/4,410 \times 405 = \underline{\underline{\text{₦}396}}$$

(b) Profit to date = Value of work certified/Contract Price x Notional Profit

$$= 4,500/4,725 \times 405 = \underline{\underline{\text{₦}385.71}}$$

Wk 3: Profit Recognised for the year

₦'000

Profit to date	386
Profit b/f	<u>(112.5)</u>
	<u>273.5</u>

bi.	<u>Valuation of work-in progress</u>	
	Using Cost Method:	N
	Cost of work to date plus profit	4,675,714
	Cash Received	<u>4,275,000</u>
	Work in Progress at cost as at 31 Aug. 2019	<u>400,714</u>
bii.	Using Architectural Method	
	Work Certified by Architect	4,500,000
	Cash received	<u>4,275,000</u>
	Work-in-progress at Net Realizable Value	<u>225,000</u>

	Workings		
		N	N
Contract Price			4,725,00
Less: Expenditure on Contract to date	4,320,000		
(N4,410,000 – 90,000)			
Less: Profit already taken	<u>112,500</u>		<u>4,207,500</u>
Apparent Profit			<u>517,500</u>

Profit to be taken for the year; (~~N~~4,275,00 x ~~N~~517,500) ÷ ~~N~~4,725,000 = ~~N~~468,214

Note: The contract is nearing completion

Valuation of Work-in-progress

Examiner's Report

The question tests candidates' knowledge on the preparation of contract account, while part (b) of the question tests their knowledge on the valuation of work-in-progress using cost and architectural method as it will be shown on the financial position of the contractor.

About 20% of the candidates attempted the question and their performances were poor. Major pitfalls of the candidates were poor understanding of this topic. Candidates are advised to prepare very well for the Institute future examination.

**ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA
ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA
PART II EXAMINATIONS – SEPTEMBER 2020**

PUBLIC SECTOR ACCOUNTING

Time Allowed: 3 hours

SECTION A: PART I 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. Instituting a sound internal control system in the public sector is one of the functions of
 - A. Officer controlling expenditure
 - B. Sub accounting officer
 - C. Role player
 - D. Accounting officer
 - E. Internal Auditor
2. Which of the following is **NOT** an objective of the Treasury Single Account (TSA)?
 - A. Ensure cash availability
 - B. Eliminate operational inefficiency and cost associated with maintaining multiple bank accounts
 - C. Block loopholes in revenue management
 - D. Ensure job stability
 - E. Establish an efficient collection and disbursement mechanisms for government funds
3. Which of the following is responsible for the administration of inter governmental financial transaction?
 - A. Revenue collector
 - B. Minister of Finance
 - C. Accountant General of the Federation
 - D. Auditor
 - E. Federal Pay Officer

4. The following documents are required to accompany a contract payment voucher, **EXCEPT**
- A. Copy of the Tender Board meeting where contract was approved
 - B. Copy of letter of award or contract
 - C. Certificate of completion of contract
 - D. Copy of contract agreement and details
 - E. Copy of reference letter stating the status and age of the contactor
5. Which of the following commission is responsible for compelling any person or Government institution to disclose information relating to Public revenue and expenditure?
- A. Security Service Commission
 - B. Audit Committee
 - C. Economic and Financial Crimes Commission
 - D. Public Complaints Commission
 - E. Fiscal Responsibility Commission
6. The following are required as needful for budgeting, **EXCEPT**
- A. Planning
 - B. Motivation
 - C. Communication
 - D. Auditing
 - E. Standard measure of performance
7. A development plan spanning a period of not less or greater than 5 years is called
- A. Perspective Plan Budgeting System
 - B. Planning Program Budgeting System
 - C. Program Performance Budgeting System
 - D. Input Budgeting System
 - E. Input-Output Budgeting System
8. The following are the roles of the Director of Finance in the Ministries, Extra-Ministerial Department and Agencies on the Treasury Single Account, **EXCEPT**
- A. Ensure that proper books of Revenue Accounts are maintained
 - B. Ensure prompt issuance of receipts for remittances paid through the e-collection
 - C. Abide by the provisions of the Memorandum of Understanding with Stakeholders
 - D. Ensure that internally generated revenue is not diverted
 - E. Ensure that returns on revenue performance are rendered promptly

9. Which of the following Legal and Financial Frameworks is **NOT** applicable to Public Sector Accounting?
- A. Companies and Allied Matters Act, Cap C20, LFN 2004
 - B. Public Procurement Act, 2007
 - C. Fiscal Responsibility Act 2007
 - D. 1999 Nigerian Constitution (as amended)
 - E. Financial Rules and Regulations
10. Which of the following is **NOT** a Non-Oil Revenue?
- A. Returns on Investments
 - B. Broadcasting and Television
 - C. Royalties on Mining Right
 - D. Stamp Duty
 - E. Tariffs
11. Revenue Collector is issued an officialfor the regular collection of particular items of revenue as specified in the estimate.
- A. Treasury Receipt Book 6A
 - B. Treasury Receipt Book 6
 - C. Treasure Receipt Book
 - D. Treasure Receipt Book A6
 - E. Treasury Receipt Book A
12. Which of the following are **NOT** used as vouchers for receipt of funds and payment of financial transactions?
- I. Treasury Form (TF 6)
 - II. Treasury Form (TF 1)
 - III. Treasury Form (TF 27)
 - IV. Treasury Form (TF 153A)
- A. I, II and III
 - B. II, III and IV
 - C. III, I and II
 - D. III and II
 - E. II and I
13. The revenue allocation system in Nigeria has been criticised for
- A. High concentration of revenue in the coffer of the Federal Government
 - B. Stabilisation of prices
 - C. Inadequate revenue generation
 - D. Continuity of government services
 - E. Tax effort

14. A procuring entity may **NOT** carry out emergency procurement where
- A. Goods, works or services are only available from a particular supplier or contractor
 - B. There is urgent need for the goods, works and services
 - C. There is a catastrophic event
 - D. There is an alternate source within the system to take care of the emergency
 - E. There is procuring entity on matter concerning national security
15. Which of the following uses monetary and fiscal measures of control over public expenditure?
- A. Judiciary
 - B. Legislature
 - C. Executive
 - D. Accountant-General of the Federation
 - E. Auditor-General for the Federation
16. Fund which are held and managed by the government as custodians and trustees are known asfunds
- A. Custodian
 - B. Revolving
 - C. Proprietary
 - D. General
 - E. Fiduciary
17. The accounting standards applicable to Government Business Enterprises (GBEs) is
- A. IPSAS
 - B. IAS
 - C. FIRS
 - D. SIRS
 - E. IFRS
18. In evaluation of bids, the Tender Committee shall **NOT** examine
- A. Conformity with minimum requirements stipulated in the bid document
 - B. Political Status of directors in the bid
 - C. That they have been duly signed
 - D. That they are substantially responsive to bid document
 - E. That they are generally in order
19. Government makes use of the following vouchers in Government store, **EXCEPT**

- A. Tally Card
 - B. Store Issue Voucher
 - C. Store Ledger
 - D. Store Survey Sheet
 - E. Store Register Book (for Petrol and Diesel)
20. According to Section (9) of the Pension Reform Act 2014, as amended, the ratio of contribution by Employee: Employer in the private and public sector is
- A. 7.5% : 7.5%
 - B. 8% : 7.5%
 - C. 8% : 10%
 - D. 10% : 7.5%
 - E. 10% : 8%
21. Which of the following best describes the Composition of the Board of Survey?
- A. The President and not less than one member
 - B. The President and not less than two members
 - C. The President and not less than three members
 - D. The President and not less than four members
 - E. The President and not less than six members
22. The Financial Management functions of the GIFMIS will cover the entire Financial Management including the following, **EXCEPT**
- A. Budget Preparation
 - B. Budget Financing
 - C. Budget Maintenance and Management
 - D. Budget Execution and Treasury Management
 - E. Budget Execution Reporting
23. Grants made by the central government to Local Government authorities to compensate for their lack of or poor taxable capacity is called
- A. Consolidated Revenue Fund
 - B. Development Fund
 - C. Capital Grants
 - D. General Grants
 - E. Development Grant

24. The account maintained by the Pension Fund Administrator for all beneficiaries of Pension Fund is called
- A. Pension Fund Account
 - B. Retirement Savings Account
 - C. Retirement Account for Savings
 - D. Retirement Benefits Accounts
 - E. Pension Fund Administrators Accounts
25. One of the advantages of Audit is that management attention is focused on the strength and weakness of
- A. Attending the Board meetings
 - B. The fiscal policy of the government
 - C. The appropriation bills
 - D. The Board of Directors
 - E. The system of internal control
26. Fundamental principles underlying the preparation of financial statements include the following, **EXCEPT**
- A. Consistency of presentation
 - B. Accrual basis of accounting
 - C. Going concern assumption
 - D. Materiality
 - E. First-in first-out principle
27. The department that is charged inter-alia, with the responsibility of production and publication of the accounts of the Federal Government of Nigeria is
- A. The Treasury Department of the federal ministry of finance
 - B. The Administration Department
 - C. The Budget Department
 - D. The Central-pay office of the ministry
 - E. Printing corporation
28. Which of the following is **NOT** an advantage of adopting IPSAS in Nigeria?
- A. Ensure credibility, integrity and transparency
 - B. Improve accountability and transparency
 - C. Uniformity and comparison of data
 - D. Improve political acceptability of Government
 - E. Provide easy access for EFCC and ICPC to eradicate corruption

29. When the permanent Board of Survey and Enquiry is sitting as a Board of Survey, the Board shall
- I. Defer its sitting owing to the fact that criminal proceedings are pending in connection with the loss.
 - II. Investigate loss of stores and unserviceable stores
 - III. Not survey end-of-year Accountant-General's and Sub-Treasury's cash balances
- A. II
 - B. I and III
 - C. III
 - D. II and III
 - E. I, II and III
30. Which of the following is **NOT** a recurrent expenditure?
- A. Petrol expenses
 - B. Stationeries
 - C. Motor-Vehicle repairs
 - D. Transport expenses
 - E. Purchase of Motor Vehicle

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 specific provisions of Section 83 and 162 of the 1999 Constitution are and
2. The documents used to support stores and materials issued within the same store for conversion or manufacture are called.....
3. The imprest that is retired immediately the purpose for which it is set, is achieved is referred to as.....
4. Where there is loss of Government funds of ₦50,000 or less without fraud being involved, are personally empowered to surcharge the officers responsible up to the full amount of the loss.

5. Documents issued by the Accountant-General to introduce new financial policies and guidelines or amend existing ones are known as
6. An “Accrual Basis” in Public Sector Accounting is
7. Tax Revenue is
8. Payment or Expenditure Voucher are classified into and
9. An accounting basis that recognises revenue on cash basis and expenditure on accrual basis is called
10. An Officer to whom the control of sub-head or specified portion of sub-head has been delegated by the Accounting Officer is called.....
11. For a Local Government, the Chief Accounting Officer is:
12. Public Procurement Act establishes two organisations, namely..... and
13. The President of the Board of Enquiry is responsible for transmittingcopies of proceedings and report.
14. Any service duly recognised by the Ministry of Establishment is called
15. A continuous process which reviews the set – targets and holds the budget holders to account is termed
16. A summary of total receipts and payments as posted in the cashbook of a self - accounting unit is called.....
17. Sources and Application of fund is now known asunder the International Public Sector Accounting Standard.
18. The appointment of the Auditor-General for the Federation is done by
19. Under cash flow accrual basis of accounting, the two methods of preparing cash flow statements are and
20. The committee of the National Assembly which is responsible for the handling of queries raised by the Auditor-General is

SECTION B**ATTEMPT ANY FOUR QUESTIONS****(50 MARKS)****QUESTION 1**

Federation Accounts Allocation Committee (FAAC) was set up by allocation of revenue Act, CAP A15 LFN 2004 to deliberate upon and allocate funds from the Federation Account to the three tiers of Government- Federal, State and Local Governments.

Required:

- a.
 - i. List **TEN** members of Federation Accounts Allocation Committee (FAAC) Technical Session (5 Marks)
 - ii. State **FOUR** functions of the Technical Session (2 Marks)
 - b.
 - i. State the main difference between a Federation Account and a Federal Government Account (2 Marks)
 - ii. List **SEVEN** charges to Federal Government Account (3½ Marks)
- (Total 12½ Marks)**

QUESTION 2

- a. What is a Voucher? (1 Mark)
- b. List the various Forms or Natures of Vouchers used for e-banking financial transactions with examples, in the Public Financial Management. (2½ Marks)
- c. State **FOUR** reasons for maintaining DVEA Book (2 Marks)
- d. The following financial information was extracted from the on-line Vote Book of the Federal Ministry of Agriculture with the Head Codes 035 on Sub-Head 0337 –Office Materials and Supplies for the month of July, 2019

31st July, 2019**₦ Million**

Total Expenditure	12,000
Total Balance	36,000
Total Outstanding	6,000
Balance Available	30,000

Additional Information

(1) On 2nd August, 2019 a previous liability of ₦2,000 was settled for ₦2,600

(2) On 3rd August, 2019 another liability of ₦2,000 was settled for ₦1,600

Required:

- i. Determine the balance available on 3rd August 2019 and comment on the accuracy of your result on suitable Vote Book
- ii. Determine the authorised vote or allocation for the month (7 Marks)

NOTE: Ignore the Three Line Nos Columns

(Total 12½ Marks)

QUESTION 3

- a. Explain the term Commercialisation with **TWO** relevant examples? (3 Marks)
- b. What are the commercialisation functions of the Bureau of Public Enterprises? (5 Marks)
- c. Briefly discuss the powers of the permanent secretary under procurement and contract award matters in the Public Service (4½ Marks)

(Total 12½ Marks)

QUESTION 4

- a. Briefly state **FIVE** conditions for granting retirement benefits with immediate effect for public servants (7½ Marks)
- b. What are the requirements for withdrawal from Retirement Savings Account? (5 Marks)

(Total 12½ Marks)

QUESTION 5

- a. State **FIVE** characteristics of Public Sector Accounting (PSA) that makes it fundamentally different from private sector accounting. (5 Marks)
- b. List **FIVE** statutory payments permissible from Consolidated Revenue Fund. (5 Marks)
- c. List **FIVE** documents that must accompany a contract payment voucher. (2½ Marks)

(Total 12½ Marks)

QUESTION 6

- a. IPSAS 5 on borrowing costs prescribes the accounting treatment for borrowing costs. Using the Alternative Treatment which says “Borrowing costs that are directly attributable to the acquisition, construction or production of a qualifying asset shall be capitalised as part of the cost of that assets”. From the information given below.

On January 1, 2016 MOTUNRAYO'S municipal Government began construction of homes for the victims of the tsunami disaster that were homeless. The construction is expected to take 3.5 years and financed by issuance of bonds for ₦14m at 12% p.a. Stationery purchased was ₦1.5m. The bonds were issued at the beginning of the construction and carry a 1.5% issuance cost. There was no disruption in construction all through the year.

You are required to:

Compute the borrowing costs that need to be capitalised in 2016 under IPSAS 5.

(Note: Use straight line method for amortisation of issuance costs)

(5 Marks)

- b. State **THREE** examples of qualifying assets and **TWO** examples that are not qualifying assets under IPSAS 5 on borrowing costs.

(7½ Mark)

(Total 12½ Marks)

SOLUTIONS

Multiple Choice Questions

1. D
2. D
3. B
4. E
5. E
6. D
7. A
8. C
9. A
10. C
11. A
12. B – Bonus – No answer provided – Correct answer is “iv” only, which is not among the options
13. A
14. D
15. C
16. E

- 17. E
- 18. B
- 19. D
- 20. C
- 21. B
- 22. B
- 23. D
- 24. B
- 25. E
- 26. E
- 27. A
- 28. D
- 29. B
- 30. E

EXAMINER'S REPORT

This is a compulsory 30 multiple choice questions that covers the entire segment of the syllabus. This section was 100% attempted by the candidates about 75% scored above 60% of the marks allocated.

SHORT ANSWER QUESTIONS

1. Contingencies fund; Federation Accounts
2. Stores Conversion note
3. Special Imprest
4. Accounting Officer
5. Treasury Circulars or Treasury Guidelines
6. Accrual Basis: Is an accounting basis that records revenue when earned and recognises expenditure when incurred.
7. (i) Main source of Government Revenue or
(ii) Revenue collected from individuals in their private capacities and organizations.
8. Payment or (Expenditure) Voucher
(i) Recurrent Payment Voucher (TF 1) and
(ii) Capital Payment Voucher (TF 27)
9. Modified Accrual Basis
10. Officer Controlling Expenditure
11. The Local Government Chairman
12. National Council on Public Procurement and Bureau of Public Procurement
13. 5 Copies
14. Public Service

15. Budgetary Control
16. Transcripts
17. Cash flow statement
18. President of the nation
19. Direct and indirect methods
20. Public Accounts Committee

EXAMINER'S REPORT

This part consisted of 20 compulsory questions which covers the entire syllabus. It requires candidates to write the correct answer that best completes each of the questions. There was about 99% attempted and over 70% scored above 60% of total marks obtainable.

SOLUTION 1

A. i. Ten members of the Technical Section of FAAC

- a. Accountant General of the Federation – Chairman
- b. States Accountant General
- c. Representatives of the following Agencies;
Nigeria National Petroleum Corporation, Federal Inland Revenue Service, Nigeria Customs Service, Department of Petroleum Resources, Revenue Mobilization Allocation and Fiscal Commission, Federal Ministry of Finance, Central Bank of Nigeria, National Planning Commission, Office of States and Local Government affairs, Office of the Vice President, Directorate of Military Pension, Office of Head of Service of the Federation, Department of Civil Pensions.

A. ii. Four functions of the Technical section

- a. To consider the accounting returns of revenue collecting Agencies
- b. To deliberate and consider the revenue available for distribution
- c. To make recommendation to the plenary session for the adoption of the revenue to be shared to the three tiers of the Government
- d. To consider any other issues sent from the plenary session

B. i. Federation Account:

Established by Section 162 of the 1999 Constitution of the Federal Republic of

Nigeria. Federation Account is one into which shall be paid all revenue collected by the Federal Government except proceeds from the Pay As You Earn of the personnel of the Armed Forces of the Federation, Nigeria Police, Foreign Service Officers and residents of the Federal Capital Territory, Abuja

It is a distributable pool account from which allocations are shared among the three tiers of Government - Federal, State and Local Governments using the revenue allocation formula.

Federal Government Account:

This is also known as the Consolidated Revenue Fund (CRF).

It was established by Section 80 of the Constitution of the Federal Republic of Nigeria 1999 as amended, except revenue items specifically designated to other funds, all others shall be paid into the Consolidated Revenue Fund.

B. ii. Charges to the Federal Government Account

- a. All Recurrent Expenditure Heads in the approved estimates e.g. Personnel cost, Overhead Cost and Servicing National debt.
- b. Salaries and Consolidated allowances of statutory officers. Commissioners of:
Police Service Commission, Public Complaint Commission, Public Service Commission, Nigeria Law Reform Commission, Independent National Electoral Commission, Auditor General for the Federation, President and Justices of the Federal Court of Appeal, Chief Judge and Judges of the Federal High Court, Chief Justice and the Justices of the Supreme Court, Pension and Gratuity of Statutory and non statutory officers including the members of the armed forces (Any seven points)

Examiner's Report

This question tested the candidates' understanding of; Federation Accounts Allocation Committee; Functions of the Technical Session; Main difference between a Federation Account and a Federal Government Account as well as, charges to Federal Government Account. About 90% of the candidates attempted this question and about 80% scoring above 50% of the marks allocated.

SOLUTION 2

- (a) Voucher: - is a documentary evidence of payment or receipt of money which is available for future reference, accounting and auditing purposes.

OR

Voucher: - is the document that serves as evidence of receipt or disbursement of government money, with adequate authority and procedures.

(b) **Natures/Forms or Classes of Vouchers**

The various forms or natures or classes of Vouchers

1. Receipt or (Revenue) Voucher

- (i) Treasury Receipt Booklet (TF 6)

2. Payment or (Expenditure) Voucher

- (i) Recurrent Payment Voucher (TF 1) and
(ii) Capital Payment Voucher (TF 27)

3. Adjustment (Journal) Voucher

- (i) Principal Journal Voucher (PJV)
(ii) Supplementary Journal Voucher (SJV)

(c) **Reasons for keeping Departmental Vote Expenditure Allocation Book**

The reasons for keeping Departmental Vote Expenditure Allocations Book are:-

- (i) To have absolute control over expenditure
(ii) To prevent any reckless spending or abuse of vote in a Ministry or Department
(iii) To ensure that votes meant for a particular expenditure are not channeled to other expenditures which are not provided for in the approved Budget
(iv) To reveal balances available
(v) To show all commitment and outstanding liabilities
(vi) To review uncommitted balances at a glance.

(d) **METHOD 1: VOTE BOOK METHOD**
COMPUTATION OF VOTE BOOK

MDA: *Ministry of Agriculture

Head Code: 035 *

Sub-Head Code: 0337

SW/AIE/RIE/ No.....

AMOUNT:(N).

Service: **Office Materials and Supplies***

Expenditure					Liability						
Date	PV	Particulars	Payment	Total	Bal	Ref	Incur	Clear	Outstand.	Remark	Bal Avail
			₦	₦	₦			₦	₦	₦	₦
31/7/19		Bal B/d		*12,000	*36,000				*6,000		*30,000
2/8/19		Underestimation	2,600	*14,600	*33,400			2,000	*4,000	*LESS ₦600	*29,400
3/7/19		Overestimation	1,600	*16,200	*31,800			2,000	*2,000	*ADD ₦400	*29,800

OR

METHOD 2: Using: **ARITHMETICAL OR MATHEMATICAL METHOD**

(a) The authorized vote or allocation for the month:

$$\begin{aligned}
 \text{Allocation} &= \text{Column Exp. Total} + \text{Exp. Balance} \\
 &= 12,000 + 36,000 \\
 \text{Allocation} &= \underline{\text{N48,000}}
 \end{aligned}$$

OR

$$\begin{aligned}
 \text{Allocation} &= \text{Column Exp. Total} + \text{Outstand} + \text{Bal. Available} \\
 &= 12,000 + 6,000 + 30,000 \\
 \text{Allocation} &= \underline{\text{N48,000}} \\
 \text{On 3rd August, 2019:} \\
 \text{Allocation} &= 16,200 + 31,800 \\
 &= \text{N48,000} \\
 \text{Balance Available} &= \text{Allocation} - (\text{Column Exp.Total} + \text{Outstanding}) \\
 &= 48,000 - (16,200 + 2,000) \\
 &= 48,000 - 18,200 \\
 \text{Balance Available} &= \underline{\text{N29,800}}
 \end{aligned}$$

***Comment:**

The Federal Ministry of Agriculture was prudent in the expenditure pattern by recovering N400,000 to the treasury which resulted into the Balance Available of N29,800

Examiner's Report

The question was divided into 4 parts; "a" – "d". The Part "a" & "b", tested the candidates understanding of the term Voucher as well as forms of Vouchers used for e-banking in the Public Financial Management. Part "c" & "d" tested their knowledge of DVEA BOOK and an extract from a Vote Book requesting the candidates to determine the Balance Available and the Authorised Vote or allocation for the period. About 70%

of the candidates attempted this question. Performance was fair as about 50% scoring above 50% of marks allocated.

SOLUTION 3

- 3a Commercialisation is the re-organization of enterprises wholly or partly owned by the government such that these enterprises operate as profit-making (commercial) ventures and without subventions from the government.

OR

Commercialisation can be defined as the process of making an enterprise self-accounting and self sustaining instead of depending on the government for funding.

Examples: The commercialization of NEPA to PHCN, Nigeria Telecommunication (NITEL) to Nigeria Telecom (NTEL) Company, NNPC, Nigeria Railway Corporation and Nigeria Port Authority.

3b Commercialization functions of the Bureau of Public Enterprises (BPE)

The functions of the Bureau in respect of commercialization are to:-

1. implement the Council's policy on commercialization;
2. prepare public enterprises approved by the Council for commercialization;
3. advise the Council on further public enterprises that may be commercialized;
4. ensure the updating of the accounts of all commercialized enterprises to ensure financial discipline;
5. ensure the success of the commercialization exercise and monitor, on a continuous basis for such period as may be considered necessary, the operations of the public enterprises after commercialization;
6. review the objectives for which public enterprises were established in order to ensure that they adapt to the changing needs of the economy;
7. ensure that public enterprises are managed in accordance with sound commercial principles and prudent financial practices;
8. interface with the public enterprises, together with the supervising Ministries, in order to ensure effective monitoring and safeguard of the public enterprises managerial practices;
9. ensure that the Board and Management of each commercialized enterprise and the Government of the Federation keep to the terms and

- conditions of the Performance Agreements, if any, between the public enterprise concerned and the Government of the Federation;
10. maintain and review on a continuous basis, any Performance Agreement between a public enterprise and the Government of the Federation;
 11. evaluate and recommend to the Council whether or not a public enterprise is eligible for funding through grants, loans, subventions or equity; and
 12. Perform such functions with respect to commercialization as the Council may, from time to time, assign to it.
- 3c Powers of the Permanent Secretary under procurement and contract award matters in the Public Service:
- i. Finance circular No 15775 of 27/6/01 states that contract of works, services and purchases of up to ₦ 1,000,000 may be approved by the Permanent Secretary/Chief Executive of the Ministry without an open tender.
 - ii. Preside over the activities of their Tenders Boards for the proper planning and evaluation of tenders and execution of procurements;
 - iii. Ensure that adequate appropriation is available for procurements in their annual budget;
 - iv. Integrate their entity's procurement expenditure into its yearly budget;
 - v. Ensure the establishment of a procurement planning committee over whose activities they shall preside;
 - vi. Constitute a procurement evaluation committee for the efficient evaluation of tenders;
 - vii. Constitute a Procurement Committee;
 - viii. Render annual returns of procurement records to the Bureau of Public Procurement;
 - ix. Liaise with the Bureau of Public Procurements to ensure the implementation of its regulations; and
 - x. Ensure compliance with the provisions of the Public Procurement Act by their organizations, failing which they shall be personally liable for any breach or contravention thereof, whether or not such breach or contravention was caused by them in person, their subordinates or any person to whom they may have delegated their responsibilities.

Examiner's Report

The question was divided into 3 parts (a – c). Parts “a” & “b” tested the candidates’ understanding of the term - commercialisation as well as the functions of the Bureau of Public Enterprises under commercialization. While Part “c” tested their understanding on the powers of the Permanent Secretary under Procurement and Contract Award Matters in the Public Service. Only about 10% of the candidates

attempted this question. Performance was very poor as less than 20% scoring above 50% of marks allocated.

SOLUTION 4

- a) Conditions for granting retirement benefits with immediate effect for public servants are:
 - i) On Voluntary retirement for the purpose of facilitating improvement in the department.
 - ii) On compulsory retirement on attaining the retirement age of 60 years.
 - iii) On health grounds
 - iv) On total permanent disability while in Service
 - v) Abolition of office
 - vi) Public interest

- b) Requirement for withdrawal from Retirement Savings Account.
 - i) Where the employee retires before the age of 50 years in accordance with the terms and conditions of his employment, he shall be entitled to make withdrawals.
 - ii) Withdrawal is not allowed until the attainment of 50 years
 - iii) An officer retired and is less than 50 years on the advice of suitably qualified physician or properly constituted Medical Board, certifying that the employee is no longer mentally and physically capable of carrying out the function of his office may withdraw.
 - iv) If the officer is retired due to his total or permanent disability either of mind or body.

Examiner's Report

The question tested Candidates' Knowledge on conditions for granting retirement benefits as well as on requirements for withdrawal from Retirement Savings Account. About 60% of the candidates attempted this question and about 30% scored above 60% of marks allocated.

SOLUTION 5

5a Five characteristics of Public Sector Accounting (PSA) that makes it different from Private Sector

S/N	Characteristics	Private sector	Public sector
1	Objectives	To maximize profit	Provision of free or affordable welfare services
2	Accounting Basis	Accrual Basis	Cash Basis
3	Income/Revenue	Income is from the sales of goods and services	Income is from taxes, fines, fees, custom duties, etc
4	Accountability	Responsible to stake/shareholders	Responsible to the citizens
5	Treatment of Cost of Fixed Assets	The cost is spread over the estimated useful life of the Asset	Written off after payment or in the year of purchase
6	Formation/Establishment	Registration through Corporate Affairs Commission	Formed through Enabling Act
7	Auditing	By Chartered Accountants firms	Audited by Auditor General
8	Accounting Standards	IFRS	IPSAS

5b Statutory Payments Permissible from The Consolidated Revenue Fund

The charges to the Consolidated Revenue Fund are grouped as follows:

1. **All Recurrent Expenditure Heads in the approved estimates**, e.g. personnel cost, overhead cost and servicing of national debts.
2. **Salaries and Consolidated Allowances of Statutory Officers:** These are expenditure chargeable directly to the Consolidated Revenue Fund, irrespective of budget approval. Statutory Officers include:
 - (i) Commissioners of the following Bodies:
 - Police Service Commission.

- Public Complaints Commission
 - Public Service Commission
 - Nigerian Law Reform Commission
 - Independent National Electoral Commission
- (ii) Auditor - General for the Federation
 - (iii) President and Justices of the Federal Court of Appeal
 - (iv) Chief Judge and Judges of the Federal High Court
 - (v) Chief Justice and Justices of the Supreme Court.
3. Pension and Gratuity: These are the entitlements of both statutory and non-statutory officers, including members of the Armed Forces.

5c Documents Accompanying a Contract Payment Voucher

The following documents are required to accompany a contract payment voucher:

- i. The minutes of the meeting of the Tenders Board that awards the contract. This is to ascertain that the contract amount is within the range of the Tenders Board.
- ii. Certificate of completion of the contract. This is issued by a competent Field Engineer or Surveyor.
- iii. Copy of the contract agreement to show that the terms are fully complied with.
- iv. Letter of award of the contract.
- v. Delivery Note or Stores Receipt Voucher (SRV) where the contract is supply of items.
- vi. A waybill, and/or invoice issued by the contractor.

Examiner's Report

The question tested Candidates' Knowledge and understanding of basic characteristics that differentiates between Public Sector Accounting and Private Sector Accounting. It also required Candidates to list documents that need to accompany a contract payment voucher. About 75% of the candidates attempted this question and more than 60% scored above 50% of total marks allocated.

SOLUTION 6

6a. TUNRAYOS MUNICIPAL

Computation of the Borrowing Costs that needs to be capitalized in 2016 under IPSAS. 5

	*	₦ 000
i. Interest on ₦=14m bonds (₦ 14,000,000 x 12%)		1,680 *
ii. Amortization of issuance costs (Using straight line method) (1.5% x ₦ 14,000,000)/ 3 ½ years *		<u>60 *</u>
Total borrowing to be Capitalized		<u>1,740 *</u>

6bi. Examples of qualifying assets are;

1. Office buildings
2. Hospitals
3. Infrastructure assets such as;
 - i. Roads
 - ii. Bridges
 - iii. Power generation facilities
4. Inventories that require a substantial period of time to bring them to a condition ready for use or sale.

6bii. Examples of Assets that are not Non-qualifying Assets are;

1. Other investments
2. Those assets that are routinely produced over a short period of time
3. Assets that are ready for their intended use or sale when acquired also are not qualifying assets.

Examiner's Report

The question tested candidates' knowledge of "Borrowing Cost" under IPSAS 5. It required the candidates to compute the borrowing cost as well as to state examples of qualifying assets under IPSAS 5 on borrowing costs. Only about 20% of the candidates attempted this question. About 20% scoring 40% of the marks allocated.

ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA
ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA
PART II EXAMINATIONS – SEPTEMBER 2020

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. In a histogram, a grouped frequency table is usually represented by a set of bars. To be correctly presented, the histogram must show the relationship of the rectangles to the frequencies by reference to the of each bar.
 - A. Height
 - B. Width
 - C. Area
 - D. Diagonal
 - E. Perimeter

2. An Ogive is
 - A. A graph of a cumulative frequency distribution
 - B. A chart showing a non-linear relationship between two quantities
 - C. Another name for a histogram
 - D. A chart showing a linear relationship of the cumulative frequency distribution
 - E. A Gantt chart

3. One of the merits of primary data collection is that
 - A. It saves time and cost
 - B. The degree of accuracy is very high
 - C. It is very slow and affordable to collect data
 - D. The researcher is not in charge of the data collection
 - E. It is very easy to collect

4. Which of the following is **TRUE** about a highly positively skewed data?
- A. Median is the least representative average
 - B. All averaging techniques will produce equally acceptable results
 - C. The mean will tend to overstate the average
 - D. The mode will tend to overstate the average
 - E. The median will tend to overstate the average

5. Which of the following sets of data has the widest spread?

	I	II	III	IV	V
Mean	150	165	185	205	275
Standard deviation	15	20	25	30	35

- A. I
 - B. II
 - C. III
 - D. IV
 - E. V
6. The mean and median obtained from a set of data are 60 and 58 respectively. Determine the coefficient of skewness of the distribution if its variance is 81
- A. -0.67
 - B. -0.33
 - C. 0
 - D. 0.33
 - E. 0.67
7. A linear relationship model for the management of a Community Bank, when expenditure ((Y) ₦' m) is regressed on revenue ((X) ₦' m), is given by $Y = 42.113 + 0.499X$. Obtain the estimate of revenue when the expenditure is ₦ 780m
- A. ₦ 1479 m
 - B. ₦ 1579 m
 - C. ₦ 1679 m
 - D. ₦ 1779 m
 - E. ₦ 1879 m

8. A long- term oscillation of the time series values about the trend line is called variation.
- A. Seasonal
 - B. Irregular
 - C. Residual
 - D. Trend
 - E. Cyclical
9. If the computed Laspeyre's index and Paasche's index for 8 different food items are 120% and 130% respectively, then the value of Fisher's index , to the nearest whole percentage, is
- A. 120%
 - B. 124%
 - C. 125%
 - D. 128%
 - E. 130%
10. An experiment consists of rolling two dice. Find the probability that the sum of the numbers thrown is 5?
- A. $\frac{10}{36}$
 - B. $\frac{8}{36}$
 - C. $\frac{6}{36}$
 - D. $\frac{4}{36}$
 - E. $\frac{3}{36}$
11. The probability that an event X will occur is 0.43, while the probability that another event Y will occur is 0.65. If the two events are independent, calculate the probability of X or Y or both occurring.
- A. 0.8005
 - B. 0.7525
 - C. 0.7005
 - D. 0.2795
 - E. 0.2685

12. The probability distributions of number of calls received daily by a personal secretary to a chartered accountant are given in the table below:

Number of calls (x)	0	1	2	3	4
Probability of receiving x calls[P(x)]	0.3	0.1	0.15	0.2	0.25

The expected number of calls received daily by the secretary is

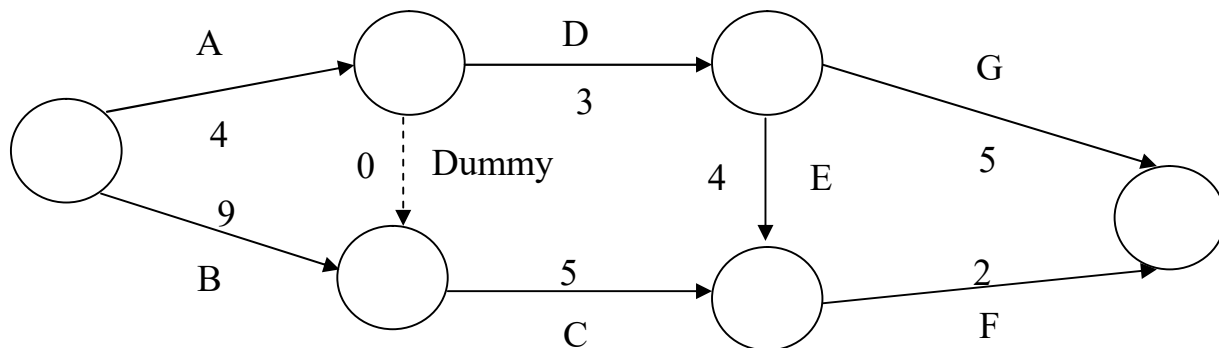
- A. 0
B. 1
C. 2
D. 3
E. 4
13. The quantity of goods demanded rises from 1,000units to 1,500units when the price falls from ₦1.50 to ₦1.00 per unit. The price elasticity of demand for this product is approximately
- A. 1.0
B. 1.5
C. 2.5
D. 3.5
E. 4.0
14. The equation of the regression line for son's height(y) in inches versus father's height(x) in inches is $y = 35 + 0.5x$. For a 71-inch tall son, find the father's height (x)
- A. 107
B. 72
C. 71
D. 65
E. 60
15. If $R(x)$ and $C(x)$ denote total revenue and total cost functions respectively, then the profit $P(x)$ function is given as
- A. $P(x) = R(x) - C(x)$
B. $P(x) = C(x) - R(x)$
C. $P(x) = R(x) + C(x)$
D. $P(x) = R(x) \times C(x)$
E. $P(x) = \frac{C(x)}{R(x)}$

16. What principal will you have to deposit in a 2.25% savings account compounded quarterly in order to have a total of ₦2,500,000 after 10 years?
- A. ₦2,198,234.25k
 - B. ₦2,098,625.50k
 - C. ₦2,001,215.33k
 - D. ₦1,997,549.50k
 - E. ₦1,987,625.50k
17. A firm, which is making 2,000 face masks per day, plans to increase its production. The number of face masks produced is to be increased by 200 per day from 2,000 on the first day to 2,200 on the second day to 2,400 on the third day and so on, until it is producing 6,000 in N days. The value of N is
- A. 20
 - B. 21
 - C. 25
 - D. 38
 - E. 39
18. If the demand function for a product is given as $p = 50q - q^2$, then the price elasticity of demand at $q = 20$ is
- A. 0.5
 - B. 1.0
 - C. 1.5
 - D. 2.0
 - E. 3.0
19. Which of the following is **NOT** a basic step in formulating a linear programming problem?
- A. Identify the objective function
 - B. Identify the slack variables
 - C. Identify the constraints
 - D. Identify the decision variables
 - E. Identify the linearity of the objective function and constraints

20. Which of the following statements is **NOT** true about Linear programming as an Operations Research method?
- A. Linear programming cannot be applied if the objective function and/or the constraints are not linear
 - B. Linear programming involves a model which is just a simplified form of the reality but not the reality itself
 - C. Solution of the linear programming model is only valid based on the assumptions used
 - D. Linear programming is robust enough to accommodate changes
 - E. In particular, solution of linear programming problem by the graphical method cannot be applied if the decision variables are more than two
21. Mr. Right Ventures has decided to manufacture its own items of stock at the rate of 4,000 items per week. Demand for the item is at the rate of 2,000 in one week. Each production run costs ₦10 and holding cost per item is 20k per week. Determine the Economic Production Run.
- A. 532 units
 - B. 533 units
 - C. 632 units
 - D. 633 units
 - E. 732 units
22. In Inventory Control Analysis, the costs of insurance and taxes are included in the
- A. Cost of ordering
 - B. Set up cost
 - C. Inventory carrying cost
 - D. Cost of shortages
 - E. Service cost

Use the information below to answer questions 23 and 24

The network diagram to complete a project is given below. The durations are in weeks.



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

- A. 16 weeks
- B. 14 weeks
- C. 13 weeks
- D. 12 weeks
- E. 11 weeks

24. The number of paths of the network is

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

25. Which of the following is **NOT** an example of items that fail suddenly?

- A. Highway tube lights
- B. Electric bulbs
- C. Contact set
- D. Resistors in radio
- E. Tyres

26. A machine used in a company has resistors with a life span of 6years. The failure probabilities, $p(x)$ of these resistors are given in the table below

Years	1	2	3	4	5	6
$P(x)$	0.2	0.139	0.15	0.1	0.111	0.3

Find the average life span of the machine.

- A. 0.6138 year
- B. 0.6238 year
- C. 3.583 years
- D. 3.683 years
- E. 3.783 years

27. The table below shows the demands, capacities and unit transportation costs, Use the Least-Cost Method to determine the initial basic solution.

	Market	Market	Market	Market	
Plant	1	2	3	4	Capacity
1	2	2	2	1	3
2	10	8	5	4	7
3	7	6	6	8	5
Demand	4	3	4	4	15

- A. 60
 - B. 64
 - C. 79
 - D. 84
 - E. 94
28. The assignment problem is a special case of the
- A. Transportation problem
 - B. Linear programming problem
 - C. Inventory control problem
 - D. Network analysis problem
 - E. Replacement analysis problem
29. Which of the following allocation methods is the best in transportation problems when opportunity cost principle is used to make allocations to various cells in order to minimise the penalty cost?
- A. North-West corner Method
 - B. Vogel's Approximation Method
 - C. Least Cost Method
 - D. Hungarian Method
 - E. Stepping Stone Method

- 30 The daily bread demand pattern for a bakery with the associated probabilities is given in the table below. Use the random numbers: 15, 20, 87, 90, 34, 56, 60, 07, 75, 40 to find the sum of the Simulation demands for the 4th and 10th days.

Daily demand number	0	20	30	40	60
Probabilities	0.11	0.25	0.10	0.4	0.14

- A. 120
- B. 100
- C. 90
- D. 80
- E. 60

SECTION A: SHORT-ANSWER QUESTIONS (20 MARKS)

ATTEMPT ALL QUESTIONS

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

1. The value of r in the table below is

Time (t)	Value of series (Y)	Trend by LSM $Y = 43 + 7t$	Seasonal variation assuming additive model
1	47		
2	58		
3	62		r

2. The arithmetic mean of nineteen numbers is 7. When a twentieth number, x is added the overall mean still gives 7. The value of x is
3. Type 1 error is an error that occurs if the is rejected when it is supposed to be accepted.
4. For the probability distribution given in the table below, find the expected value of x .

X	0	1	2	3	4
$P(x)$	$1/6$	$1/4$	$1/3$	$1/6$	$1/12$

5. Find the minimum value of the function $p = q^3 - 12q - 11$.
6. The rate of change of consumption with respect to income is known as
7. When the unit price of a commodity increases, the quantity demand
8. The sales function of a commodity is $q = 144 - 6p$, where p is in thousands of Naira. The marginal revenue equals to zero at the price of
9. The holding cost, annual demand requirement and the ordering cost of an important material are Le0.85 per unit, 1,200 units and Le7.97 per order respectively. The number of orders to be placed per year is
10. The coefficient of determination is the of the Pearson's product moment correlation coefficient.
11. The source of data collection can be divided into and
12. Given that the 1st and 3rd quartiles of a set of numbers are 46 and 55 respectively, the quartile deviation is
13. The region where all the constraints are simultaneously satisfied is called the
14. The critical path of a network is the path with theduration.
15. The Operations Research is used for rationing in the financial world.
16. The index that uses the geometric mean of the result obtained from Laspeyre's and Paasche's indices is the
17. A transportation model in which the total supply and total demand are unequal is called.....

18. The table below shows the final table of Monte Carlo method to simulate daily demand of a product

Daily Demand	Probability	Cumulative probability	Random number Interval
10	0.21	0.21	00 – 20
20	0.17	0.38	21 – 37
30	0.51	0.89	38 – 88
40	0.11	1.00	89 – 99

If 17, 88, 08, 48 and 57 is a sequence of random numbers to be used to simulate the demand for the next 5 days, then the average daily demand for the product, on the basis of the simulated data, is

19. A method of simulation that utilises samples from a real population and does not assume theoretical counterpart of the actual population is
20. The group Replacement Policy is where an/a replacement of items is made.

SECTION B: ATTEMPT ANY FOUR QUESTIONS IN THIS SECTION (50 MARKS)

QUESTION 1

In a certain organisation, employees were categorised according to their ages as shown below:

Age group	No. of Employees
15 – 19	66
20 – 24	65
25 – 29	56
30 – 34	50
35 – 39	42
40 – 44	37
45 – 49	35
50 – 54	30
55 – 59	24
60 – 64	22

Calculate the

- a. Mean (5 Marks)
 b. Median (1½ Marks)
 c. Mode (1½ Marks)
 d. Quartile Deviation (4½ Marks)
- (Total 12½ Marks)**

QUESTION 2

The information about the quarterly retirement savings (N'000) of Mrs. AKUO in the years 2012, 2012, 2013, 2014 and 2015 were summarised in the table below:

Year	Savings (N'000)			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2012	10	31	35	32
2013	20	40	54	56
2014	32	52	60	40
2015	43	64	71	45

The trend line, estimated using Least Squares Method, is given as $T = 24.3603 + 2.4603x$, where $x = 0$ for 2012 quarter 1, $x = 1$ for 2012 quarter 2, etc.

You are required to:

- a. Estimate the trend for each quarter (6 Marks)
 b. Compute the seasonal index for each quarter using multiplicative model (5 Marks)
 c. Forecast the retirement savings expected in the second quarter of 2017 (1½ Marks)
- (Total 12½ Marks)**

QUESTION 3

- a. The marginal revenue function (in GH¢) of a production company is given by $3x^2 - 7x + 4$, where x is the number of items produced and sold in millions. Determine the maximum revenue. (5 Marks)
- b. The demand and supply functions (in Leone) for a product are respectively given below:
 $P_d = 17,500 - 100q$ and
 $P_s = q^2 + 100q + 5,000$.

Find the:

- i. Consumers' surplus (4½ Marks)
- ii. Producers' surplus. (3 Marks)

(Total 12½ Marks)

QUESTION 4

- a. AGD Nigeria Limited makes use of the concept of Economic Order Quantity (EOQ) to estimate the order quantity for its various parts and is currently planning its orders. The following data are available for the analysis:

Annual consumption	80,000 units
Cost to place one order	₦1,200
Cost per unit	₦50
Carrying cost	6% of the unit cost

You are required to calculate the

- i. Economic Order Quantity (EOQ) (1½ Marks)
- ii. Number of orders per year (1½ Marks)
- iii. Ordering Cost (1½ Marks)
- iv. Carrying Cost (1½ Marks)
- v. Total Cost of Inventory (1½ Marks)

- b. The annual demand of a commodity is 10,000 units. It is found that requesting an order costs ₦800 and it costs ₦106 to hold a unit for a year.

You are required to estimate the:

- i. Economic Order Quantity (EOQ) (1½ Marks)
- ii. Number of orders placed per year (1½ Marks)
- iii. Length of the inventory cycle (2 Marks)

(Total 12½ Marks)

QUESTION 5

A patient is required to take two types of pills (feel good and get better) due to an illness. The pills contain three nutrients (Minerals, Vitamins, and Proteins). Each Milligram of feel good pill costs ₦100 and contains 16mg of Minerals, 40mg of Vitamins and 32mg of Proteins while each Milligram of get better pill costs ₦50 and contains 4mg of Minerals, 30mg of Vitamins and 4mg of Proteins. The minimum daily pills prescriptions for the patient are 80mg of Minerals, 300mg of Vitamins and 96mg of Proteins.

You are required to:

- a. Formulate the appropriate linear programming problem. (5 Marks)
 - b. Solve the linear programming problem using a graphical method. (7½ Marks)
- (Total 12½ Marks)**

QUESTION 6

The following activities with their durations are necessary to complete a project:

Activity	Preceding Activity	Duration (in Weeks)
K	-	6
L	K	9
M	K	12
N	K	15
O	L	18
P	L,M,N	9
Q	N	12
R	L	21
S	O,P,Q	6
T	Q	9

You are required to:

- a. Draw the Activity -- On -- Arrow Network diagram for the project (5 Marks)
 - b.
 - i. Identify all the paths and calculate the duration for each path (5 Marks)
 - ii. Identify the critical path and calculate its duration (2½ Marks)
- (Total 12½ Marks)**

FORMULAE

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

Economic Order Quantity

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

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

Slope of a regression equation

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

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

The 95% confidence interval for μ

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

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

$$b = \frac{\sum ty}{\sum t^2} \cdot a = \bar{y} - bx_m, \quad x_m = \text{median of } x \text{ values}$$

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

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

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

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

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

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

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

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

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

SECTION A

SOLUTIONS (MCQ)

1. C

2. A

3. B

4. C

5. D

6. E

7. A

8. E

9. C

10. D

11. A

12. C

13. B

14. B

15. A

16. D

17. B

18. E

19. B

20. D

21. D

22. C

23. A

- 24. C
- 25. E
- 26. D
- 27. C
- 28. A
- 29. B
- 30. C

WORKINGS (MCQ)

5. Coefficient of Variation (CoV) = $\frac{SD}{Mean} \times 100$

$$CoV_A = \frac{15}{150} = 0.1000 \times 100 = 10.00\%$$

$$CoV_B = \frac{20}{165} = 0.1212 \times 100 = 12.12\%$$

$$CoV_C = \frac{25}{185} = 0.1351 \times 100 = 13.51\%$$

$$CoV_D = \frac{30}{205} = 0.1463 \times 100 = 14.63\%$$

$$CoV_E = \frac{35}{275} = 0.1273 \times 100 = 12.73\%$$

The bigger the value of CoV the wider the spread. Therefore, data D gives the correct answer (D)

6. Coefficient of skewness = $\frac{3(mean - median)}{SD}$

$$SD = \sqrt{Variance} = \sqrt{81} = 9$$

$$Coefficient\ of\ skewness = \frac{3(60 - 58)}{9} = \frac{2}{3} = 0.67 \quad (E)$$

7. $Y = 42.113 + 0.499X$

When $Y = 780$

$$X = \frac{780 - 42.113}{0.499} = N1479m \quad (A)$$

9.
$$I_{Fisher} = \sqrt{I_{Laspeyre} \times I_{Paasche}}$$

$$I_{Fisher} = \sqrt{120 \times 130} = \sqrt{15600} = 124.9$$

$$I_{Fisher} = 125\%$$

(C)

10.

	1	2	3	4	5	6
1	1,1	1,2	1,3	1,4	1,5	1,6
2	2,1	2,2	2,3	2,4	2,5	2,6
3	3,1	3,2	3,3	3,4	3,5	3,6
4	4,1	4,2	4,3	4,4	4,5	4,6
5	5,1	5,2	5,3	5,4	5,5	5,6
6	6,1	6,2	6,3	6,4	6,5	6,6

n (Sample space) = 36

Space of sum is 5 are (1,4), (4,,1), (3,2), (2,3)

n (Sum is 5) = 4

$$P(\text{sum is 5}) = \frac{4}{36} \quad (D)$$

11. $p(X) = 0.43, p(Y) = 0.65$
 $P(X \text{ or } Y) = p(X) + p(Y) - p(X \cap Y)$
 $= 0.43 + 0.65 - 0.43 \times 0.65$
 $= 0.8005$

(B)

12. $E(X) = \sum xP(x)$

$$E(X) = (0 \times 0.3) + (1 \times 0.1) + (2 \times 0.15) + (3 \times 0.2) + (4 \times 0.25)$$

$$E(X) = 0 + 0.1 + 0.3 + 0.6 + 1.0 = 2$$

(C)

13.
$$\text{Price elasticity} = \frac{\% \text{ change in quantity}}{\% \text{ change in price}}$$

$$\begin{aligned}
 & \left| \frac{1,500 - 100}{1,000} \right| \\
 & \left| \frac{100 - 150}{150} \right| \\
 & = \left| -\frac{500}{1,000}x \frac{150}{50} \right| \\
 & = 1.5
 \end{aligned}$$

(B)

14. For $y = 35 + 0.5x$

$$y - 35 = 0.5x$$

$$0.5x = y - 35$$

$$\text{When } y = 71$$

$$0.5x = 71 - 35$$

$$0.5x = 36$$

$$x = \frac{36}{0.5} = x = 72$$

(B)

16. Formula for Compound interest is: $A = P(1 + r)^n$

Since interest is compounded quarterly $A = P(1 + i)^k$ where $i = r/4 = 2.25\%/4 = 0.0225/4$

and $k = 4 \times 10 = 40$, $A = \text{₦}2,500,000$

$$\text{₦}2,500,000 = P(1 + 0.0225/4)^{40} = P(1 + 0.005625)^{40}$$

$$\text{₦}2,500,000 = P(1.005625)^{40} = P(1.2515334388881)$$

$$P = \text{₦}2,500,000/1.2515334388881 = \text{₦}1,997,549.50k \quad (D)$$

17. Since it has a common difference of 200 then it is an AP

Formula for nth term of an AP is $T_n = a + (n-1)d$, $d = 200$, first term = 2000, $n = ?$

$$T_n = 6,000, \quad 6,000 = 2,000 + (n-1) 200 = 2,000 + 200n - 200$$

$$6,000 = 2,000 + 200n - 200$$

$$6,000 - 2,000 + 200 = 200n$$

$$4,200 = 200n$$

$$n = \frac{4,200}{200} = 21$$

(B)

18. $p = 50q - q^2$

$$\frac{dp}{dq} = 50 - 2q$$

$$\text{Elasticity of demand, } e_d = \frac{p}{q} \div \frac{dp}{dq}$$

$$e_d = \frac{50q - q^2}{q} \div 50 - 2q$$

$$e_d = \frac{50 - q}{50 - 2q}$$

$$\text{At } q = 20$$

$$e_d = \frac{50 - 20}{50 - 2(20)} = \frac{30}{10}$$

$$e_d = 3$$

(E)

21. Let the Economic production run be Q

$$Q = \sqrt{\frac{2cd}{h\left(1 - \frac{d}{r}\right)}} \quad c = \text{₦}10, d = 2,000, h = 0.20, r = 4,000$$

$$Q = \sqrt{\frac{2 \times 10 \times 2,000}{0.20 \left(\frac{2,000}{4,000}\right)}} = \sqrt{\frac{40,000}{0.20 \times 0.5}} = \sqrt{\frac{40,000}{0.1}} = \sqrt{40,000} = 632.456 = 633 \text{ Units} \quad (\text{D})$$

23. $ADG = 4 + 3 + 5 = 12 \text{ weeks}$

$$ADummyCF = 4 + 0 + 5 + 2 = 11 \text{ weeks}$$

$$ADEF = 4 + 3 + 4 + 2 = 13 \text{ weeks}$$

$$BCF = 9 + 5 + 2 = 16 \text{ weeks} \quad (\text{A})$$

24. From question 23 solution, it shows that there are 4 paths (C)

26. Average life span of Machine = $\frac{\sum xp_i(x)}{\sum p_i(x)}$

$$= \frac{(1 \times 0.2) + (2 \times 0.139) + (3 \times 0.15) + (4 \times 0.1) + (5 \times 0.111) + (6 \times 0.3)}{0.2 + 0.139 + 0.15 + 0.1 + 0.111 + 0.3}$$

$$= 0.2 + 0.278 + 0.45 + 0.4 + 0.555 + 1.8/1$$

$$= 3.683$$

(D)

27.

	Market	market	market	Market	
Plant	1	2	3	4	Capacity
1	<div>2</div>	<div>2</div>	<div>2</div>	<div>1</div>	3 0
2	<div>10</div>	<div>8</div>	<div>5</div>	<div>4</div>	7 6 2 0
3	<div>7</div>	<div>6</div>	<div>6</div>	<div>8</div>	5 2 0
Demand	4 2 0	3 0	4 0	4 1 0	15

Initial feasible solution = $(3 \times 1) + (2 \times 10) + (4 \times 5) + (1 \times 4) + (2 \times 7) + (3 \times 6)$

$$= 3 + 20 + 20 + 4 + 14 + 18$$

$$= 79$$

(C)

30.

Daily demand number	Probabilities	Cumulative probabilities	Random number interval
0	0.11	0.11	00 – 10
20	0.25	0.36	11 – 35
30	0.10	0.46	36 – 45
40	0.40	0.86	46 – 85
60	0.14	1.00	86 – 99

Days	Random number	Demand
1	15	20
2	20	20
3	87	60
4	90	60 *
5	34	20
6	56	40
7	60	40
8	07	0
9	75	40
10	40	30 * *

From the table, Simulation demand for the 4th and 10th days are 60 and 30 units respectively. Their sum = $60 + 30 = 90$ units (C)

SECTION A

SOLUTION (SAQ)

1. $r = -2$
2. $x = 7$
3. Null hypothesis
4. 1.75
5. $p = -27$
6. Marginal propensity to consume
7. Decreases/falls/reduces
8. ₦12000
9. 8
10. Square
11. Primary source and secondary source
12. 4.5
13. Feasible Region
14. Longest
15. Capital/Resources/Optimal
16. Fisher Ideal Index
17. Unbalanced
18. 22
19. System simulation/Computer simulation
20. En-masse/Group

WORKINGS (SAQ)

1.
$$r = 62 - (43 + 7(3))$$
$$r = 62 - 64$$
$$r = -2$$

$$2. \quad \text{Mean} = \frac{\sum x}{n}$$

$$7 = \frac{\sum x}{19}$$

$$\sum x = 19 \times 7$$

$$\sum x = 133$$

The sum of the twenty numbers = $x + 133$

$$\therefore \quad \text{Mean of the twenty numbers is } \frac{133+x}{20} = 7$$

$$133 + x = 20 \times 7$$

$$133 + x = 140$$

$$x = 140 - 133$$

$$x = 7$$

$$\begin{aligned} 4. \quad \text{Expected value of } x &= E(X) = \sum xP(x) \\ &= \left(0X \frac{1}{6}\right) + \left(1X \frac{1}{4}\right) + \left(2X \frac{1}{3}\right) + \left(3X \frac{1}{6}\right) + \left(4X \frac{1}{12}\right) \\ &= 0 + \frac{1}{4} + \frac{2}{3} + \frac{1}{2} + \frac{1}{3} \\ &= \frac{3+8+6+4}{12} = \frac{21}{12} = \frac{7}{4} \\ &= 1.75 \end{aligned}$$

$$5. \quad p = q^3 - 12q - 11$$

$$\frac{dp}{dq} = 3q^2 - 12, \frac{dp}{dq} = 0 \text{ (at turning point)}$$

$$3q^2 - 12 = 0, \quad q^2 = 4 \rightarrow q = \pm 2$$

$$\frac{d^2p}{d^2q} = 6q$$

$$\text{At } q = 2, \quad \frac{d^2p}{d^2q} = 6(2) = 12 > 0$$

At $q = 2$, is a min point and the min. value of
 $p = 2^3 - 12(2) - 11 = -27$

$$8. \quad q = 144 - 6p$$

$R = \text{Price} \times \text{Quantity}$

$$R = p(144 - 6p) = 144p - 6p^2$$

$$MR = \frac{dR}{dq} = 144 - 12p$$

@ $MR=0$

$$144 - 12p = 0$$

$$p = 12$$

Answer is: price = ₦12,000

9. Using $EOQ = \sqrt{\frac{2 \times D \times C_o}{C_h}}$

$$EOQ = \sqrt{\frac{2 \times 1200 \times 7.97}{0.85}}$$

$$EOQ = \sqrt{\frac{19,128}{0.85}}$$

$$EOQ = \sqrt{22,503.52941}$$

$$EOQ = 150.0$$

$$\text{Number of orders} = \frac{\text{Annual demand}}{EOQ}$$

$$\text{Number of orders} = \frac{1200}{150}$$

$$\text{Number of orders} = 8 \text{ orders per year}$$

12. Quartile Deviation $= \frac{1}{2}(Q_3 - Q_1) = \frac{1}{2}(55 - 46) = \frac{1}{2} \times 9 = 4.5$

18. The simulated demands for the next 5 days using the sequence of random numbers given are: 10,30,10,30,30

$$\text{Average} = \frac{10 + 30 + 10 + 30 + 30}{5}$$

$$\text{Average} = \frac{110}{5}$$

$$\text{Average} = 22$$

EXAMINER'S REPORT

On the average, all the questions test the major parts of the syllabus, while maintaining the appropriate weights among statistics (40%), Business Mathematics (20%) and Operations Research (40%). Although the performance was generally poor, candidates performed better in MCQ than in SAQ. The average score in MCQ was 12 out of 30, while the average score in SAQ was 6 out of 20.

Candidates are advised to cover the entire syllabus during revisions.

SECTION B

SOLUTION 1

Age group	No. of Employees (f)	Mid-Values (X)	fx	Cum. Freq.
15 – 19	66	17	1122	66
20 – 24	65	22	1430	131
25 – 29	56	27	1512	187
30 – 34	50	32	600	237
35 – 39	42	37	1554	279
40 – 44	37	42	1554	316
45 – 49	35	47	1645	351
50 – 54	30	52	1560	381
55 – 59	24	57	1368	405
60 – 64	22	62	1364	427
Total	427		14709	

$$(a) \text{ Mean } = \bar{x} = \frac{\sum fx}{\sum f} = \frac{14709}{427} = 34.45$$

$$(b) \text{ Median } = L_M + \left(\frac{N}{2} - F_b \right) \frac{C}{f_m}$$

$$= 29.5 + \left(\frac{427}{2} - 187 \right) \frac{5}{50} = 32.15$$

$$(c) \text{ Mode } = L_m + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) C$$

$$= 14.5 + \left(\frac{66-0}{2(66)-0-65} \right) 5$$

$$= 14.5 + \left(\frac{66}{67} \right) 5 = 19.43$$

$$(d) \text{ First Quartile } = Q_1 = L_{Q_1} + \left(\frac{N}{4} - F_{Q_1} \right) \frac{C}{f_{Q_1}}$$

$$= 19.5 + \left(\frac{427}{4} - 66 \right) \frac{5}{65}$$

$$= 19.5 + (40.75)(0.077)$$

$$= 22.63$$

$$\begin{aligned}
\text{Third Quartile} &= Q_3 = L_{Q_3} + \left(\frac{3N}{4} - F_{Q_3} \right) \frac{C}{f_{Q_3}} \\
&= 44.5 + \left(\frac{1281}{4} - 316 \right) \frac{5}{35} \\
&= 44.5 + (320.25 - 316) \frac{5}{35} \\
&= 45.11
\end{aligned}$$

$$\begin{aligned}
\text{Quartile Deviation} &= \frac{Q_3 - Q_1}{2} \\
&= \frac{45.11 - 22.63}{2} \\
&= 11.24 (1)
\end{aligned}$$

Examiner's Report

The question one tests the candidate's knowledge of Measures of Location.

About 90% of the candidates attempted the question. An average score of 8 out of 12½ marks was obtained by candidates.

The only observed difficulty was in the detailed calculations involved in the solution.

Candidates should be familiar with the formula of calculating each of the Mean, Media, Mode and Quartile Deviation.

SOLUTION 2

- a. The trend for each quarter using Least Squares Method is calculated as shown in the table below:

x	y	Trend (T) = $24.3603 + 2.4603x$	Variation by Multiplicative Model $\left(\frac{y}{T} \right)$
0	10	$24.3603 + 2.4603(0) = 24.3603$	0.4105
1	31	$24.3603 + 2.4603(1) = 26.8206$	1.1558
2	35	$24.3603 + 2.4603(2) = 29.2809$	1.1953
3	32	$24.3603 + 2.4603(3) = 31.7412$	1.0082
4	20	$24.3603 + 2.4603(4) = 34.2015$	0.5848
5	40	$24.3603 + 2.4603(5) = 36.6618$	1.0911
6	54	$24.3603 + 2.4603(6) = 39.1221$	1.3803

7	56	$24.3603 + 2.4603(7) = 41.5824$	1.3467
8	32	$24.3603 + 2.4603(8) = 44.0427$	0.7266
9	52	$24.3603 + 2.4603(9) = 46.5030$	1.1182
10	60	$24.3603 + 2.4603(10) = 48.9633$	1.2254
11	40	$24.3603 + 2.4603(11) = 51.4236$	0.7779
12	43	$24.3603 + 2.4603(12) = 53.8839$	0.7980
13	64	$24.3603 + 2.4603(13) = 56.3442$	1.1359
14	71	$24.3603 + 2.4603(14) = 58.8045$	1.2074
15	45	$24.3603 + 2.4603(15) = 61.2648$	0.7345

b. **The seasonal index table is as shown below:**

Year	Quarter1 (Q_1)	Quarter2 (Q_2)	Quarter3 (Q_3)	Quarter4 (Q_4)
2012	0.4105	1.1558	1.1953	1.0082
2013	0.5848	1.0911	1.3803	1.3467
2014	0.7266	1.1182	1.2254	0.7779
2015	0.7980	1.1359	1.2074	0.7345
Total	2.5199	4.501	5.0084	3.8673
Averages	0.6300	1.1253	1.2521	0.9668
Adjustment	0.00645	0.00001	0.00645	0.00645
Adjusted index	0.63645	1.13175	1.25855	0.97325

From the seasonal table above, the seasonal indices, for each quarter, are

$$Q_1 = 0.63645 \quad Q_2 = 1.13175 \quad Q_3 = 1.25855 \quad Q_4 = 0.97325$$

c. To forecast the retirement savings expected in the second quarter of 2017,

We use the trend line $T = 24.3603 + 2.4603x$

where $x = 21$ for second quarter 2017

$$\therefore T = 24.3603 + 2.4603 \times 21 = 76.0266$$

The forecasted retirement savings in the second quarter of 2017 is

$$76.0266 \times 1000 = \text{N} 76,026.6$$

Examiner's Report

This question is on determining Seasonal Variations in the Time Series Data.

About 60% of the candidates attempted the question with an average score of 3marks out of 12½marks allocated.

Most of the candidates showed lack of understanding of this question.

Candidates should study Seasonal Variations within the topic of Time Series.

SOLUTION 3

a. $MR = 3x^2 - 7x + 4$

$$R = \int (3x^2 - 7x + 4) dx$$

$$R = x^3 - \frac{7x^2}{2} + 4x + c$$

@ $x = 0 \implies R = 0 \therefore c = 0$

$$R = x^3 - \frac{7x^2}{2} + 4x$$

@ turning point $\frac{dR}{dx} = 0$, and R is maximum if $\frac{d^2R}{dx^2} \big|_{MR=0} < 0$

Or $MR = 0$

$$3x^2 - 7x + 4 = 0$$

$$3x^2 - 4x - 3x + 4 = 0$$

$$x(3x - 4) - 1(3x - 4) = 0$$

$$(3x - 4)(x - 1) = 0$$

$x = 1$ and $4/3$

$$\frac{d^2R}{dx^2} = 6x - 7 \quad \frac{d^2R}{dx^2} \big|_{x=1} = 6(1) - 7 = 6 - 7 = -1 < 0$$

hence $x = 1,000,000$ is the output level that maximizes revenue

$$\begin{aligned} \therefore \text{Maximum Revenue} &= x^3 - \frac{7x^2}{2} + 4x \\ &= 1000000^3 - \frac{7(1000000)^2}{2} + 4(1000000) \\ &= \text{GH} \nless 1,500,000 \end{aligned}$$

b. i. $p = 17,500 - 100q$ and.....dd
 $p = q^2 + 100q + 5,000$ss

$$\begin{aligned} \text{Consumers' surplus} &= \int_0^{q_e} D(q) dq - p_e q_e \\ &= \int_0^{q_0} D(q) dq - p_0 q_0 \end{aligned}$$

@ equilibrium dd = ss

$$\Rightarrow 17500 - 100q = q^2 + 100q + 5,000$$

$$q^2 + 200q - 12,500 = 0$$

$$q^2 + 250q - 50 - 12,500 = 0$$

$$(q - 50)(q + 250) = 0$$

$$q = 50 \text{ or } -250$$

Since $q > 0 \Rightarrow q_e = 50 \text{ units}$

put $q = 50$ into dd

$$p_e = 17,500 - 100(50) = \text{Le}12,500$$

$$\begin{aligned} \text{Consumers' surplus} &= \int_0^{50} (17,500 - 100q) dq - 50 \times 12,500 \\ &= 17,500q - 50q^2 \Big|_0^{50} - 625,000 \\ &= 17,500(50) - 50(50)^2 - 625,000 \\ &= \text{Le}125,000 \end{aligned}$$

$$\text{ii. Producers' surplus} = p_e q_e - \int_0^{q_e} S(q) dq \text{ or}$$

$$\begin{aligned} &= P_0 q_0 - \int_0^{q_0} S(q) dq = \int_0^{50} S(q) dq = 50 \times 12,500 - \int_0^{50} (q^2 + 100q + 5,000) dq \\ &= 50 \times 12,500 - \left[\frac{q^3}{3} + 50q^2 + 5,000q \right]_0^{50} \\ &= 625,000 - \left[\frac{50^3}{3} + 50(50)^2 + 5,000(50) \right] \\ &= 625,000 - [41,666.667 + 125,000 + 250,000] = 625,000 - 416,666.667 \\ &= \text{Le } 208,333.33 \end{aligned}$$

Examiner's Report

Consumers' and Producers' Surpluses based on the elementary differentiation and integration is tested in the question.

About 65% of the candidates attempted the question with an average score of 5 marks out of 12½ marks.

Many of the candidates could not remember the expressions for both Consumers' and Producers' surpluses. Hence, they had difficulty in getting the question correct. Candidates are advised to cover the syllabus fairly well in preparing for future examinations.

SOLUTION 4

- a. i. Economic Order Quantity is

$$EOQ = \sqrt{\frac{2 \times D \times C_o}{C_h}}$$

where

D = Annual Required Units

C_o = Ordering Cost

C_h = Inventory Unit Cost × Carrying Cost as percentage of unit cost

$$EOQ = \sqrt{\frac{2 \times 80,000 \times 1,200}{50 \times 0.06}}$$

$$EOQ = \sqrt{64,000,000}$$

$$EOQ = 8,000 \text{ Units}$$

- ii. Since Number of orders per year = $\frac{\text{Annual Requirement}}{EOQ}$

$$\text{Therefore, Number of orders per year} = \frac{80,000}{8,000}$$

$$\text{Number of orders per year} = 10 \text{ orders per year}$$

- iii. Since Ordering Cost = Fixed ordering cost × Number of orders per year

$$\text{Therefore, Ordering Cost} = 1,200 \times 10$$

$$\text{Ordering Cost} = 120 \times 10 = \text{N}12,000$$

iv. **Since** Carrying cost = Carrying Cost as a percentage of unit cost $\times \frac{EOQ}{2}$

Therefore, Carrying cost = $50 \times 0.06 \times \frac{8,000}{2}$

Carrying cost = ~~N~~12,000

v. **Since** Total Inventory Cost = Ordering Cost + Carrying Cost

Therefore, Total Inventory Cost = 12,000 + 12,000

Total Inventory Cost = ~~N~~24,000

b. i. **Since** $EOQ = \sqrt{\frac{2 \times D \times C_o}{C_h}}$

where $D = 10,000$, $C_o = 800$ and $C_h = 106$

Therefore, $EOQ = \sqrt{\frac{2 \times 10,000 \times 800}{106}}$

$$EOQ = \sqrt{\frac{16,000,000}{106}}$$

$$EOQ = \sqrt{150,943,3962}$$

$$EOQ = 388.5143$$

$$EOQ \approx 389 \text{ units}$$

ii. **Since** Number of orders per year = $\frac{\text{Annual Demand}}{EOQ}$

Therefore, the Number of orders per year = $\frac{10,000}{388.5143}$

$$\text{Number of orders per year} = 25.7391$$

The number of orders per year is, therefore, approximately 26

iii. Since the cycle length = $\frac{\text{Number of days per year}}{\text{Number of orders per year}}$

Therefore, the cycle length = $\frac{365}{25.7391} = 14.1808$

The cycle length = 14.1808

\therefore The cycle length \approx 14 days or 2 weeks

Examiner's Report

The candidate's knowledge of Inventory Control is tested in this question. Candidates are expected to calculate the components of Inventory Control Measures.

About 80% of the candidates attempted the question with an average score of 8marks out of the allocated 12½marks.

Many of the candidates that attempted the question showed a clear understanding of what is required in the question.

SOLUTION 5

- a. Let x mg of feel good and y mg of betta pills be taken by the patient daily.

Let C be the total cost of daily pills prescription.

The problem is to meet the necessary nutrient requirement at minimum cost for the patients.

The objective function is $C = 100x + 50y$

The constraints are

$16x + 4y \geq 80$ (Mineral constraint)

$40x + 30y \geq 300$ (Vitamin constraint)

$32x + 4y \geq 96$ (Protein constraint)

$x \geq 0, y \geq 0$ (Non-negativity constraints)

- b. Minerals constraints

$16x + 4y \geq 80$ is drawn on the graph

$16x + 4y = 80$ Therefore when

$x = 0, y = 20$

$y = 0, x = 5$

Vitamins constraints

$40x + 30y \geq 300$ is drawn on the graph

$40x + 30y = 300$ Therefore when

$$x = 0, \quad y = 10$$

$$y = 0, \quad x = 7.5$$

Proteins constraints

$32x + 4y \geq 96$ is drawn on the graph

$32x + 4y = 96$ Therefore when

$$x = 0, \quad y = 24$$

$$y = 0, \quad x = 3$$

From the graph, the corner points of the boundary of the feasible region are A, B, C, D with the coordinates A(0, 24), B(1, 16), C(3.8, 5), D(7.5, 0)

Coordinates Value of the objective function = $(100x + 50y)$

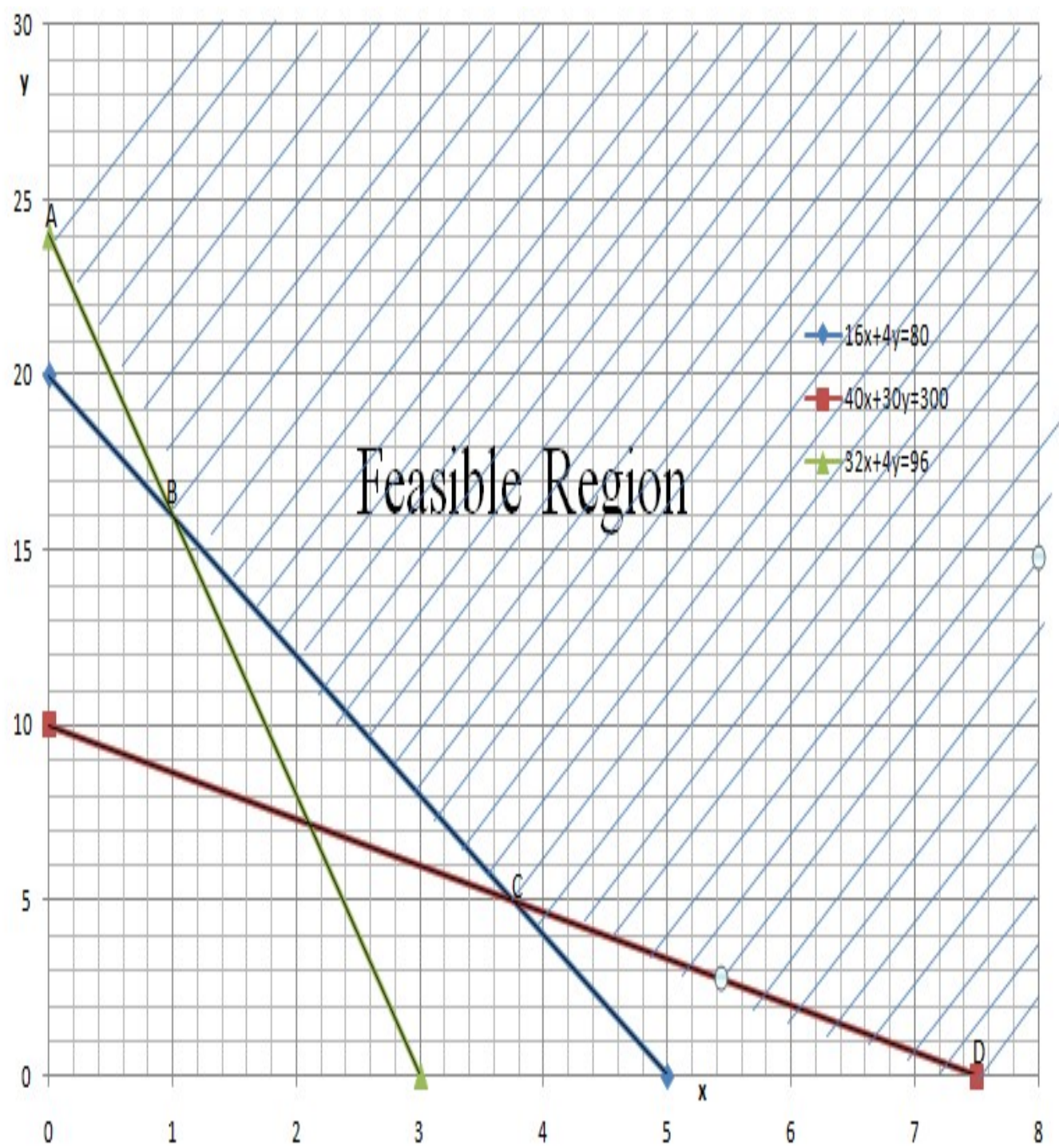
$$A(0, 24) \qquad 100(0) + 50(24) = 1200$$

$$B(1, 16) \qquad 100(1) + 50(16) = 900$$

$$C(3.8, 5) \qquad 100(3.8) + 50(5) = 630$$

$$D(7.5, 0) \qquad 100(7.5) + 50(0) = 750$$

Coordinates (3.8, 5) gives the lowest cost hence the optimal pills prescriptions for the patient is 3.8mg of feel good and 5mg of betta.



Examiner's Report

This is a Linear Programming Problem with worded constraints. Candidates are expected to formulate the relevant Linear Programming problem comprising the objective function and the associated constraints.

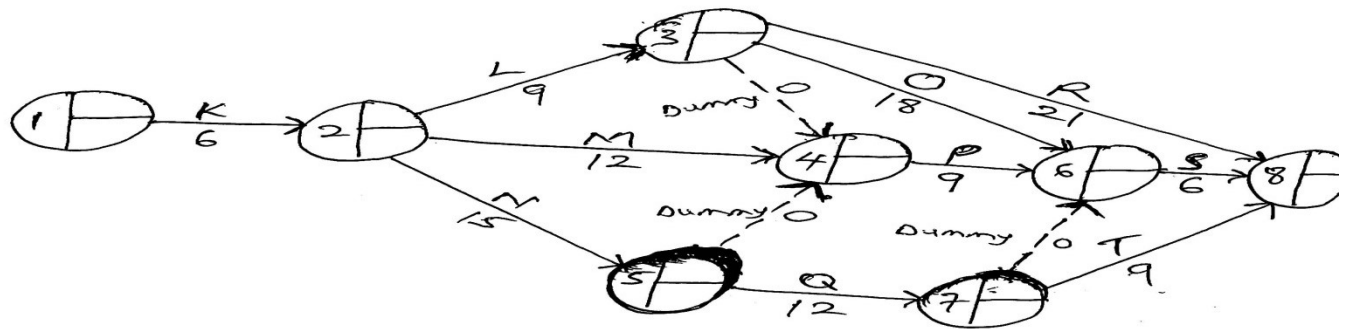
About 75% of the candidates attempted the question with an average score of 3 out of 12½marks.

Converting the worded constraints into actual inequalities was the major difficulties encountered by majority of the candidates that attempted the question.

Candidates are advised to learn the necessary ingredients in the topics of Linear Programming.

SOLUTION 6

a.



- b. i. The activities and their durations are as shown

Path and Duration:

K,L,R	$6 + 9 + 21 = 36$ weeks
K,L,O,S	$6 + 9 + 18 + 6 = 39$ weeks
K,L, Dummy, P, S	$6 + 9 + 0 + 9 + 6 = 30$ weeks
K,M,P S,	$6 + 12 + 9 + 6 = 33$ weeks
K,N, Dummy, P, S	$6 + 15 + 0 + 9 + 6 = 36$ weeks
K,N,Q, Dummy, S	$6 + 15 + 12 + 0 + 6 = 39$ weeks
K,N, Q, T	$6 + 15 + 12 + 9 = 42$ weeks

- ii. The critical path is K, N, Q, T with duration of 42 weeks.

Examiner's Report

This question is on Network Diagram based on drawing an Activity-On-Arrow Network Diagram. The given data comprise Activities, Preceded Activities and their corresponding durations.

Candidates are expected to determine all the paths and their durations and also to identify the critical path and its associated duration.

The major pitfall encountered by majority of the 45% of the candidates that attempted the questions was in the placement of the three compulsory dummies on the drawn Network Diagram.

Candidates should be familiar with the purpose of a dummy in a typical Network Diagram.

ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA
ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA
PART II EXAMINATIONS – SEPTEMBER 2020

INFORMATION TECHNOLOGY

Time Allowed: 3 hours

SECTION A: PART I 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. Data is transformed into information through which of the following?
 - A. Sorting
 - B. Aggregation
 - C. Processing
 - D. Integration
 - E. Classifying

2. Information system for generating operational information is known as
 - A. Transaction processing system
 - B. Processing system
 - C. Strategic system
 - D. Tactical system
 - E. Back-up system

3. The requirement of a mobile telecommunication company to update account balances within a second is the concern of which of the following?
 - A. Social feasibility
 - B. Licensing feasibility
 - C. Market feasibility
 - D. Technical feasibility
 - E. Economic feasibility

4. System analysis deals with ‘What’ while system design deals with
- A. Where
 - B. When
 - C. How
 - D. Who
 - E. Which
5. Education is different from training, while education promotes understanding, the purpose of training is
- A. Awareness
 - B. In-depth understanding
 - C. Skill building
 - D. Outsmarting competitors
 - E. General application
6. Which of the following is **NOT** true of systems implementation?
- A. Costly
 - B. Requires planning
 - C. Requires expertise
 - D. Comes after feasibility study
 - E. End-user acceptance
7. For a particular computer program to execute efficiently on a given computer, which of the following need **NOT** be considered?
- A. Technical details of the program
 - B. Hardware
 - C. System software routine
 - D. Data used
 - E. Schedule established by the computer operator
8. Which of the following is the technology used in the fourth generation of computers?
- A. Vacuum tube
 - B. Integrated circuit
 - C. Transistor
 - D. Microprocessor
 - E. Nanotechnology

9. The following are components of central processing unit (CPU) of a computer, **EXCEPT**
- A. Control unit
 - B. Arithmetic unit
 - C. Backing storage
 - D. Main memory
 - E. Logical unit
10. Which of the following is **NOT** an example of quantitative Information?
- A. Number of hours worked in a production line
 - B. Price of goods
 - C. Variation in the wages of staff in an organisation
 - D. Annual sales of production company
 - E. Variation of tolerance of finished goods
11. Which of the following is **NOT** an impact printer?
- A. Thermal printer
 - B. Dot-matrix printer
 - C. Daisy wheel printer
 - D. Chain printer
 - E. Band printer
12. Which of the following is an application software?
- A. Operating system
 - B. Language translator
 - C. Word processor
 - D. Utility routine
 - E. Loaders
13. Which of the following is **NOT** an electronic spreadsheet package used on microcomputers?
- A. Excel
 - B. Multiplan
 - C. MultiMate
 - D. Quattro
 - E. Supercalc

14. Which of the following is **NOT** a point/factor to be considered when buying an application package for use?
- A. Price of the package
 - B. No need for integration with other packages
 - C. Type of hardware and operating system designed for the package
 - D. History of the package usage elsewhere
 - E. Technology version of the package
15. The following are examples of object oriented languages, **EXCEPT**
- A. Small talk
 - B. Java
 - C. Ada
 - D. C++
 - E. Visual Basic
16. Which of the following is **NOT** an advantage of High Level Language Program?
- A. It is easier to write and understood
 - B. It is problem oriented
 - C. It is a procedure oriented language
 - D. It is machine dependent
 - E. It can be complied and executed on several machine
17. The following are examples of real-time applications, **EXCEPT**
- A. Airline reservation system
 - B. Payroll system
 - C. Credit card system
 - D. Missile guidance system
 - E. Stock control system
18. Which of the following is **NOT** a data processing method?
- A. Random Processing
 - B. Online Processing
 - C. Batch Processing
 - D. Transaction Processing
 - E. Real-time processing

19. The internet protocol that defines a small number of messages used for diagnostic and management purpose is called
- A. HTTP
 - B. SMTP
 - C. ICMP
 - D. FTP
 - E. TCP/IP
20. Which of the following is the mode of data transmission using start and stop signals between blocks of characters instead of individual character?
- A. Asynchronous Transmission
 - B. Synchronous Transmission
 - C. Simplex Transmission
 - D. Half-duplex Transmission
 - E. Duplex Transmission
21. The network hardware device that provides a central connection point for cables from workstations, servers and other peripherals is called
- A. Bridge
 - B. Modem
 - C. Gateway
 - D. Router
 - E. Switch
22. What is the process by which a perpetrator gains access to computer systems by pretending to be an authorized / legitimate user?
- A. Scavenging
 - B. Spamming
 - C. Masquerading
 - D. Super-zapping
 - E. Eavesdropping
23. Which of the following copies itself into memory or disk until no more space is left?
- A. Anti- viral agent
 - B. Worms
 - C. Virus
 - D. Dirty data
 - E. Test data

24. Which of the following changeover methods employed during system implementation is the most risky?
- A. Direct changeover
 - B. Phased changeover
 - C. Parallel run
 - D. Pilot run
 - E. One-by-one method
25. A string of characters and numbers that a user adds to an electronic document being sent from his/her computer is known as
- A. Password
 - B. Authority code
 - C. Data signature
 - D. PIN
 - E. Character string
26. Which of the following is most likely to protect an organisation's information system from computer hackers?
- A. Card-key locks
 - B. Virus detection program
 - C. Encryption of programs and data
 - D. Firewalls
 - E. Hard-to-determined password
27. Multiprocessing capability can be achieved by which of the following?
- A. Application package
 - B. Operating system
 - C. Utility software
 - D. Language translator
 - E. Linkage Editor
28. The following are examples of optical storage media, **EXCEPT**
- A. CD-ROM Disks
 - B. Video Disks
 - C. Winchester Disks
 - D. Magneto-Optical disks
 - E. Flash EPROM disks

29. A website is defined as a collection of
- A. Email sent through the internet
 - B. Document accessible within an intranet network
 - C. Web-pages connected through hyperlinks, all belonging to a particular company
 - D. Graphics, games and animation sent as attachment to an email
 - E. Protocols that establishes error-free and rapid links between computers on the internet
30. Which of the following is **NOT** an example of output device?
- A. Speaker
 - B. Printer
 - C. Light pen
 - D. Projector
 - E. Plotter

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 device that reads bar-coded labels is called
2. The high-speed memory capable of keeping up with the processing speed of the processor is known as
3. A program solution plan that is expressed in a meta-language containing logical step-by-step actions to be taken to solve a particular problem is called
4. The clarity of the images formed on the screen is called.....
5. The display object that forms images from tiny dot which are arranged in rectangular pattern is called
6. In systems development, the transformation of existing data file into the form required by the new system is called.....

7. The transmission medium that consists of many extremely thin strands of glass or plastics together in a jacket and transmits data with light beam is called
8. The type of system in which the various states and activities follow each other in a predictable manner is
9. A specialised portable computer that uses a pen-like device to enter data is called
10. A security program that connects intranet to external networks for preventing unauthorised traffic and employees from entering the intranet is known as
11. A system that does not interact with its environment either for the exchange of information or business transaction is called.....
12. The standard coding form in which each character is coded using 7 bits is known as
13. A type of computer that consists of the combination of both the digital and analog computers connected together in a single system is called
14. The network architecture that gives equal power to all computers on the network and used primarily in small network is called
15. The point-and-check of ones way to thousands of hyperlinked websites and resources for multimedia information entertainment etc is called
16. The overall power and speed of a microcomputer which is the frequency of the processor's electronic clock, that is, how many cycles a computer can execute per second, is known as
17. The meaning of the acronym MICR is
18. The utility program that places the program segments into the appropriate locations in the memory ready for execution is known as

19. The suite of programs that perform a variety of different processing operations and using data which is compatible with whatever operation that is being carried out is known as
20. C++ is an example of what type of programming language?

SECTION B: ATTEMPT ANY FOUR QUESTIONS (50 MARKS)

QUESTION 1

- a. Machine Language is written as combinations of 0s and 1s.
- You are required to:**
- i. State **TWO** advantages and **TWO** disadvantages of machine language (4 Marks)
 - ii. Enumerate **THREE** other programming languages apart from machine language and state **ONE** example in each case (3 Marks)
- b. Enumerate **FIVE** expected roles of users in an Information System environment. (2½ Marks)
- c. State **THREE** factors to consider when selecting a data transmission system. (3 Marks)
- (Total 12½ Marks)**

QUESTION 2

- a. Computer hardware is the physical unit consisting of the electronic components of the computer system.
- You are required to:**
- i. List **SIX** components of a typical computer hardware (3 Marks)
 - ii. State **ONE** function of each of the components of the computer hardware stated in 2(ai) above (6 Marks)
- b. Enumerate **SEVEN** attributes of good information (3½ Marks)
- (Total 12½ Marks)**

QUESTION 3

- a. The movement of paper messages from one place to another can be replaced by electronic mail.

You are required to:

- i. Define Electronic mail (1½ Marks)
- ii. Enumerate **TWO** advantages and **TWO** disadvantages of using electronic mail. (4 Marks)
- b. List the **THREE** basic types of loss that any organisation will not want its computer system to suffer (3 Marks)
- c. Enumerate **FOUR** basic reasons for computer forensics. (4 Marks)

(Total 12½ Marks)

QUESTION 4

- a. Highlight **THREE** basic characteristics of accounting information system. (3 Marks)
- b. Enumerate **THREE** unpredictable disturbances that may necessitate the existence of controls in any business organisation. (3 Marks)
- c. List **FOUR** type of data/information that can be stored on the internal memory of the computer. (4 Marks)
- d. List **FIVE** sections or subsystems in any accounting information system. (2½ Marks)

(Total 12½ Marks)

QUESTION 5

- a. The two types of data input characters are combination of letters and integers.

You are required to:

State the **FOUR** major character sets and state one example in each case.

(4 Marks)

- b. Enumerate **FOUR** points at which system changeover procedure can take place. (4 Marks)
- c. i. What is cloud computing? (2½ Marks)

- ii. Enumerate **TWO** technologies that are used in cloud computing. (2 Marks)
(Total 12½ Marks)

QUESTION 6

- a. Network topology defines the layout of wires and devices in a network.

You are required to:

- i. Define star topology (1½ Marks)
- ii. Enumerate **THREE** advantages and **TWO** disadvantages of star topology (5 Marks)
- iii. List **FOUR** network topologies apart from star topology. (2 Marks)
- b. One of the major content of feasibility study is Cost –Benefit analysis.
- You are required to:**
- i. List **FOUR** examples of tangible costs (2 Marks)
- ii. List **FOUR** examples of intangible running costs (2 Marks)
- (Total 12½ Marks)

SOLUTIONS

SECTION A

MULTIPLE CHOICE QUESTIONS

1. C
2. A
3. D
4. C
5. C
6. A
7. E
8. D
9. C
10. E
11. A
12. C

13. C
14. B
15. C
16. D
17. B
18. A
19. C
20. A
21. E
22. C
23. B
24. A
25. C
26. C
27. B
28. C
29. C
30. C

Examiner's Report

Thirty questions are set in this section and questions spread across the whole syllabus.

About 60% of the candidates scored over 50% of the allocated marks.

The standard of the questions is very high and the general performance is very encouraging. The relative high scores obtained in this MCQ helped to increase the pass rate.

SHORT ANSWER QUESTIONS

1. Barcode Reader / Scanner
2. Cache Memory
3. Pseudocode / Algorithm / Flowchart
4. Resolution(Screen)
5. Pixels (Picture Element)
6. File Conversion / System Changeover
7. Fibre Optics / Fibre Optics Cable

8. Mechanistic system / Deterministic system
9. Pen Computer
10. Firewall
11. Closed System
12. ASCII (American Standard Code for Information Interchange) / (Arithmetic Standard Code for Instruction Interchange)
13. Hybrid Computer
14. Peer-to-peer
15. Surfing / Browsing
16. Pulse/ Clock Pulse / Processor Power
17. Magnetic Ink Character Recognition / Magnetic Ink Character Reader
18. Loader
19. Integrated software
20. Object Oriented Language (OOL)

Examiner's Report

Twenty questions are set in this section and the questions cover the entire syllabus.

About 70% of the candidates scored over 40% of the allocated marks. The performance is not quite encouraging.

The candidates need to be more familiar with the Information Technology (I.T) terms.

SECTION B

SOLUTION 1

a. i. Advantages of machine language include:

1. No need for language translator since it is already in form that can be directly used by the hardware
2. It occupies less space in the computer memory
3. Processing with machine language is very fast
4. It is directly understood by the Computer

Disadvantage of machine language include:

1. It is machine dependent i.e. the code on one machine/computer will not run on another machine
2. It is very difficult to write because of the use of 0s and 1s
3. It is only written by highly skilled programmers and electrical engineers

4. It is very easy to make mistake – It is prone to error or bug
 5. It is very difficult to detect and correct the mistakes
 6. All operation codes must be remembered
 7. All memory addresses have to be remembered
- ii. The other programming languages apart from machine language include:
1. Second general language / symbolic language e.g Assembly language
 2. Third generation language/high-level language e.g FORTRAN, PASCAL, COBOL, ADA
 3. Fourth generation language/very high level language e.g SQL, RPG, QBE, Mark
 4. Fifth generation language/object oriented language e.g C++, Java, Visual Basic
- b. The expected roles of users in Information system environment include:
- i. Specify users requirement during system development and acquisition
 - ii. Use the hardware and software responsibly for the information
 - iii. Report issues in the right format as agreed in the organization
 - iv. Comply with the usage policy of their organization
 - v. Report any suspicion of breach of security into their system to the appropriate quarters
 - vi. Users are expected to use software and not to develop them regardless of their technical knowhow
 - vii. Generate output from the system
 - viii. Users are not supposed to tamper or edit the content of the programs
 - ix. Operate the system according to the manual
- c. Factors to be considered when selecting data transmission media include:
- i. Speed of the transmission required
 - ii. Length of the transmission system
 - iii. Cost of each type of data transmission media (Cost effectiveness)
 - iv. System protocol that is available
 - v. Ease of Installation
 - vi. Accuracy of data transmission
 - vii. Ease of maintenance
 - viii. Efficiency of data transmission

Examiner's Report

This question tests candidates' understanding on programming languages and data transmission systems. It demands for the advantages and disadvantages of machine language. It also demands for the criteria in the selection of transmission media.

Over 80% of the candidates attempted this question and the performance is fair as 70% of the candidates scored above 50% of the allocated marks.

The major pitfall is the inability to mention the roles of computer users.

Candidates are advised to get more familiar with the roles of computer users in the I. T. environment so that good marks could be scored in future examinations.

SOLUTION 2

a. i. The six component parts of a computer hardware

1. Input unit / device
2. Internal / primary /main memory
3. Control unit
4. Arithmetic and logic unit (ALU)
5. Output unit / device
6. Secondary / Auxillary unit / device
7. Communication unit

ii. Function of each part of computer hardware are as follows:

1. Input device is used to transfer data and programs to the internal memory of the computer
2. Internal memory are used to store:
 - Program containing instructions that will be used for processing
 - Data read from input or secondary device
 - Intermediate result ready for further processing
 - Output information that is ready to be sent to output or secondary storage device
3. Control unit interprets and executes instructions received from the computer system
4. Arithmetic and logic unit performs both arithmetic calculation such as addition, subtraction, division and multiplication as well as logical operations using operators like <, >, =, <=, >=

5. Output unit receives the results of processing from the processor for transmission to the users
 6. Secondary /Auxiliary /backing storage provide for the storage of records and programs until when required for processing activities. It also supplement the internal memory
 7. The Communication unit transfer data and programs from one computer system to another.
- b. The attributes of good information include:
- i. It must be detailed enough for effective decision making
 - ii. It must be sufficiently accurate and free from errors
 - iii. It must be complete
 - iv. It must be meaningful
 - v. It must be cost effective
 - vi. It must be flexible
 - vii. The information must be communicated through the right channel to the recipients
 - viii. It must be simple and devoid of unneeded complexity
 - ix. It must be verifiable
 - x. It must be timely
 - xi. It must be very objective
 - xii. It must be compatible with the responsibilities of specific managers
 - xiii. It must allow decision makers to make effective decision
 - xiv. It must be brief

Examiner's Report

This question tests candidates' knowledge on the components of a computer system and the features of good information.

This question is very popular among the candidates as over 90% of the candidates attempted this question and the performance was encouraging as over 70% of the candidates scored over 50% of the allocated marks.

The major pitfall was that some candidates gave specific component names instead of the generic names.

For future examinations, candidates are advised to consult ICAN study texts.

SOLUTION 3

- a.i. Electronic mail (e-mail) is the electronic transfer of messages in coded, graphics or textual form from one place/ device to another

OR

E-mail is used for sending and receiving of electronic messages in the form of coded, graphic and textual information

- ii. Advantages of using e-mail include:

1. Since the transmission is electronic, it is almost instantaneous without delay
2. E-mail is several times cheaper than other forms of sending messages
3. It is very efficient for when prepared once, it can be transmitted to several different people at different locations
4. E-mail is generally protected by the use of password
5. Attachment can be used with e-mail to send document reports and memoranda.
6. E-mail is very easy to use. Daily correspondent can be sent and received and saved on the computer
7. The language used in mail is generally simple and informal
8. It is cheap
9. E-mail does not use paper hence enhancing paperless office
10. E-mail can carry adverts

Disadvantages of e-mail include:

1. E-mail does not allow full import of a message for user tends to be very informal and casual
2. When messages demand detailed discussion of a problem, e-mail may not be appropriate i.e. attachment size limitation
3. There is likelihood of information overload due to overuse of e-mail / E-mail Bankruptcy/ E-mail Fatigue
4. E-mail over the internet may be unduly delayed while virus infection is very common
5. It is system and network dependent
6. Spam mails: many people send unwanted emails to others.
7. E-mail may subject the users to some health hazards e.g. eye strain, finger strain

8. E-mail may be prone to security challenges such as hacking
- b. Types of loss to be avoided by computer system in an organization are:
- i. Loss of availability: when system is not available for use e.g during system breakdown
 - ii. Loss of integrity: Virus attack
 - iii. Loss of confidentiality: Access by unauthorized user
- c. Basic reasons for computer forensics are:
- i. In legal cases, computer forensics techniques are used to analyse computer system belonging to dependants (in criminal cases) or litigants (civil cases)
 - ii. To recover data in the event of hardware or software failures
 - iii. To analyse a computer after a break-in to determine how the attackers gain access and what the attackers did
 - iv. To gather evidence against an employee that an organization wishes to terminate e.g in cases of fraud, embezzlement, extortion
 - v. To gain information about how computer systems work for the purpose of debugging and performance optimization
 - vi. Falsification of data or forgery
 - vii. To determine system performance in order to carry out debugging where necessary
 - viii. To track Internet browsing activities
 - ix. To ascertain illegal reconstruction of events
 - x. Software piracy
 - xi. Homicide Investigation

Examiner's Report

This question tests candidates' knowledge on electronic means of message transfer and issues on computer forensics.

It demands for the definition, advantages and disadvantages of email. It also demands for the uses of computer forensics. Less than 40% of the candidates attempted this question and the performance was poor as 45% of the candidates scored less than 30% of the allocated marks.

The major pitfall was the inability of the candidates to explain computer forensics, which is a recent technology in I. T.

For future examinations, computer forensics has come to stay and candidates should study it using good I. T. texts and the ICAN study pack.

SOLUTION 4

- a. The basic characteristics of accounting information system are:
 - i. The existence of procedure for collecting data/ Input
 - ii. The existence of procedure to sort and classify data, carry out arithmetic and logic operation on data, hold data for immediate or future use, summarize data and check the results for accuracy/ Processing and output
 - iii. Existence of procedure for communicating the processed data to appropriate managers/ Information communication
- b. Unpredictable disturbance necessitating controls are:
 - i. Entry of powerful and advanced technological new computers into the market
 - ii. An unexpected rise in labour costs
 - iii. Failure of suppliers to deliver raw materials for production
 - iv. Government policies and regulation
- c. Types of data/information that can be stored on internal memory are:
 - i. Programs which contain instructions that will be used for processing
 - ii. Data that have been read from an input device or secondary storage device
 - iii. Immediate results (data currently being processed or used for processing other data)
 - iv. Output information that is ready to be sent to an output devices or secondary storage device
 - v. Programs and Instructions that have been executed
 - vi. Booting programs
 - vii. Data that has been used for processing
- d. The five sections or subsystems in accounting information system are:
 - i. Expenditure consisting of the activities involved in buying and selling for goods and services used by the organization

- ii. Production involving conversion of raw materials and labour to finished products
- iii. Human resource involving hiring and paying employees
- iv. Revenue consisting of selling goods and services and collecting payment for sales
- v. Financing involve obtaining necessary funds to run the organization and repaying creditors and distributing profits to investors.

Examiner's Report

This question tests candidates' knowledge on Accounting Information System (AIT) and control systems. It demands for the characteristics and subsystems of AIT and the data contained in the ROM and RAM.

This question is very easy but the performance is still very poor. Although over 80% of the candidates attempted this question, 60% of them scored below 50% of the allocated marks.

Accounting Information System is a specialized Information System and in particular it is the Information System studied by the candidates yet the solution given was poor. Also the data stored in the internal memory could not be mentioned. The solution given was poor.

SOLUTION 5

- a. The character sets include:
 - 1. 26 upper case letters: A, B, C -----, Z
 - 2. 26 lower case letters: a, b, c-----, z
 - 3. Punctuation marks (on keyboard) : ; , ' "
 - 4. Digits : 0, 1, 2, -----9
 - 5. Special Symbol: *, #, +, -, /
 - 6. Arithmetic and logic operation symbols e.g +, -, /, ÷
- b. Points at which system changeover procedure take place are:
 - i. When the system has been proved to the satisfaction of the analyst and other implementation activities has been completed
 - ii. When users and managers are satisfied with the results of the system test, staff training and reference manuals

- iii. When the operations manager is satisfied with the performance of equipment, operations staff and the timetable
 - iv. When the target data for changeover is due.
- c.i. Cloud computing is an internet- based computing where shared resources such as software and information are provided to computers and other devices on demand like public utility (electricity grid).

OR

It describes a new supplement, consumption and delivery model for information technology services based on the web-based tools or applications that users can access and use through a web browser as if it were a program installed on their own computer.

OR

Cloud Computing is a system in which applications and services run on a distributed network using virtualized resources and accessed by common internet protocols and networking standard.

OR

It can also be described as a trend in information technology that moves computing resources and data away from the user's desktop and personal computers into a large data center

OR

It is a web-based technology where quality services are provided to users including data and software on remote servers.

- ii. Cloud Computing technologies are:
- Virtualization: is the process of sharing license keys to physical instances of application among different users of the enterprise. The main purpose of this technology is to provide a standard version of the cloud application to all clients. It is popularly used for its flexibility and instant running process
 - Service-Oriented Architecture is an application which divides the services into individual business functions and procedure daily. This unique component of cloud application enables cloud related arrangements that can be modified and adjusted on request as business needs.

- Grid Computing is a process of connecting multiple servers from multiple to achieve a common goal. Grid computing turns large problems into smaller ones and broadcast to servers and place them within the grid. It is mainly applied in e-commerce and intended to share the resources on huge scale cluster computing.
- Utility Computing: This process relies on the pay per utilize model. It gives computational services on demand for a metered benefit. It mainly helps in cost cutting by reducing initial investment. As the computing requirements for a business change, the billing also changes accordingly, without acquiring any additional cost.

Examiner's Report

This question tests candidates' understanding on characters used by the computer system and the Cloud Computing System.

It demands for the types of characters used to enter data into the computer system and the technologies used by the cloud computing system.

Over 70% of the candidates attempted this question but the performance was poor. The candidates understand character set but did not know the cloud technologies instead the properties of the cloud system were given.

For future examination, the cloud technologies should be differentiated from the properties.

SOLUTION 6

- ai. Star topology is a network structure where all computers and devices are connected to a central server and messages are routed directly from the server to their various destinations.
- ii. Advantages of star topology include;
 - Cable damage on associated workstations has limited impact on the network
 - Relatively efficient and provide good control of the data processed on the network
 - The server in star network prevents collisions of messages.
 - The topology is very suitable for dumb terminals
 - Mixed transmission speeds can be accommodated on star network.

- It is possible to use existing cable connections.

Disadvantages of star topology include:

- Breakdown of the server renders the network unoperative (grounded)
- Requires more cable than most of the other topologies
- More difficult than other topologies to implement.
- The number of computers or nodes is limited by the complexity of the central server i.e network size is limited by the number of connection that are connected to the server 2

iii. Other network topologies include

1. Bus or linear network topology
2. Ring topology
3. Tree or hierarchical topology
4. Mesh topology
5. Hybrid network topology

bi. Examples of tangible cost include:

- Cost of hardware, software and other equipments
- Cost of producing documentation
- Cost of installation of the system
- Cost of system testing
- Changeover costs

ii. Intangible / running cost include;

- Staff salaries
- Overheads
- Training
- Maintenance
- Utilities and consumables
- Insurance and financing

Examiner's Report

This question tests candidates' understanding on the network architecture and some aspects of systems development.

It demands for the definition, advantages and disadvantages of star topology. It also demands for the tangible and intangible costs involved in feasibility study in systems development.

Over 70% of the candidates attempted this question and the performance was fair.

The first part was well attempted and the solution given was good but the second part was poorly answered.