



4. When goodwill is created in partnership and it is to be written off immediately, the entries require are
- Dr. Capital in previous profit ratio  
Cr. Capital in new profit ratio
  - Dr. Capital in new profit ratio  
Cr. Capital in previous profit ratio
  - Dr. Current account in new profit ratio  
Cr. Current account in previous profit ratio
  - Dr. Current account in previous profit ratio  
Cr. Current account in new profit ratio
  - Dr. Capital account in new profit ratio  
Cr. Current account in previous profit ratio
5. Goodwill would be created in each of the following situations, **EXCEPT**
- Change in partners' profit sharing ratio
  - Retirement of a partner
  - Conversion of partnership to a limited liability company
  - Dissolution of partnership
  - Amalgamation of partnership
6. The capital of Marie, Foday and Tejan are Le1,000,000, Le750,000 and Le 500,000 respectively. Profits are shared in ratio 3:2:1. Foday retires on the basis that the firm purchased his capital by the other partners in the sharing ratio of 3:1.
- The capital of Marie and Tejan are
- Le1,562,500 and Le687,500
  - Le1,500,000 and Le1,000,000
  - Le1,462,500 and Le420,000
  - Le862,500 and Le462,500
  - Le750,000 and Le500,000

**Use the following information to answer questions 7 & 8**

The authorised share capital of Drake plc of ₦10,000,000 was converted into 20,000,000 ordinary shares. A public offer of 95% of the shares was made at ₦0.75 each and were fully subscribed and paid up.

7. What is the nominal value of each of the shares?
- ₦5.00
  - ₦4.80
  - ₦0.50
  - ₦0.48
  - ₦0.40
  -

8. Calculate the total share premium received from the offer.
- A. ₦7,500,000
  - B. ₦6,650,000
  - C. ₦5,130,000
  - D. ₦5,000,000
  - E. ₦4,750,000
9. Which of the following is **NOT** relevant in choosing a method of computing the depreciation of a depreciable asset?
- A. Cost and residual value of the asset
  - B. Amount of money being owed in respect of the asset
  - C. Depreciation policy of the owner of the asset
  - D. Intensity of use of the asset
  - E. Acquisition date of the asset
10. Which of the following events after occurring the reporting date and before the financial statements are approved, are adjusting events?
- i. A valuation of property providing evidence of impairment in value at the reporting date
  - ii. Sale of inventory held at the reporting date for less than cost
  - iii. Discovery of fraud or error affecting the financial statements
  - iv. The insolvency of a customer with a debt owing at the reporting date which is still outstanding
- A. I, II, IV
  - B. I, II, III, IV
  - C. I, III, IV
  - D. I, IV
  - E. II and III
11. Which of the following will **NOT** be reported in statement of cash flows?
- A. Proceed from sales of non-current asset
  - B. Payment of dividends
  - C. Purchases of plant and machinery
  - D. Proceed from issue of loan notes
  - E. Issuance of share to acquire property
12. The amount of cash or cash equivalents that could currently be obtained by selling an asset in an orderly disposal is called
- A. Residual value
  - B. Carrying value
  - C. Net current value
  - D. Realisable value
  - E. Value in use

13. Which of the following is an example of a non-current liability?
- Loan Notes
  - Trade Payables
  - Dividend Payable
  - General Reserves
  - Accruals
14. Making an allowance for receivables is an example of which concept?
- Accruals
  - Prudence
  - Going concern
  - Materiality
  - Matching
15. Which of the following is **NOT** a book of prime entry?
- Purchase day book
  - Journal
  - Sales invoice
  - Sales day book
  - Cash book
16. Which of the following is correct?
- Capital = Total Assets + Total Liabilities
  - Capital = Total Liabilities - Total Assets
  - Capital = Non-current Assets - Total Liabilities
  - Capital = Total Assets - Total Liabilities
  - Capital = Non-current Assets + Non-current Liabilities

**Use the information below to answer questions 17 and 18.**

FCA Limited has the following opening balances on its ledger accounts:

	GH¢
Furniture	125,000
Trade accounts receivable	50,000
Bank account	25,000
Loan	75,000

17. What is the opening figure for Capital?
- GH¢200,000
  - GH¢175,000
  - GH¢150,000
  - GH¢125,000
  - GH¢75,000



23. In the book of the Lessee, the accounting treatment for operating lease payment is:
- |    |                             |                             |
|----|-----------------------------|-----------------------------|
| A. | Dr. Operating lease rentals | Cr. Cash                    |
| B. | Dr. Operating lease rentals | Cr. Asset leased            |
| C. | Dr. Cash                    | Cr. Operating lease rentals |
| D. | Dr. Asset leased            | Cr. Cash                    |
| E. | Dr. Cash                    | Cr. Asset leased            |
24. The credit entry for short working recoupable is recorded in the
- |    |                            |
|----|----------------------------|
| A. | Landlord's account         |
| B. | Minimum rent account       |
| C. | Royalty payable account    |
| D. | Royalty receivable account |
| E. | Tenant's account           |

**Use the following information to answer questions 25 and 26**

Non-current Asset:

Machinery cost	-	L\$2,500,000
Estimated useful life	-	10 years
Residual value	-	L\$12,500
Date of acquisition	-	1/1/2009
Depreciation method	-	Straight line

25. Calculate the accumulated depreciation on the non-current asset as at 31/12/2014
- |    |              |
|----|--------------|
| A. | L\$1,492,500 |
| B. | L\$1,368,125 |
| C. | L\$1,243,750 |
| D. | L\$1,143,700 |
| E. | L\$1,053,700 |
26. The carrying amount of the non-current asset as at 31/12/2016 was
- |    |              |
|----|--------------|
| A. | L\$1,144,375 |
| B. | L\$1,007,500 |
| C. | L\$510,000   |
| D. | L\$480,000   |
| E. | L\$420,000   |

27. A charitable organisation has the following figures for its 2015 accounting year:

	<b>₦</b>
Subscriptions received in 2015	840,000
Subscriptions unpaid in 2014	90,000
Subscriptions paid for 2016	45,000
Subscriptions due, not yet paid in 2015	54,000

How much subscriptions should be charged to the Income and Expenditure Account for 2015?

- A. ₦894,000
- B. ₦840,000
- C. ₦784,000
- D. ₦759,000
- E. ₦740,000

**Use the following information to answer questions 28 and 29.**

A trader paid rent of GMD162,000 for 10 months ended October 31, 2016. He prepares final account to December 31.

28. How much will he charge to the statement of profit or loss for 2016?

- A. GMD194,400
- B. GMD162,000
- C. GMD153,000
- D. GMD143,000
- E. GMD141,500

29. How much is carried and how is it classified in the statement of financial position as at 31 December 2016?

- A. GMD32,400 and classified as prepayment
- B. GMD32,400 and classified as accruals
- C. GMD30,200 and classified as prepayment
- D. GMD19,200 and classified as prepayment
- E. GMD16,200 and classified as accruals

30. In a Not-for-profit organisation, the excess of expenditure over income is

- A. Added to accumulated fund
- B. Added to reserve
- C. Deducted from reserve
- D. No effect on accumulated fund
- E. Deducted from the accumulated fund

**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. What effect will deficit in the income and expenditure account have on the statement of financial position of a Not-for-profit organisation?
2. The accounting entries to correct purchase of a computer wrongly debited into Purchases Account are ..... and .....
3. The journal entries to correct Furniture Account of L\$12,300 omitted from the Trial Balance and debited to the Suspense Account are ..... and .....
4. The accounting entries to record Provision for Discount on Trade Receivables are ..... and .....
5. A document sent by a supplier to a customer in respect of goods returned or over payments made by the customer is called .....
6. The model that requires an asset after initial recognition to be carried at cost less accumulated depreciation and impairment losses is called .....

**Use the following information to answer questions 7 and 8.**

A Property, Plant and Equipment which cost Le750m is expected to have a useful life of five years and an expected residual value of Le25m. Using straight line method of depreciation

7. What is the annual depreciation charge?
8. What will be the carrying amount of the assets after four years?
9. The benchmark standard of IAS 16 requires that Property, Plant and Equipment should be initially measured at .....
10. **Two** examples of non-cash transaction relating to financing activity are ..... and .....
11. The events that occur between the reporting date and the date when the financial statements are authorised for issue is known as .....
12. State the formula for calculating dividend yield.
13. In Branch Accounts, the account which will be prepared to show the "Loading" added to the cost to arrive at the selling price using cost plus a percentage method is .....



**Required:**

Using the above figures, calculate

- i. Net profit on total asset percentage (1½ Marks)
- ii. Net profit to capital employed (1½ Marks)
- iii. Proprietary ratio (1½ Marks)
- iv. Current ratio (1½ Marks)
- v. Quick asset ratio (1½ Marks)

**(Total 12½ Marks)**

**QUESTION 2**

Two traders, Adeshina and Abiodun agreed to undertake a joint venture in low-priced goods sharing profits in the ratio of 1:3. The venturers kept separate books to record the joint venture transactions as follows:

(i) Transactions recorded by Adeshina

	₦'000
Purchases of goods for cash	200
Expenses incurred	140
Cost of goods appropriated from own inventory	200
Cash sales	400
Credit sales	300

(ii) Transactions recorded by Abiodun

	₦'000
Purchases made	600
Expenses incurred	60
Cash sales	800
Unsold inventory taken over	100

(iii) At the finalisation of the joint venture, the venturers balanced their accounts with a transfer of cash.

**You are required to show in respect of the above transactions:**

- a. The joint ventures accounts in the respective venturers' books.
- b. A memorandum joint venture trading account. **(Total 12½ Marks)**

### QUESTION 3

After sharing profit or loss equally for many years, Joko and Tade trading as Jokotade Enterprises decided to admit Yaya as a partner who contributed cash of L\$112,000,000 as his capital to get one-fifth share of future profits.

The following are the extracts of the statement of financial position of the firm immediately before the admission of Yaya on January 1, 2017.

**Jokotade Enterprises**  
**Statement of financial position as at December 31, 2016**

	L\$'000
<u>Non-current assets</u>	
Motor vehicles	175,000
Plant and equipment	196,000
	<u>371,000</u>
Current assets	62,000
	<u>433,000</u>
<u>Equity and liabilities</u>	
Capital - Joko	120,000
- Tade	180,000
	<u>300,000</u>
Liabilities	133,000
	<u>433,000</u>

**Notes:**

- (i) To effect the admission of Yaya, the assets were revalued as follows:  
Plant and equipment      L\$236,000,000  
Motor vehicles              L\$163,000,000
- (ii) Other assets and liabilities retained their carrying amount.
- (iii) Goodwill was valued at L\$30,000,000 and Yaya paid in his share of goodwill.
- (iv) The relative profit sharing ratio of Joko and Tade remained unchanged. (The profit sharing ratio of the three partners is now 5:5:2)

**Required:**

- a. Prepare the revaluation account and partners' capital accounts to effect the admission of Yaya.
  - b. Prepare the statement of financial position after the adjustments as at January 1, 2017.
- (Total 12½ Marks)**

#### QUESTION 4

The balances extracted from the books of Money Matters Enterprises for the year ended December 31, 2016 were

	GMD
Provision for Depreciation: Motor vehicle	180,000
Salaries and wages	243,000
Motor vehicle	900,000
Inventory 1 January 2016	40,000
Capital 1 January 2016	583,000
Trade payables	140,000
Allowance for doubtful debts	24,000
Trade receivables	747,400
Motor vehicle expenses	53,600
Sales	3,657,000
Purchases	2,600,000

#### Additional information:

- (i) Inventory on hand as at 31 December 2016 was valued at GMD179,600.
- (ii) Motor vehicle to be depreciated at 10% using reducing balance method.
- (iii) Allowance for doubtful debts at 5% of Trade receivables.
- (iv) Motor vehicle expenses of GMD4,400 wrongly debited to the salaries and wages account.
- (v) Accrued motor vehicle expenses GMD5,900.

**You are required to prepare extended (columnal) trial balance with the following columns for:**

- a. Initial trial balance
- b. Adjustments
- c. Final adjusted trial balance

**(Total 12½ Marks)**

#### QUESTION 5

- a. List the components of a complete set of financial statements for SMEs.  
(5 Marks)
- b. What is Small and Medium Entities (SME) as described by IFRS and state its distinguished features from other big entities?  
(7½ Marks)

**(Total 12½ Marks)**

#### QUESTION 6

- a. What are the benefits of adopting International Accounting Standards?  
(6¼ Marks) b.  
State **FIVE** functions of International Accounting Standard Boards (IASB).  
(6¼ Marks)

**(Total 12½ Marks)**

**SOLUTION: MCQ**

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

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

**WORKINGS**

**Question 6**

<u>Partner's Capital Account</u>	Marie Le	Tejan Le
Balance b/f	1,000,000	500,000
Purchase of Foday's capital (3:1)	<u>562,500</u>	<u>187,500</u>
Closing Balance	<u>1,562,500</u>	<u>687,500</u>

**Question 7 and 8**

Total Nominal Value (N)	N10,000,000
Total number of ordinary shares	20,000,000 ord. shares
<b>Nominal value per share (N10,000,000/20,000,000)</b>	<b>N0.50</b>
Number of ordinary shares to be issued = 95% x 20,000,000	19,000,000 ord. shares
Total proceeds from the shares = 19,000,000 x N0.75	N14,250,000
Nominal value of shares issued = 19,000,000 x N0.50	N9,500,000
<b>Total Premium on the shares issued = 19,000,000 x N0.25</b>	<b>N4,750,000</b>

- 17. Capital = Assets – Liabilities  
 = (N125,000 + 50,000 + 25,000) – 75,000  
 = N125,000
- 18. Current Assets = 50,000 + 25,000  
 = N75,000

**Question 21 and 22**

	<b>GH¢</b>
Initial Deposit	68,000
Total instalments (GH¢85,000 x 4years x 2)	<u>680,000</u>
<b>Hire Purchase Price</b>	<b>748,000</b>
Cash Price	<u>150,000</u>
Total Hire Purchase Interest	<u>598,000</u>
Number of Instalment required = 4years x 2 (half yearly)	8 times
HPI per instalment = GH¢598,000/8 instalments	74,750
<b>Total HPI charged in year one = GH¢74,750 x 2</b>	<b>149,500</b>

25.  $(\text{N}2,500,000 - \text{N}12,500) \div 10 \text{ years} = \text{N}248,750$   
 $\text{N}248,750 \times 6 \text{ years} = \text{N}1,492,500$

26.  $\text{N}248,750 \times 8 \text{ years} = \text{N}1,990,000$   
 $\text{N}2,500,000 - \text{N}1,990,000 = \text{N}510,000$

27. **Subscriptions Account**

	N		N
Balance b/d	90,000	Receipt & payment	840,000
Income & Exp.	759,000		
Balance c/d	<u>45,000</u>	Balance c/d	<u>54,000</u>
28.	<u>894,000</u>		<u>894,000</u>
Balance b/d	54,000	Balance b/d	45,000

$\text{N}162,000 \div 10 \text{ months} = \text{N}16,200 \text{ per month}$   
 $\text{N}162,000 + \text{N}32,400 \text{ (for 2 months)}$   
**N194,400**

**EXAMINER'S REPORT**

The question cut across the subject syllabus. This section was well attempted by all the candidates being compulsory for them, about 80% of the candidate did very well.

**SHORT ANSWER SOLUTION**

1. Decreases/Reduces the accumulated fund
2. Dr. Computer Account, Cr purchases Account
3. Dr. Furniture Account ₦12,300  
Cr. Suspense Account ₦12,300
4. Dr, statement of profit or loss Account  
Cr. Provision for Discount on Trade Receivables
5. Credit Note
6. Cost Model
7. N145,000,000
8. N170, 000,000
9. Cost
10. (i) Conversion of loan notes/preference shares to equity  
(ii) Issue of shares capital to acquire property, plant and equipment  
(iii) Bonus Issue.
11. Events after reporting date/Post Balance sheet event
12. 
$$\frac{\text{Dividend per share}}{\text{Market price per share}} \times \frac{100}{1}$$
13. Branch Inventory Adjustment Account
14. Finance lease
15. Vendor
16. Royalty
17. Settled by sharing it between or among the other solvent partners in the ratio of their last agreed capital.
18. (i) Cash/Bank  
(ii) Issue of shares

(iii) Issue of loan notes

19. Statement of distribution of profit/Appropriation Account

20. As agreed by the partners

### **Workings**

7.  $[(\text{Le } 750\text{m} - \text{Le } 2\text{m}) / 5 \text{ years}] = \text{Le } 145\text{m}$

8.  $[(\text{Le } 750\text{m} - (\text{Le } 145\text{m} \times 4 \text{ years}))] = \text{Le } 170\text{m}$

### **EXAMINERS' REPORT**

The questions in this section were within the scope of the syllabus, testing deep knowledge on the principle of accounting.

The pass rate was about 41%, thus the performance was fair, the candidates were not making use of the study pack very well, hence the candidate are advice to make use of study packs, ICAN Insight while preparing for future examination.

### **SECTION B**

#### **SOLUTION 1**

- a. i
- **Profitability:** This is the measure of relationship between profit and the resources employed in earning it: the resultant figure is usually expressed as a percentage.
  - The resources aspect of the relationship may comprise total assets or fixed assets plus working capital or equity fund.
  - For other business which is not assets reliant, an alternative suitable measure might be adopted.
  - Thus in a profession such as that of an accountant or a solicitor, profit would be more appropriately related to fee income less expenses.
  - A subsidiary measure of profitability is in the relationship between gross profit and net profit to sales.
- ii
- **Financial Stability:** This measures the degree of safety of a business from failure due to inability to pay its way.
  - It is necessary to consider stability in both the long and short term.
  - Thus, in assessing financial stability, important relationships.

- Those subsisting between total resources owned and external obligations (that is solvency)
- And between short term resources owned and external obligations which have to be met in the near future (that is, liquidity).

$$\text{b.(i) Net profit on Total Asset \%} = \frac{\text{Net Profit}}{\text{Total Assets}} \% \\ = \frac{\text{N}1,275,000}{\text{N}10,040,000 + 160,000} \times \frac{100}{1} = 12.5\%$$

$$\text{(ii) Net profit to Capital Employed} = \frac{\text{Net Profit}}{\text{Shareholder 's fund} + \text{Long term loans}} \times \frac{100}{1} \\ = \frac{\text{N}1,275,000}{\text{N}6,675,000 + \text{N}3,240,000} \times \frac{100}{1} = 12.86\% \quad 1$$

$$\text{(iii) Proprietary Ratio} = \frac{\text{Share holder s' Fund}}{\text{Total Tangible Assets}} \% \\ = \frac{\text{N}6,675,000}{\text{N}10,040,000} \times \frac{100}{1} = 66.5\%$$

$$\text{(iv) Current Ratio} = \frac{\text{Total Current Assets}}{\text{Currents liabilities}} : 1 \\ = \frac{\text{N}160,000}{\text{N}125,000} = 1.28 \\ = 1.28 : 1$$

$$\text{(v) Quick Ratio} = \frac{\text{Total Current Asset} - \text{Inventory}}{\text{Current Liabilites}} : 1 \\ = \frac{\text{N}160,000 - \text{N}95,000}{\text{N}125,000} = 0.52 \\ = 0.52 : 1$$

### EXAMINERS' REPORT

The question tests candidates' understanding of profitability & financial stability. About 50% of the candidates attempted Question 1a&b.

In question 1a: About 80% of the candidates that attempted it scored about 15% of the total allocated 5 marks in the section.

In question 1b: About 60% of the candidates that attempted this question scored about 50% of the allocated 7 ½ marks. The performance was just on the average.

Candidate should study well and understand this basic concept in accounting.

**SOLUTION 2**

**a. ADESHINA BOOKS**

**JOINT VENTURE WITH ABIODUN**

	N'000		N'000
Cash purchases by Adeshina	200	Cash – sales proceeds	
Cash Expenses by Adeshina	140	Received by Adeshina	400
Goods appropriated by Adeshina from own stock	200	Receivables–credit sales by Adeshina	300
<b>ABIODUN'S BOOKS</b>			
Profit and loss account			
Share due to Adeshina	100		
Cash paid to Abiodun to settle	<u>60</u>		
	<u>700</u>		<u>700</u>

**JOINT VENTURE WITH ADESHINA**

	N'000		N'000
Cash –purchases by Abiodun	600	Cash – sales proceeds	
Cash-Expenses by Abiodun	60	Received by Abiodun	800
Profit or loss a/c share		Stock taken over by Abiodun	100
Due to Abiodun	<u>300</u>	Cash received from Adeshina to settle	<u>60</u>
	<u>960</u>		<u>960</u>

**b. ADESHINA AND ABIODUN**

**MEMORANDUM JOINT VENTURE ACCOUNT**

	N'000		N'000
Purchases (Total)	1,000	Sales (Total)	1,500
Expenses (Total)	200	Stock taken over	100
Share of profit to :-			
- Adeshina (1)	100		
- Abiodun (3)	300		

400  
1,600

1,600

**EAMINERS' REPORT**

The question tests the candidates' knowledge of joint venture account and preparation of memorandum joint venture trading account.

About 70% of the candidates attempted the question and about 50% of them scored above average marks allocated. However, most candidates had problem in the area of share of profit among the ventures. Also calculation of sales posed a bit of a problem for them.

The allocation of marks was found to be fair, ordinarily the question should have been a bonus question if not for the fact they ignore this aspect of the syllabus.

Candidates are advised to cover all aspect of the syllabus while preparing for future examination.

**SOLUTION 3**

ai.

**Revaluation Account**

	L\$'000		L\$'000
Motor vehicles	12,000	Plant & Equipment	40,000
Share of profit:			
Joko	14,000		
Tade	<u>14,000</u>		<u>40,000</u>
	<u>40,000</u>		

**Alternative**

**Revaluation Account**

	L\$'000	
		L\$'000

Motor Vehicles	175,000	Motor Vehicles	163,000
Plant & Equipment	196,000	Plant & Equipment	236,000
Share of profit			
Joko $\frac{1}{2}$ x 28,000	14,000		
Tade $\frac{1}{2}$ x 28,000	<u>14,000</u>		
	<u>399,000</u>		<u>399,000</u>

ii. **Capital Accounts**

	Joko	Tade	Yaya		Joko	Tade	Yaya
	L\$000	L\$000	L\$000		L\$000	L\$000	L\$000
Joko			2,500	Bal c/d	120,000	180,000	
Tade			2,500	Revaluation	14,000	14,000	
Bal c/d	136,500	196,500	112,000	Cash			117,000
				Goodwill "c	<u>2,500</u>	<u>2,500</u>	
	<u>136,500</u>	<u>196,500</u>	<u>117,000</u>	Bal b/f	<u>137,000</u>	<u>196,500</u>	<u>117,000</u>
				Bal b/f	136,500	196,500	112,000

b. Statement of financial position as at January, 2017

	L\$000
Motor vehicles	163,000
Plant and Equipment	<u>236,000</u>
	399,000
Current assets (62,000 + 117,000)	<u>179,000</u>
	<u>578,000</u>

L\$'000

**Capital & Liabilities**

Capital -	Joko	136,500	
	Tade	196,500	
	Yaya	<u>112,000</u>	445,000
Liabilities			<u>133,000</u>
			<u>578,000</u>

**EXAMINERS' REPORT**

The question tests the candidate knowledge on Revaluation & Partner Admission in partnership. About seventy percent (70%) of the candidates attempted the question and performance was average.

Common pitfall was the inability of the candidates to correctly treat the recognition and de-recognition for the goodwill occasioned by admission of a new partner (Yaga). Candidates are advised to study and practise extensively.

**SOLUTION 4**

**MONEY MATTERS ENTERPRISES**

Extended Trial Balance for the Year ended 31 December, 2016

	Initial T/B		Adjustments		Final T/B	
	Dr	Cr	Dr	Cr	Dr	Cr
Provision for Depreciation Motor Vehicle		180,000		72,000		252,000
Salaries & Wages	243,000			4,400	238,600	
Motor Vehicle	900,000				900,000	
Inventory – 1 Jan	40,000				40,000	
Capital		583,000				583,000
Trade Payables		140,000				140,000
Prov. For Doubtful Debts		24,000		13,370		37,370

Trade Receivables	747,400				747,400	
Motor Vehicle Expenses	53,600		[5900] [4400]		63900	
Sales		3,657,000				3,657,000
Purchases	2,600,000				2,600,000	
Inventory 31 Dec., 2016			179,600		179,600	
Trading Account				179,600		179,600
Profit or loss:						
Depreciation (Motor Veh.)			72,000		72,000	
Doubtful Debts			13,370		13,370	
Accruals				5,900		5,900
	4,584,000	4,584,000	<u>275,270</u>	<u>275,270</u>	<u>4,854,870</u>	<u>4,854,870</u>

### Tutorial

Prov. For Doubtful Debts

	₱
Balance b/d	24,000
(5% x ₱747,400)	<u>37,370</u>
	<u>13,370</u>

Provision for Depreciation Motor Vehicle

$(₱900,000 - ₱180,000) \times 10\% = ₱72,000$

### EXAMINERS' REPORT

This question tests candidate's knowledge about extended Trial balance or better still final account preparation, their disposition and understanding of adjustment journals was also tested.

About 75% of the candidates attempted the question. In terms of scoring and performance about 45% of the candidates that attempted the question got above 50%, indicating an average performance.

## **SOLUTION 5**

### **a. COMPLETE SET OF FINANCIAL STATEMENT FOR SMEs**

1. A statement of financial position as at the reporting date
2. A single statement of profit or loss and other comprehensive income for the reporting period displaying all items of income and expenses recognised during the period including those items recognised in determining profit or loss and items of other comprehensive income.

**OR**

A separate statement of profit or loss and a separate statement of comprehensive income.

The separate statement of comprehensive income will begin with profit or loss and displayed the items of other comprehensive income.

3. A statement of changes in equity for the period.
4. A statement of cash flows for the period
5. Notes, comprising a summary of significant accounting policies and other explanatory information.

### **b. Small and medium entities (SME's) are private and non-publicly accountable entities.**

They are different from other big entities because:

1. They do not have public accountability.
2. Their debt or equity instruments are not traded in a public market.
3. They are not in the process of issuing such instrument for trading in a public market
4. They do not hold assets in fiduciary capacity for a broad group of outsiders as one of their primary businesses.
5. The amount of its annual turnover is not more than N500m or such amount as may be fixed by the Corporate Affairs Commission
6. They do not publish general purposes financial statements for external users.

7. No board members are aliens
8. No member is a government or a government corporation or agency or its nominee.
9. The directors among them hold not less than 51% of its equity share capital.

### **EXAMINERS' REPORT**

The question tends to test the candidates' understanding of Financial Statement for Small and Medium Scale Enterprises (SME) as stated by International Financial Reporting Standard (IFRS) as well as to state the distinguishing features from other bigger entities.

Candidates lack understanding of the question; they could not differentiate between feature of SMEs and differences between SME and other bigger entities.

About 30% of the candidates attempted the question with an average score of 4 marks out of 12½ marks.

Candidates are expected to study wide before any examination, make use of materials like study packs on all subjects and also attend lecturer to prepare well before the examination.

### **SOLUTION 6**

#### **a. BENEFITS OF ADOPTING INTERNATIONAL ACCOUNTING STANDARD**

1. It allows for uniformity in presentation of financial statements across the globe
2. The credibility of financial reporting is enhanced
3. The quality of accountancy and audit services, actuarial, valuation and corporate governance standard is improved.
4. It brings about convergence of national accounting standards and IFRS to high quality solutions
5. It enhances easy borrowing from international institutions
6. Comparability of financial statements with foreign similar entities.

7. It gives rooms for developing a high quality, understandable, enforceable and globally accepted financial statements.
8. The use of one common global reporting language.
9. Investors will have better information for decision making.

**b. FUNCTIONS OF INTERNATIONAL ACCOUNTING STANDARD BOARD (IASB)**

1. Develop and publish in the public interest, accounting standards to be observed in the preparation of financial statements.
2. Promote the general acceptance and adoption of such standards by preparers and users of financial statements;
3. Promote and enforce compliance with the accounting standards developed or reviewed by the board;
4. Review from time-to-time the accounting standards developed in line with the prevalent social, economic and political environment.
5. Receive from time-to-time notices of non-compliance with its standards from the preparer, user or auditor of an account.
6. Receive copies of all qualified reports together with detailed explanations for such qualifications from auditors of the accounts within a period of 60 days from the date of such qualifications;
7. Perform such other duties which in the opinion of the council, are necessary or expedient to ensure the efficient performance of the functions of the board.

**EXAMINERS' REPORT**

The question tests candidates understanding of International Accounting Standard (IAS) and its application in accounting publication. About 70% of the candidate attempted the question. About 60% of the candidate that attempted the question performed below average.

Student's poor performance can be attributed to lack of deep knowledge. Student should as a matter utmost determination study hard to be able to understand and comprehend IAS.

Proper coverage of the syllabus is important and tuition centres should be admonished to pay particular attention to understand IAS. It is key to their accounting career.





5. In public schools, trusts and foundations are managed by
- A. External Auditors
  - B. Internal Auditors
  - C. Appointed Committees
  - D. Principals
  - E. Bursars
6. The Annual Board of Survey is convened by
- A. Accountant-General of the Federation
  - B. Auditor-General for the Federation
  - C. Permanent Secretary of each Ministry
  - D. Director, Finance & Accounts of each Ministry
  - E. Internal Auditor of each Ministry
7. Which of the following is **NOT** the basic distinction between “budget” and “development plan”?
- A. Budget is short-term plan while a development plan is longer
  - B. Budget is flexible while a development plan is fixed in terms of ends and means specification
  - C. Budget may not cover the entire system of the economy, while a development plan covers the entire structure of the economy
  - D. Budget relies heavily on internal and indirect taxes while a development plan depends heavily on foreign exchange earnings and heavy capital inflows from abroad
  - E. Budget is concerned with current problems while a development plan addresses fundamental economic issues
8. Which of the following is **NOT** used in the Pay Office?
- A. Cash book
  - B. Voucher register
  - C. Cheque book
  - D. Contract register
  - E. Treasury receipt book
9. Which of the following is **NOT** a member of National Council on Public Procurement?
- A. Minister of Finance
  - B. Secretary to the Government of the Federation
  - C. Minister of Foreign Affairs
  - D. Head of Service of the Federation
  - E. The Economic Adviser to the President

10. Which of the following is **NOT** required for budgeting?
- A. Planning
  - B. Motivation
  - C. Communication
  - D. Standard for measure of performance
  - E. Auditing
11. Which of the following information is **NOT** contained in the payment vouchers in respect of contract awarded through tender?
- A. Certified true copy of the contract agreement
  - B. Copy of the approval given by the approving authority
  - C. List of directors of the company that won the contract
  - D. Certified true copy of all the minutes of the meeting of the Tender Board in relation to the award of the contract
  - E. Copy of each payment voucher in respect of total amount already paid in respect of the contract
12. Application for virements should have the following features, **EXCEPT**
- A. Be in writing
  - B. Indicate that both sub-heads are within the same economic head
  - C. State that after the transfers, the other sub-heads will not be in deficit
  - D. That the sub-heads should be from different economic Head
  - E. State that a particular sub-head is in deficit
13. Which of the following is **NOT** a feature of Non-self Accounting Units?
- A. Attached voucher to their return
  - B. Do not maintain Accounting Code
  - C. Render return in Sub-Heads
  - D. Do not maintain clearance account
  - E. Render return in details
14. Which of the following information must **NOT** be clearly displayed in the Financial Statements?
- A. Name of the reporting entity
  - B. Name of the accountant of the company
  - C. Presentation currency
  - D. Reporting date and the period covered
  - E. Responsibility Statement

15. Which of the following is **NOT** correct, concerning variation control sheet?
- A. It shows variation in the emoluments, taxable allowances and the deductions from emolument for each other
  - B. The total of the variation will be added or subtracted from the total of the previous month
  - C. The figure obtained from the additions or subtraction will determine the total emoluments, taxable allowance and other type of deductions for the previous month
  - D. The figure obtained from the additions or subtraction will determine the total emoluments, taxable allowance and other type of deductions for the current month
  - E. It is designed to ensure a greater degree of control over the preparation of payrolls
16. ATRRS is an acronym for
- A. Automated Teller Recording and Reporting System
  - B. Automated Transfer Recording and Reporting System
  - C. Automated Transaction Recording and Reporting System
  - D. Accounting Transaction Reporting and Recording System
  - E. Automated Transfer Recording and Reviewing System
17. Which of the following is **NOT** a difference between sub-self accounting unit and self-accounting unit?
- A. Self-Accounting unit maintains clearance account while Sub-Self Accounting unit does not maintain clearance account
  - B. Self-Accounting unit maintains accounting code for Sub-Self Accounting unit
  - C. Sub-Self-Accounting unit renders returns in Sub-Head while Self-Accounting unit renders returns in head
  - D. Sub-Self-Accounting unit may attach vouchers while Self-Accounting unit will not attach vouchers
  - E. Sub-self Accounting unit render returns in details while Self-Accounting unit render summarised returns
18. Transcripts is prepared by (i) ..... and rendered to (ii) ..... on (iii) ..... basis
- A. (i) Final Account Section (ii) Accountant-General (iii) Monthly
  - B. (i) Final Account Section (ii) Accountant-General (iii) Quarterly
  - C. (i) Final Account Section (ii) Auditor-General (iii) Monthly
  - D. (i) Final Account Section (ii) Auditor-General (iii) Quarterly
  - E. (i) Salary Section (ii) Auditor-General (iii) Monthly

19. Boards of Survey can be classified into ..... classes
- A. Two
  - B. Three
  - C. Four
  - D. Five
  - E. Seven
20. Which of the following best describes the term 'Board of Enquiry'?
- A. Is constituted to audit the Financial Statements
  - B. A situation in which one or more persons are constituted into a Board to conduct an investigation
  - C. Investigation as to make enquiries about something
  - D. A situation in which Directors of each Ministry query payment vouchers
  - E. A situation in which no Director of a ministry query payment vouchers
21. The Final Accounts of the Federal Government can be obtained from the following documents, **EXCEPT**
- A. The Estimate
  - B. Official Gazette
  - C. The Annual Reports of the Accountant-General
  - D. Transcripts from Ministries and Extra Ministerial Departments
  - E. Construction contract awarded by the Federal Government
22. The specific principles, bases, conventions, rules and practices applied by an entity in preparing and presenting financial statements is known as
- A. Accounting estimate
  - B. Accounting guidelines
  - C. Accrual Accounting
  - D. Cash Accounting
  - E. Accounting Policies
23. Which of the following best define 'Materiality' in the standard?
- A. Assessing whether an omission or misstatement could influence decisions of users, and so be material
  - B. Applying a new accounting policy to transactions
  - C. Assessing whether an omission or misstatement could influence decisions of users and so be immaterial
  - D. Assessing the nature of the change in policy
  - E. Assessing the quality of materials for production

24. The National Assembly in the removal of the Auditor-General from office must be
- A. Supported by three quarter majority of the Senate praying that he be so removed for inability to discharge the functions
  - B. Supported by one-third majority of the Senate
  - C. Supported by the Deputy Senate President
  - D. Supported with disagreement in the Upper House
  - E. Supported by two-third majority of the Senate
25. Which of the following officer is **NOT** a part of the Executive arm of government?
- A. Senate President
  - B. President
  - C. Governor
  - D. Local Government Chairman
  - E. Minister
26. Which of the following is **NOT** an internal user of Public Sector Accounting?
- A. Government employees
  - B. Revenue collectors
  - C. Trade unions
  - D. Local and foreign investors
  - E. Accounting officers
27. Under the Modified Accrual Basis, which of the following is correct?
- A. Revenue is recognised on cash basis and expenditure on accrual basis
  - B. Only expenditure is recognised on cash basis
  - C. Only revenue is recognised on cash basis
  - D. Revenue and expenditure are recognised on accrual basis
  - E. Revenue is recognised on accrual basis while expenditure is recognised on cash basis
28. Which of the following is **NOT** a public money?
- A. Repayment of government loan
  - B. Dividend from government investment
  - C. Interest earned
  - D. Sale proceeds of government property
  - E. Deposit

29. In a Local Government, which of the following has the responsibility to debate, approve and amend the budget
- A. Local Government Revenue Committee
  - B. Auditor-General for Local Government
  - C. Chairman of the Local Government Council
  - D. Secretary to the Local Government
  - E. Local Government Council
30. Which of the following ministries has a representative on the Board of the EFCC?
- A. Education
  - B. Power and Steel
  - C. Works
  - D. Agriculture
  - E. Justice

**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 Officer that is responsible for the preparation and presentation of Financial Statements of the Parastatal is .....
2. The body that has the power to prosecute directly without recourse to the Attorney-General's office is .....
3. The pre-payment made by entities for goods and services expected to be received is called .....
4. The parastatals are expected to adopt. .... basis of accounting in preparation and presentation of financial status.
5. A medium-plan whereby projections are made and acted upon yearly in keeping with the state of the economy is called .....
6. The mechanism for ensuring strict compliance with the openness, competition and cost accuracy, rules and procedure that should guide contract awards in government is called .....

7. The assistance received by a department apart from releases from the Consolidated Revenue Fund (CRF) deducted from the total supply estimates is known as .....
8. The body set-up by the government to oversee the scrutiny of contract-processes and approval of the contracts is known as .....
9. An IT-based system for budget management and accounting implemented by the Federal Government of Nigeria (FGN) to improve Public Expenditure Management Processes is .....
10. Ministry or Ministerial Department which has the authority and capacity to collect and disburse the resources accruing to it is known as .....
11. Examples of Non-Self Accounting unit are ..... and .....
12. A summary of total receipts and payments as posted in the cashbook of a Self-Accounting unit is a .....
13. Among the Financial Officers in a Local Government, the Officer that must not be the cashier in the Treasury is .....
14. Before inclusion in the Financial Regulations, new rules and policies could be introduced by issuance of .....
15. The body established by Act of Parliament No.5 of December 2002 which has the power to enforce the provisions of the Bank and other Financial Institutions Act is .....
16. The National Council on Public Procurement was established by ..... Act
17. The authority which empowers government officers controlling vote to incur expenditure is called .....
18. The responsibility of the Annual Board of Survey, on the cash book balance and stamps held at mission overseas lies with .....
19. The office of the Accountant-General of the Federation is an Extra-Ministerial Agency under the .....
20. A misstatements in, and omissions from an entity's financial statements for one or more prior periods arising from a failure to use, or misuse of, reliable information that was available and could reasonably be expected to have been obtained and taken into account in preparing those statements is known as .....

**SECTION B****ATTEMPT ANY FOUR QUESTIONS****QUESTION 1**

- a. List **FIVE** main characteristics of Cash Basis of Accounting (7½ Marks)
- b. State **FIVE** functions of Minister of Finance (5 Marks)
- (Total 12½ Marks)**

**QUESTION 2**

- a. List **TEN** sources of Revenue payable into Consolidated Revenue Fund (5 Marks)
- b. Better-living Local Government awarded a contract for the construction of drainages in four towns within the local government to the tune of ₦17.5million. The contract was to be completed in five months. It is the practice of the local government to pay mobilisation to a contractor to the tune of 60% of total contract-sum, while the remaining amount is payable at completion of the contract less a retention fee of 10% of the balance. Every contract is subject to 5% Development Levy. The contract was awarded to the Youth-Leader of the ruling party as a way to compensate him for his efforts at making the party win at the local government election

**Required**

- i. Compute the amount collected by the contractor on mobilisation. (2 Marks)
- ii. How much was collected at the completion of the contract? (4 Marks)
- iii. 'Due process' ensures that strict compliance to rules and procedures take place on award and execution of contracts. State **THREE** benefits of 'Due Process'. (1½ Marks)

**(Total 12½ Marks)**

**QUESTION 3**

- a. i. What is the full meaning of the Acronym "GIFMIS"? (1 Mark)
- ii. State **FOUR** of the main objectives of GIFMIS (6 Marks)
- b. i. Government businesses are to be carried out with adequate focus on Government Financial Regulations. In line with Government Accounting, describe the term 'Survey' (1½ Marks)

- ii. State the proceedings following the completion of a survey as stipulated in the Financial Regulations (1808) (4 Marks)

**(Total 12½ Marks)**

#### **QUESTION 4**

- a. The newly transferred Chief Store Officer of ABUKI State Ministry of Works made the following observations after inspection of the hand over note and store records:

- Stores whose total value worth ₦1,500,000 was not accounted for in the handing over note. It could not be ascertained when the store items got missing.
- Obsolete store items worth ₦700,000 was also discovered but yet to be written off.

**You are required to state the step to be taken by:**

- i. Chief Store Officer on loss of Store (2 Marks)
- ii. Chief Store Officer on obsolete Store (2 Marks)
- iii. The actions to be taken by Head of Department on both situations (3½ Marks)

- b. At the apex of the verification process is the Auditor-General for the Federation who ensures that the Executive arm of Government is carrying out its avowed duties with probity. The enormity of inputs-money, men and materials also calls for auditing. In view of the above, write short notes on the following:

- i. Effectiveness Audit (2 Marks)
- ii. Financial Audit (3 Marks)

**(Total 12½ Marks)**

#### **QUESTION 5**

- a i. The Accountant-General of the Federation is saddled with the responsibility of the preparation, production and publication of monthly and annual statements of accounts.

List the **FOUR** major statements and **THREE** of the supporting statements.

(5½ Marks)

- ii. The annual reports of the Accountant-General are the most detailed source as they contain a number of Financial Statements. State **TWO** items that the reports contain. (2 Marks)

- b. List **TEN** members of the Economic and Financial Crimes Commission as contained in the Act of Parliament No.5 of Dec. 2002. (5 Marks)  
**(Total 12½ Marks)**

### **QUESTION 6**

- a. Mr. Stephen Ahmed retired from Public Service in 2016 after spending 35 years of meritorious service. He approached you for advice on which withdrawal method he should adopt that will be more advantageous to him and the conditions for the lump sum withdrawal. His cumulative benefit is ₦12,700,580 and according to the template provided by the Pension Commission, Mr. Stephen Ahmed is entitled to 40% as lump sum.

#### **You are required to state:**

- i. **THREE** advantages of a programme based withdrawal (3 Marks)
- ii. **THREE** advantages of annuity based withdrawal (3 Marks)
- iii. The value of lump sum to be given to him (2 Marks)
- iv. The condition for the lump sum withdrawal (2 Marks)
- b. Medium-term Expenditure Framework (MTEF) is a multi-year budgeting system covering a period of three projected years. State **THREE** components of MTEF (2½ Marks)  
**(Total 12½ Marks)**

## **MULTIPLE CHOICE SOLUTIONS**

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

## **EXAMINERS' REPORT**

This is a 30 Compulsory Multiple Choice Questions covering every areas of the syllabus. This part was well attempted by more than 90% of the candidates.

## **SHORT ANSWER SOLUTION**

1. Accounting officer / Chief Executive officer
2. EFCC
3. Advance Payment
4. Accrual
5. Rolling Plan
6. Due Process
7. Appropriations-in-aid / Grants
8. Tender Board
9. Government Integrated Financial Management Information System (GIFMIS)
10. Self – Accounting Units
11. (i) Public Complaints Commission  
(ii) Code of Conduct Bureau (CCB)  
(iii) Independent Corrupt Practices and Other Related Offences Commission (ICPC)  
(iv) Economic and Financial Crimes Commission (EFCC)  
(v) Federal Road Safety Commission (Any 2 at ½ mark each = 1 mark)
12. Transcripts
13. The Treasurer
14. Treasury / Financial Circulars
15. The Economic and Financial Crimes Commission (EFCC)
16. Public Procurement Act 2007
17. Warrant
18. The Head of mission
19. Federal Ministry of Finance
20. Prior Period errors

## **EXAMINER'S REPORT**

This part consists of 20 compulsory Short Answer Questions that covers all areas of the syllabus. The attempt was high as more than 98% of the candidates attempted the questions.

## **SECTION B**

### **SOLUTION 1**

#### **Main Characteristics of cash basis of accounting**

- i) It is very simple to develop an accounting system based on the mere recording of cash receipts and payments.
- ii) Financial statements generated with this technique are not complicated; they are very understandable and the accounting does not require the making of estimates for depreciation or doubtful debts, or adjustments for accruals and prepayments.
- iii) It facilitates fiscal stewardship in that public sector where the concept of cash limit is used in budgeting the use of resources, compliance can be determined easily.
- iv) The concept does not make for proper measurement of performance. It is not easy to measure the physical work produced and the assets consumed in doing that within a period of time. The technique does not recognize the time when resources are used.
- v) Performance under this approach is poorly measured since recognition is given to the use of limited cash in any service delivery. The cash basis stresses the economy of a service very much, and does not consider the efficiency and effectiveness in service delivery.
- vi) In accounting for the existing resources of government, only cash and near cash items are shown on the balance sheet.
- vii) Traditional accounting in government is based on cash accounting. Government's final accounts are prepared, using only movement of cash as a means of determining income and expenses.

#### **FUNCTIONS OF THE MINISTER OF FINANCE**

- i) He is responsible for the preparation of annual estimates of revenue and expenditure of the Federal Government.
- ii) He is required to formulate all policies related to fiscal and monetary matters.
- iii) The Minister is to ensure the mobilization of both foreign and indigenous financial resources through external and internal financial institutions for development purposes.
- iv) To ensure a favorable balance of payments position required to maintain adequate foreign exchange services.
- v) To stabilise the value of Nigerian currency both internally and externally.
- vi) To supervise all matters in connection with the allocation of revenue to the three tiers of Federal, State and Local Governments.
- vii) Relating with relevant International Organizations and Financial Institutions. Such Organizations include: Economic Communities of West Africa (ECOWAS), United Nations National Development (UNND), European Union (EU) and Africans Union (AU).

viii) Responsible for issuance of warrant

## EXAMINER'S REPORT

The candidates were required to attempt any Four (4) of the Six (6) Questions.

## SOLUTION 2

### ANALYSIS OF THE VARIOUS SOURCES OF REVENUE PAYABLE TO CRF

A) Analysis of various sources of income are given below:

- a) **Head 6-** Direct allocation from the Federal Account at the prevailing rate.
- b) **Head 7-Direct Taxes :** These include PAYE of the Armed Forces and Police Personnel, Foreign Service Officers and Residents of the Federal Capital Territory, Abuja.
- c) **Head 8- License & Internal Revenue :** These are realized from the issues of licenses, eg arms and ammunition license fees, goldsmith license fees, radio & T.V License fees, gold dealer's license fees.
- d) **Head 9-Mining:** These include mining fees, rent of crown lands, royalties on gold, tin, ore and coal mines.
- e) **Head 10- Fees :** They are fees received on services rendered by government by government officials, eg court fees, court fines and medical fees.
- f) **Head 11-Earnings and sales:** Earnings and sales are derived from the use and subsequent disposal of Government property, eg. Sales of stores, publications and stamps, commission on money order and poundage on postal orders.
- g) **Head 12-Rent of Government Property :** The incomes include rent on Government quarters, land and buildings.
- h) **Head 13-interest & Repayments (General) :** These are interest and repayment of loans granted to individuals by the Government, Corporations and Government companies. An example is the repayment of motor vehicle loans.
- i) **Head 14-Interest & Repayments(State):** They are interest and repayment of loans granted to state Governments.
- j) **Head 15- Armed Forces :**The sales of Armed Forces' property such as old vehicles and stores constitute revenue.
- k) **Head 16-Reimbursements:** These are refunds for services rendered to the state and Local Government Councils, Public Corporations and other statutory Bodies by the Federal Government officers. Examples are reimbursements of audit fees and refunds of overpayments made to Government workers.
- l) **Head 17-Miscellaneous :** These are sources of revenue, apart from those stated above. Examples are overpayments refunded, lapsed deposits.

All the revenues discussed above are paid into the Consolidated Revenue Fund.

**b) DUE PROCESS**

(i)	Amount paid on mobilization	₦
	₦17,500,000 × 60%	10,500,000
	Less : 5 % Development levy	
	(₦10,500,000 × 5%)	<u>525,000</u>
		<u>9,975,000</u>
(ii)	Amount paid as final payment	₦
	₦17,500,000 × 40%	7,000,000
	Less : Retention fee	
	(7,000,000 × 10%)	700,000
		6,300,000
	Less : Development Levy	
	(₦6,300,000 × 5%)	<u>315,000</u>
		<u>5,985,000</u>
(iii)	<u>Benefits of Due Process in government expenditure</u>	
a)	To safeguard public funds and assets;	
b)	To improve the system of planning and diligent project analysis leading to accuracy of costing and prioritisation of investments;	
c)	To improve fiscal management through more efficient expenditure;	
d)	To improve the technical efficiency through un-impaired and enhanced information flow.	
e)	To enhance transparency and accountability in governance;	
f)	To rebuild public confidence in government financial activities;	
g)	To ascertain that government receive value for money expended.	
h)	To save money for government which can be employed in other sectors.	

**EXAMINERS' REPORT**

This "a" part required candidates to list five main Characteristics of Cash Basis of Accounting while the "b" part requires them to state five functions of Minister of Finance.

### **SOLUTION 3**

a(i) The full meaning of the acronym, GIFMIS is Government Integrated Financial Management Information System.

(ii)

1. It increases the ability of FGN to undertake central control
2. It monitors expenditure and receipts in the Ministries, Departments and Agencies (MDAs)
3. It increases the ability to access information on financial and operational performance.
4. It increases internal controls to prevent and detect potentials and actual fraud.
5. It increases the ability to access information on Government cash position and economic performance.
6. It improves medium term planning through a Medium Term Expenditure Framework. (MTEF)
7. It provides the ability to understand the costs of groups of activities and tasks.
8. It increases the ability to demonstrate accountability and transparency to the public and cooperating partners.

b(i) Board of Survey (FR 1801)

This is an examination to be held after the close of business on the last business day of each financial year or before the commencement of business on the first working day of the new financial year, on the cash, bank balances and stamps held by the Accountant-General at the Sub-Treasury, Federal pay offices and cash offices in ministries / extra – ministerial offices and other arms of government.

b(ii) FR 1808 : The proceedings on completion of survey:

- (i) A report shall be rendered in triplicate on revised Treasury Form 42
- (ii) The certificate being signed by all members of the Board.
- (iii) The three (3) copies shall be forwarded by the president not later than two weeks after the date of the survey to the Accountant-General
- (iv) Accountant-General will transmit a copy each to the Auditor-General and the Accounting officer concerned.

### **EXAMINER'S REPORT**

The question tested candidates understanding of GIFMIS; Board of Survey as well as proceedings to be followed on completion of Survey as stipulated in the Financial Regulations ( 1808).

## **SOLUTION 4**

a. (i) Section 2602 of Financial Regulation as amended stated the following steps for lost of stores;

1. Report immediately to the Head of Department. (1¼ marks)
2. Report to the nearest police station.(1¼ marks)
3. Institute action by filling of TF 146.( 1¼ marks)
4. Ensure the weakness in the system is corrected. (1¼ marks)

(ii) FR 2613 on action by officer-in-charge {i.e Chief Store officer}

1. It is the duty of the officer directly in charge of store to segregate unserviceable articles.
2. It is his duty to report to his Head of Department or Unit on the circumstances leading to the stores being rendered unserviceable.
3. FR2604. On being informed of the loss, the Head of Departments or unit shall:
  - a. Forward immediately, in writing, brief details of the loss to his Accounting Officer.
  - b. Investigate the whole incident of the earliest possible time but not later than seven (7) days complete parts 11 and 111 of Treasury form 146 {Revised} and forward the forms in quadruplicate to his Accounting Officer. If the investigation is liable to be protracted, submit the reports on Treasury Form 146 as soon as possible, and follow up with interim and final reports in a letter form.
  - c. Recommend the convening of a Board of Enquiry to his Accounting Officer if he considers that the circumstances warrant such an investigation [ see Financial Regulation 2605]
  - d. Ensure that, if weakness in the system of control or inadequate security is revealed, measures have been taken to prevent a re-occurrence of the loss.
  - e. Obtain copies of the police report and/ or court proceedings, where appropriate and forward four copies to his Accounting officer.

b(i) Effectiveness Audit

- Effectiveness Audit assess programmes or projects carried out to ascertain whether or not they achieve the set objectives.
- The concept is also referred to as Programme Results Audit
- It condemns the misapplication of efforts or resources.

(ii) Financial Audit

- Financial audit is carried out to ensure that financial and accounting controls put in place are working efficiently and
- That payments are made only for goods and services acquired and delivered in the right quantity and quality.

- Measures the extent to which the financial statements prepared in accord with the underlying records
- That financial statements are of true and fair picture, during the period under review, on a note of credibility.

## **EXAMINERS' REPORT**

The question was on Loss of Stores. It tested candidates understanding on steps taken by Chief Store Officer on Loss of Store; on Obsolete Store as well as actions required to be taken by Head of Department on both situations. The “b” part requires a short note to be written on (i) Effective Audit and (ii) Financial Audit.

## **SOLUTION 5**

### **a. (i) Four Major Statements**

- a. Statement of Public Debt - Statement; No 1.0
- b. Statement of Assets and Liabilities – Statement No 2.0
- c. Statement of Consolidated Revenue Fund- No 3.0
- d. Statement of Capital Development Fund – No 4.0

### **Supporting Statements**

- a) Notes to the Account
- b) Performance Reports
- c) Stastical Reports
- d) Accounting Policies
- e) Responsibility Statements
- f) Cash flow statements.

### **(ii) The Reports contain;**

- a) The narrative reports on the Federal Government Finance
- b) The state of Financial Affairs of the Federal Government.
- c) Data, Tables, Time series, Extracts etc
- d) Remarks on promotions, Transfers and Resignations in the Federal Civil Service.
- e) The Financial statements

### **(b) COMPOSITION OF ECONOMIC AND FINANCIAL CRIMES COMMISSION (EFCC)**

According to the Act of Parliament No 5 of December 2002, the Commission consists of the following members:

- a) A Chairman, who shall be the Chief Executive and Accounting Officer of the Commission and shall be a serving or retired member of any security or law enforcement agency.
- b) A Director General who shall be Head of Administration.

- c) The Governor of Central bank of his representative.
- d) A representative each of the following Federal Ministries not below the rank of Director;
  - (i) Foreign Affairs Ministry
  - (ii) Ministry of Finance
  - (iii) Ministry of Justice
- e) The Chairman of National Drug Law Enforcement Agency.
- f) The Director General – The National Intelligence Agency
- g) The Director General, the Department of State Security Service.
- h) The Director General – Securities and Exchange Commission.\
- i) The Commissioner for Insurance
- j) The Postmaster General, Nigeria Postal Service
- k) The Chairman, Nigeria Communication Commission
- l) The Comptroller General, Nigeria Customs Service
- m) The Comptroller General, Nigeria Immigration Service
- n) A representative of Nigeria Police Force not below the rank of Assistant Inspector General.
- o) Four eminent Nigerians with vast experience in finance, banking or accounting.

## **EXAMINERS' REPORT**

The “a” part of the question was on the preparation , production and publication of monthly and annual statements of accounts.

Part “b” requires candidates to list members of the Economic and Financial Crimes Commission as contained in the Act of Parliament No 5 of Dec. 2002.

## **SOLUTION 6**

a(i)

- 1) The funds are held only by the Pension Fund Custodian ( Sec 56 PRA 2014) and are highly regulated by the Commission.
- 2) Investment of pension funds is also regulated to ensure that the risk of loss is considerably reduced;
- 3) Programmed Withdrawal also yields an impressive return that can still take care of retirees throughout their lifetime.
- 4) A retiree on Programmed Withdrawal can move to another PFA once in a year if dissatisfied with the current PFA, whenever the transfer window opens a retiree or RSA holder can decide to transfer his/her RSA to another PFA.
- 5) In the event of death, the beneficiaries get the total sum in the RSA balance of the retiree under Programme Withdrawal.

(ii) The advantages of Annuity based.  
Certain monthly income is assured for life.

1. It is managed by insurance companies under the regulation of insurance commission i.e 2 regulators
2. The annuity is re-assured for each year.

(iii) Cumulative Contribution = ₦12,700, 580

Maximum Withdrawal lump sum = 40% = ₦5,080,282

(iv)

1. Provision of letter of disengagement
2. Remittance of year benefits by NPC
3. Application for lump sum withdrawal
4. Pension Fund Administrator approval

(b) COMPONENTS OF MTEF

- 1) A Macro- economic framework
- 2) A fiscal strategy paper
- 3) An expenditure and Revenue Framework
- 4) A Consolidated Debt Statement
- 5) A statement on Contingent liabilities.

### **EXAMINERS' REPORT**

The question tested candidates understanding on pensions accounts. Requiring them to state advantages of a (i) Programme based withdrawal (ii) annuity based withdrawal (iii) Lump sum. The "b" part was to state components of the Medium Term Framework (MTEF).

**ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA  
ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA  
PART II EXAMINATIONS – MARCH 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. Which of the following is **NOT** a characteristic of third Generation Computers?
  - A. Use of integrated circuits instead of individual transistors
  - B. The computers are smaller, cheaper and faster than second generation computers
  - C. They used high-level programming languages
  - D. They used VLSI technology
  - E. Storage media was magnetic storage
  
2. Which of the following is **NOT** a feature of mainframe computer?
  - A. It is very expensive
  - B. It is a large system
  - C. It can be used as a stand-alone system
  - D. It can run for several uninterrupted hours
  - E. It evolves large quantity of heat
  
3. Which of the following is **NOT** an example of a quantitative information?
  - A. Annual sales of a production company
  - B. Variation in the wages of low-level staff in an organisation
  - C. Prices of Goods
  - D. Standard of finished product in respect of paint work
  - E. Number of hours worked on a production line
  
4. Convert 17.75 to a Binary number
  - A. 10001.1101001
  - B. 1001.1001011
  - C. 10001.1001011
  - D. 1001.10010111
  - E. 10001.11

5. A collection of related records is called
- A. Database
  - B. DBMS
  - C. File
  - D. Field
  - E. Byte
6. The brain of any computer system is
- A. Control Unit
  - B. Arithmetic and Logic Unit
  - C. Central Processing Unit
  - D. Storage Unit
  - E. Memory Unit
7. Which of the following is **NOT** used for arithmetic and Logic Unit (ALU)?
- A. Mathematical calculations
  - B. Statistical calculations
  - C. Accounting calculations
  - D. Logic comparison
  - E. Logic calculations
8. Which of the following features does **NOT** describe a super computer?
- A. Smaller in size and processing than micro computers
  - B. They are usually used by multinational companies
  - C. They contain thousands of microprocessors
  - D. They are large in size and generate lots of heat
  - E. They are used to solve complex computing problems
9. Which of the following loses its content when the computer is turn off or put off?
- A. RAM
  - B. ROM
  - C. CD ROM
  - D. PROM
  - E. Hard disk

10. Which of the following is **NOT** a storage media for computer system?
- A. Magnetic tape
  - B. Hard disk
  - C. Soft disk
  - D. Optical disk
  - E. Solid state storage disk
11. Which of the following is **NOT** included in input controls?
- A. Input authorisation
  - B. Input authentication
  - C. Accuracy and batch controls
  - D. Error reporting and handling
  - E. Batch integrity in database systems
12. Which of the following is **NOT** an operating system?
- A. DOS
  - B. Lotus 1-2-3
  - C. Windows 2000
  - D. UNIX
  - E. LINUX
13. A computer application package that is specifically developed for an organisation's peculiar need is known as
- A. Local package
  - B. Off-the-shelf package
  - C. Altered-off-the shelf package
  - D. Customised package
  - E. In-house package
14. Which of the following is a factor for determining suitability of an application package?
- A. Adequate operating environment
  - B. Screen background display
  - C. Nature of output generated
  - D. Budget
  - E. Functionality

15. An application generator is an example of ..... generation language
- A. First
  - B. Second
  - C. Third
  - D. Fourth
  - E. Fifth
16. Which of the following is **TRUE** about decentralised processing technique?
- A. The data processing is concentrated within a computer system
  - B. Data processing is spread across the computer systems in the network to satisfy the specific needs
  - C. Any failure in hardware or software will lead to system collapse
  - D. Computer security is handled by central computer system
  - E. A problem is divided into many tasks and is handled by the central computer system
17. None-preemptive multitasking is when
- A. Users switching back and forth between program
  - B. Programs switch as they reach a logical breakpoint
  - C. Operating system switched programs based on allocated amount of time and priority
  - D. Operating system never initiates a context switch from a running process to another process
  - E. Current process running in the CPU holds it forever
18. A transaction processing with severe time limitation is called
- A. Time sharing processing
  - B. Distributed processing
  - C. Real time processing
  - D. Multitasking processing
  - E. Multiprocessing
19. Which of the following application software **CANNOT** be used to process accounting transactions?
- A. MS word
  - B. MS Access
  - C. MS Excel
  - D. Corel Draw
  - E. Daceasy

20. Which of the following is an advantage of using computer service bureau?
- A. Loss of control over time taken to process data
  - B. Inability of client staff to gain expenses in computing
  - C. Over dependence on bureau leads to loss of competitive advantage
  - D. Obtain benefit of computer power at reasonable cost
  - E. Secrecy of the company may be impaired
21. The process of visiting websites and not looking for anything of particular interest is called
- A. Web visiting
  - B. Web surfing
  - C. Web searching
  - D. Web going
  - E. Web journeying
22. Which of the following is **NOT** a factor to consider when selecting a data transmission system?
- A. Length of the transmission system
  - B. Speed of transmission required
  - C. Accuracy and reliability required
  - D. Cost of each type of data transmission
  - E. System protocol that is available
23. In a cloud computing, the various computer application for creating computing services to customers and businesses is referred to as
- A. Backend
  - B. Cloud system
  - C. Frontend
  - D. User hardware
  - E. User software
24. Which of the following is **NOT** a likely parameter for determining the selection of type of data transmission cable?
- A. Data bit rate
  - B. Reliability of the cable
  - C. Power loss (Noise) in the cable
  - D. Weight of the cable
  - F. Ease of connection and maintenance

25. Which of the following internet activities is **NOT** a discussion group?
- A. Mailing list
  - B. Web surfing
  - C. Newsgroup
  - D. Chat group
  - E. Instant messaging
26. Forensic investigation as a process does **NOT** involve the ..... of digital evidence
- A. Design
  - B. Identification
  - C. Preservation
  - D. Presentation
  - E. Analysis
27. Which of the following is **NOT** a characteristic of big data?
- A. Large volume
  - B. Varied type
  - C. High speed of generation
  - D. Low storage
  - E. Variability
28. Which of the following is **NOT** a cybercrime?
- A. Phishing
  - B. Identify theft
  - C. Hacking
  - D. Encryption
  - E. Spamming
29. The use of electronic systems to send an unsolicited email to another person is called
- A. Cracking
  - B. Piracy
  - C. Spamming
  - D. Internet fraud
  - E. Cybercrime

30. During systems implementation, education of the users promotes understanding while the purpose of training is for
- A. Awareness
  - B. In-depth understanding
  - C. Skill building
  - D. Outsmarting competitors
  - E. General appreciation

**SECTION A: PART II                      SHORT-ANSWER QUESTIONS                      (20 Marks)**

**ATTEMPT ALL QUESTIONS**

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

1. A data processing technique that processes data with Time Slice/Quantum of time and simultaneously is called .....
2. A non-permanent and mobile office run with computer and communications technology is called.....
3. A specialised portable computer that uses a pen-like device to enter data is called.....
4. A refined and rearranged basic facts is called.....
5. An audio-output device that is connected to a sound card in the system unit is called.....
6. A printer that uses heat elements to produce images on heat sensitive paper is known as .....
7. The VDU can be either colour or.....
8. Text output includes alphabetic characters, digits and .....
9. A computer program expressed in the low-level language is converted to machine language using.....

10. Assembly language is said to be machine dependent whereas a procedural language is said to be .....
11. A system whereby the operating system continually moves data back and forth between primary and secondary memories so that it appears as if the computer has unlimited amount of memory is called.....
12. In environmentally friendly system units, display and manufacturing are the basic elements of the .....
13. A data entry process where jobs are entered at a remote terminal is called.....
14. In Bus Network, all the communications devices are connected to a common channel called the .....
15. A technical staff that will be involved in setting up, administration, maintenance and upgrading communication systems is called.....
16. A computer user who breaks into or otherwise violates the system integrity of remote machines with malicious intent is referred to as .....
17. The technology used in cloud computing that serves as an interface for users to access applications provided by partners and customers is known as.....
18. An internet-based computing model whereby shared resources, software, processing power, data storage and information are delivered as a set of services on demand is called.....
19. The protocol used together with IP when small amounts of information are involved is called .....
20. An internet-based application used to search for information from any website on the internet is known as .....

**SECTION B:**

**ATTEMPT ANY FOUR QUESTIONS**

**(50 Marks)**

**QUESTION 1**

- a. Define the following with **ONE** example each:
  - i. Bit
  - ii. Byte

- iii. Record
  - iv. Database
  - v. File
  - vi. Field
- (6 Marks)

- a. Define
- i. Digital Computer
  - ii. Analog Computer
  - iii. Hybrid Computer
- (4<sup>1</sup>/<sub>2</sub> Marks)

- c. Convert the decimal number 586 to a Base 4 number
- (2 Marks)  
**(Total 12 <sup>1</sup>/<sub>2</sub> Marks)**

### QUESTION 2

- a. State **TWO** purposes of output controls
- (2<sup>1</sup>/<sub>2</sub> Marks)
- b. List **FIVE** output controls
- (5 Marks)
- c. List **FIVE** storage controls
- (5 Marks)  
**(Total 12 <sup>1</sup>/<sub>2</sub> Marks)**

### QUESTION 3

- a. State **ONE** main function each of the following tools that are used in windows-based operation
- i. My document
  - ii. Control panel
  - iii. Windows Explorer
  - iv. Start button
  - v. Recycle bin
- (7<sup>1</sup>/<sub>2</sub> Marks)
- b. State **ONE** function each of the following basic mouse operations in a wireless based environment
- i. Right clicking
    - a. Dragging and dropping
    - b. Highlighting
    - c. Pointing and Clicking
    - d. Hovering
- (5 Marks)  
**(Total 12 <sup>1</sup>/<sub>2</sub> Marks)**

#### QUESTION 4

- a. i. State **TWO** differences between batch processing and real-time data processing. (2 Marks)
- ii. List **TWO** advantages of batch processing over real-time data processing. (2 Marks)
- b. i. Define multiprogramming processing technique (2 Marks)
- ii. State **ONE** reason for the adoption of this processing technique (1 Mark)
- c. i. What is an Information Centre? (2½ Marks)
- ii. List **THREE** purposes for establishing an information centre in an organisation (3 Marks)
- (Total 12½ Marks)**

#### QUESTION 5

- a. Local Area Network (LAN) is a private communication network that operates in a confined geographical area.

**You are required to**

- i. List **FIVE** components of a typical LAN (2½ Marks)
- ii. State **ONE** function each of the LAN components stated in (5ai) above (5 Marks)
- b. Enumerate **FIVE** differences between client/server and Peer-to-peer models in relation to computer network. (5 Marks)
- (Total 12½ Marks)**

#### QUESTION 6

- a. i. Define the term “Outsourcing” (1½ Marks)
- ii. Enumerate **THREE** activities to be carried out during the implementation of a proposed system. (3 Marks)
- b. i. Define the term “Computer virus” (2 Marks)
- ii. List **FOUR** ways to prevent computer virus (2 Marks)

- c. i. Enumerate **TWO** basic elements of the Green PC (2 Marks)
- ii. List **TWO** things a computer user can do to protect the environment (2 Marks)
- (Total 12<sup>1</sup>/<sub>2</sub> Marks)**

## **MULTIPLE CHOICE QUESTIONS**

### **SOLUTION**

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

### **EXAMINERS' REPORT (MCQs)**

There are 30 multiple choice questions which covered the entire syllabus and the performance is encouraging.

### **SHORT ANSWER QUESTIONS**

1. Time Sharing
2. Virtual Office
3. Pen Computer
4. Information
5. Speaker
6. Thermal Printer
7. Monochrome
8. Special Characters
9. Assembler
10. Problem-Oriented
11. Virtual memory
12. Green PC
13. Remote Job-entry (RJE)
14. Backbone
15. Network Engineer
16. Hacker
17. Platform-as-a-service
18. Cloud Computing
19. User data Protocol (UDP)
20. Search engine

### **EXAMINERS' REPORT (SAQs)**

There are 20 short answer questions which covered the entire syllabus but the performance is below average.

## SOLUTION TO QUESTION ONE

a. (i) BIT is the smallest unit of data in a Computer System

Example 0, 1

(ii) BYTE consists of bits usually 8 bits. It is a representation of a character which could be an alphabet, digit or special character, that is, a character is made up of 8 bits.

Example: Character (e.g A)

(iii) RECORD consists of one or more fields which are normally treated together as a unit when dealing with a file.

Example: A score of a student in an examination

(iv) DATABASE is a collection of interrelated files.

Examples: Debtors files which consist of records of customers who are owing a company.

(v) FILE is a collection of related records.

Example: A record of all Accounting students in a particular class.

(vi) FIELD is a data item or value that contains one or more characters. Field may denote a name, a value, a number or an operator.

Example: JOSEPH

b. (i) Digital computers are those in which data and information are presented in digital form by a coded set of electrical pulses. Examples are programmable calculators, main frame, mini and micro computers.

(ii) Analog computers are those in which data and information are presented in a more direct manner by a physical quantity that is proportional to it or to its defined functions. Examples include thermometer, pressure gauge and voltmeter.

(iii) Hybrid Computer is the combination of both digital and analog computers connected together in a single system. Hybrid combines the high speed of analog computer with the flexibility of the digital computer which are found mostly in scientific and technical applications.

C 586 to Base 4

$$586 \div 4 = 146 \quad \text{rem } 2$$

$$146 \div 4 = 36 \quad \text{rem } 2$$

$$36 \div 4 = 9 \quad \text{rem } 0$$

$$9 \div 4 = 2 \quad \text{rem } 1$$

$$2 \div 4 = 0 \quad \text{rem } 2$$

**21022<sub>4</sub>**

## **EXAMINERS' REPORT**

This question tests the understanding of the candidate on the basic elements of data and the different types of computer system modes of operation.

Over 90% of the candidates attempted the question and the performance is very encouraging.

## **HARDWARE FUNDAMENTALS**

### **SOLUTION TO QUESTION 2**

#### 2a Purposes of Output Control

- (i) To ensure that the information distributed get to the appropriate recipient.
- (ii) To ensure that the information distributed is correct and that there will be no change in the content.
- (iii) To ensure presentation of information between the point of process and output.

#### b Output Controls

- (i) Sensitive report must have specific printers where they can be printed from.
- (ii) There must be a controlled way of distributing reports.
- (iii) How long are the sensitive reports retained.
- (iv) Are the sensitive/confidential reports stored in a protected environment.
- (v) There must be screen saver on the desktop where sensitive information is input

#### c Storage Controls

- (i) File labeling in a particular order to prevent accidental loss of storage media.
- (ii) Segregation of duty between the input and storage officers.
- (iii) Access to storage media must be properly authorized and authenticated.
- (iv) Access to the database must be properly authorized and authenticated.
- (v) There must be a log file which records every activity carried out on the database.
- (vi) Physical security of storage media environment including the data processing centre.
- (vii) File backup regularly and stored in a secured place to prevent data loss.

## **EXAMINERS' REPORT (QUESTION 2)**

This question tests the understanding of the candidates on the output and storage control systems.

Only few candidates attempted this question and the performance is very poor. The major pitfall is the misunderstanding of the question. The candidates misread Controls to be types of output and storage devices.

The students are advised to prepare for future examinations using ICAN Study Pack and other relevant textbooks.

### **SOLUTION 3**

3a Functions of the tools used in windows-based operation:

- (i) My document
  - It provides a means to access quickly all documents, photo, music and other files stored on the computer hard disk
- (ii) Control Panel
  - It provides access to windows configuration settings.
  - It also provides means to manage the settings
- (iii) Windows Explorer
  - Provides access to all items stored on the computer
  - It is used to find, copy, delete, launch and configure programs and documents
- (iv) Start button
  - It is used to open the start menu which is used to open all programs and documents
- (v) Recycle bin
  - This is where files to be deleted are dumped

3b Functions of the mouse operations

- (i) Right clicking
  - Used to select an operation to be performed on a pointed object
- (ii) Dragging and dropping
  - Used to move an object from an initial location to another location on the screen
- (iii) Highlighting
  - Used to indicate the currently selected object(s)
- (iv) Pointing and clicking
  - Used to select an object
- (v) Hovering
  - Used to indicate the object of interest even though no action is yet taken

### **EXAMINERS' REPORT (QUESTION 3)**

This question tests the understanding of the candidates on the various tools used in Windows environment and the various operations of the pointing devices particularly the mouse. Almost all the candidates attempted this question and the performance is very encouraging.

### **BATCH PROCESSING OVER REAL-TIME**

#### **SOLUTION 4**

- ai
  - Data is processed in groups called batches
  - Batch processing is typically used for large amounts of data that must be processed on a routine schedule
  - Batch programs require no user involvement and requires significantly fewer network resources than online systems

- It is less expensive
- Computer failure and temporary breakdowns have less impact on processing.

In Tabular form, we have:

<b>Batch Processing</b>	<b>Real-time Processing</b>
- Data is processed in groups	- Data is processed singly
- Data is processed on a routine schedule i.e at a pre-determined period.	- Data is processed instantly
- No need for human intervention	- Need for operator presence
- Less expensive	- Very expensive
- Tolerant to system failure	- Very sensitive to system failure

- a) ii - Batch processing is typically used for large amounts of data that must be processed on a routine schedule
- It is less expensive
  - Computer failure and temporary breakdown have less impact on processing
  - Data is processed in groups or batches i.e. data is processed at a convenient predetermined period by management.
- b) i Multi-programming processing technique
- This is a technique that enables a number of programs (jobs) to interleave with each other such that the execution of one program is overlapped with the I/O operation of the other programs
- b) ii
- If one processor (CPU) fails, the processing system can shift work to another CPUs
  - The system provides fast throughput for jobs
  - It pays particular attention to individual tasks/jobs to give them rapid service
  - If a task/job requires more resources than are available on any of the systems, all the resources can be pooled together to serve only one processor
- c) i Information Centre (IC) is a department or office that is manned by technically skilled staff that assists the Information System(IS) department staff with regards to user requests and complaints.

- ii
  - Responsible for training users in applications
  - Responsible for solving related personal computer problems
  - Supports end-user computing
  - Sourcing of and delivering up-to-date information
  - Revenue generation
  - Data collection
  - Marketing
  - Local engagement

#### **EXAMINERS' REPORT (QUESTION 4)**

This question tests the understanding of the students on the difference between Batch and Real time processing techniques. It also demands for the meaning and purposes of Information centre.

Many candidates attempted this question and the performance is very encouraging.

#### **SOLUTION 5**

5a (i) Components of a typical LAN include:

1. File Server (Host/Server) Computer
2. Workstation
3. Connection/Cables
4. Network Interface Card (NIC)
5. Network Operating System (NOS)
6. Switches
7. Bridges
8. Routers
9. Gateway
10. MODEM

(ii) - File server is a fast computer that connects all devices attached to the network

1. - Controls the communication of Information between the workstation on a network
  - Shares its resources such as peripherals, storage with workstations on the network
  - Makes Services on the network available to all devices on the network.
2. Workstation is a computer attached to the server for requesting for services from the server.

3. Connection/Cables is used for connecting all devices on the network to the server.  
They can be wired (e.g. twisted pair cable, Coaxial, Fiberoptic or wireless (e.g. Infrared or radiowaves)
4. Network Interface Cord (NIC) – present on each Computer on the network that provides physical connection between all devices on the network in order to send and receive messages.
5. Network Operating system is the software that manages the activities on the network
6. Switch provides a central connection point for cables from workstations, servers and peripherals.
  - Active switches electronically amplify the signal as it moves from one device to another.
7. Bridge – is a device that allows segmentation of a large network into two smaller, more effective networks.
  - Monitors the information traffic on both sides of the network in order to pass it to correct location.
  - Manages the traffic to maintain optimum performance on both sides of the network.
8. Routers – translates information from one network to another.
  - Select the best path to route a message based on destination address and origin.

<b>b</b>	<b>Client-Server</b>	<b>Peer-to-Peer</b>
	(i) It is more difficult to set up	It is very easy to set-up
	(ii) More expensive to install	Less expensive to install
	(iii) Variety of operating systems on clients by network operating system on server	Can be implemented on a wide range of operating systems
	(iv) Less time consuming to maintain software used as it is done from the server	More time consuming to maintain the software being used as each computer must be managed individually
	(v) Support high levels of security controlled from the server	Very low levels of security supported or none at all
	(vi) No limit to the number of computers that can be supported by the network	Ideal for networks with less than ten computers
	(vii) Require a server running server operating system	Does not require a server for operation

## **EXAMINERS' REPORT (QUESTION 5)**

This question tests candidates' knowledge on a particular type of computer connectivity. Almost half of the candidates attempted the question and it seems to be popular among them. The performance is not as good as expected.

The major pitfall was the inability of the candidates to give the functions of the components of LAN.

Candidates are advised to use the ICAN Study Pack and other good textbooks to prepare for further examinations.

## **SOLUTION TO QUESTION 6**

6a (i) Outsourcing involves an organization's management giving out certain non-key functions to other companies to perform on its behalf in order for the organization to focus better on its core business function.

(ii) The activities to be carried out during system implementation are:

1. Acquisition and deployment of hardware and software
2. End-user training
3. Testing and Installation
4. System documentation
5. File conversion
6. System changeover

b (i) Computer virus

A computer virus is a malicious small program which has the ability to infect a whole computer system

**or**

A computer virus may be referred to as infectious coding or malicious coding. It is any software designed to damage or compromise computer systems.

b (ii) - Never open unsolicited email attachments

- Always save the file attachment to disk – do not open it immediately and scan the file using your installed virus checker called antivirus

- Ensure that you are running the latest virus protection software (Antivirus)

- Install antivirus software (i.e. Virus Protection Software)

- Be sure of files to be shared or downloaded

- Be extremely cautious of websites that asks you to install a 'plug-in'

- Build a firewall

- Keep a copy of your important work (Back-up)
- Clean your computer for virus
- Scan devices before copy/open any files from it.
- Don't execute programs or files you find on the internet without checking them
- Keep your browser updated
- Keep your operating system updated
- Only install software you know and trust
- Contact your ISP about virus scanning
- Establish rules on media that may be used on the network PC

c (i) Elements of Green PC

1. System units with energy-saving processors, sleep mode capability, efficient adapters, and no cooling fans.
2. Display units that replace CRT displays with flat panels, use special power-down monitors, and use screen saver software.
3. Manufacturing that eliminates or reduces the use of harmful chemicals such as chlorofluoro-carbons, nickel and other heavy metals

(ii) Things a computer user can do to protect the environment.

1. Conserving energy by turning off computer systems at night and using screen savers
2. Recycling paper, computer boxes, packaging materials, printer cartridges and floppy disks
3. Educating self and others about ecological dangers and using ecologically sound products

**EXAMINERS' REPORT (QUESTION 6)**

This question tests the knowledge and understanding of the candidates on computer virus and job outsourcing. It also demands for the basic elements of the Green Computer, which is a recent development.

Many candidates attempted this question but the performance is just fair.

This question seems very popular among the students except question 6(c) which is a recent development.

**ASSOCIATION OF ACCOUNTANCY BODIES IN WEST AFRICA**  
**ACCOUNTING TECHNICIANS SCHEME, WEST AFRICA**  
**PART II EXAMINATIONS – MARCH 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. The following are the merits of using Postal Questionnaire to collect data, **EXCEPT** that it
  - A. Is not time consuming
  - B. Is cost effective
  - C. Covers wide area
  - D. May not be reliable
  - E. Is easy to administer
  
2. A shoe factory produces shoes of different sizes. In order to determine the shoe size to produce more, the Planning, Research and Statistics unit obtained some statistics measures. Which of the following statistical measures will you advise the company to use?
  - A. Mean
  - B. Median
  - C. Geometric mean
  - D. Mode
  - E. Harmonic mean
  
3. Which of the following is **NOT** compulsory for class interval in the construction of a frequency table?
  - A. The number of classes must not be too few or too many
  - B. There should not be ambiguity about which class an observation belongs to
  - C. The extreme values must be considered
  - D. The classes may not be of the same width
  - E. The class width should be 5 or multiples of 5

4. The following pieces of information are obtained on the daily withdrawal from an Automated Teller Machine (ATM) of a bank: Average withdrawal is ₦50,000 and variance withdrawal is ₦100,000,000. Find the coefficient of variation of the daily withdrawal
- A. 10%
  - B. 20%
  - C. 50%
  - D. 75%
  - E. 80%

5. The performances of **FIVE** commercial banks are ranked by **TWO** different biometric bodies: X and Y and their decisions are given in the table below:

Bank	A	B	C	D	E
Rank of X	2	4	3	1	5
Rank of Y	4	3	5	2	1

Calculate the Spearman's rank correlation coefficient for the given data

- A. -0.28
  - B. -0.29
  - C. -0.30
  - D. -0.31
  - E. -0.32
6. Which of the following is a Time Series data?
- A. Family expenditure
  - B. Annual rainfall
  - C. Set of scores obtained in a test
  - D. Wages of workers
  - E. Cost of store furniture
7. The trend line of a Time Series data shown below of yearly sales of a supermarket in a certain community is estimated to be  $X_t = 20 - 1.5t$

Year	t	$Y_t$
1990	1	40
1991	2	45
1992	3	35
1993	4	50

Calculate the seasonal variation for the year 1992 using multiplicative model

- A. 1.26
- B. 2.26
- C. 3.26
- D. 4.26

E. 5.26

8. The index number as a statistical tool, measures the following, **EXCEPT**
- A. The differences in the margin of a group of related variables
  - B. The differences that may have to do with prices of commodities
  - C. The physical quantity of goods produced
  - D. The purpose for which index number is being compiled or constructed
  - E. To make a comparison between periods of time, schools, places and so on

9. The following table shows the prices of some selected commodities (in ₦) for years 2010 and 2011. Calculate the simple Average of Relative Price Index using 2010 as base year.

Commodities	Prices	
	2010	2011
X	50	70
Y	60	80
Z	75	80

- A. 126.67%
  - B. 162.67%
  - C. 206.67%
  - D. 216.67%
  - E. 621.67%
10. In hypothesis testing, which of the following supports the “two-tailed test?”
- A.  $H_0 : \mu = 50$
  - B.  $H_{1A} : \mu \neq 50$
  - C.  $H_{1B} : \mu > 50$
  - D.  $H_{1C} : \mu < 50$
  - E.  $H_{1B} : \mu > 50, H_{1C} : \mu < 50$
11. The risk of type I error is known as
- A. Bias error
  - B. Residual error
  - C. Residual level
  - D. Significance level
  - E. Sampling error

12. An establishment with large number of cars, discovered that maintenance of official cars was normally distributed with a mean of ₦50,000 monthly. A sample of 16 cars was taken and it was discovered that the mean expenditure on car maintenance was ₦53,000 monthly with standard deviation of ₦6,000. The test statistic value to check if the sample result is in agreement with establishment's claim is
- 2.00
  - 2.05
  - 3.05
  - 8.00
  - 8.05
13. If the profit function of a business is:  $P(x) = x^2 - 10x - 200$ , find the value of  $x$  for which the profit is zero
- 20
  - 15
  - 10
  - 10
  - 20
14. If the cost function of a production company is  $C(q) = 3q^2 + 5q + 300$  while the sales function is  $S(q) = 4q + 30$ , obtain the profit when  $q = 20$
- 500
  - 600
  - 700
  - 800
  - 900
15. Honourable Detomtar wants to donate some amount of money to a charity home in the nearest future. How much will he be able to donate after one year if he decides to save L\$1,000 in the first month, L\$2,000 in the second month, L\$4,000 in the third month and so on
- L\$4,950,000.00
  - L\$4,905,000.00
  - L\$4,509,000.00
  - L\$4,095,000.00
  - L\$4,059,000.00

16. What is the Internal Rate of Returns if a financial group makes an investment of Le95million that yields Le120million in 3 years?
- A. 0.08098  
 B. 0.08908  
 C. 0.08980  
 D. 0.09088  
 E. 0.09808
17. Which of the following is **NOT** a condition for optimality?
- A. Cost is minimised when marginal cost is zero provided  $\frac{d^2C}{dq^2} > 0$   
 B. The marginal cost is zero  
 C. Revenue is maximised when  $\frac{dMR}{dq} < 0$   
 D. Marginal cost equals marginal revenue if profit is at maximum  
 E. The difference between MR and MC is zero at maximum profit.
18. If the marginal revenue function of a production company is given by  $MR = Le40$ , calculate the total revenue if 200 items are produced and sold
- A. Le2,000  
 B. Le4,000  
 C. Le6,000  
 D. Le8,000  
 E. Le12,000

19. Determine the fourth allocation of the initial feasible solution for the table below using the North West Corner method

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>Supply</b>
X					2800
Y					2550
Z					2650
Dummy					1300
Demand	1,600	1,800	2,600	3,300	9300

- A. 1600  
 B. 1700  
 C. 1800  
 D. 1950  
 E. 2000

20. Which of the following is **NOT** used for computer simulation method?
- Obtain probability distribution
  - Generate random numbers in simulation
  - Simulate varying values for the given problem
  - Prepare reports
  - Make quick decisions and draw valid conclusions
21. Mr. Wasiye, a vendor who wishes to optimise his profits, has his possible demand and respective probabilities as given in the table below:

<b>Possible demand</b>	350	420	530	620	730	840
<b>Probability</b>	0.10	0.20	0.30	0.05	0.15	0.20

- Use the following random numbers: 38, 07, 90, 95, 78, 64, 22, 10, 15, 04 to simulate a ten-day period. Hence, the demand forecast for the seventh day using Monte Carlo's random number is
- 620
  - 530
  - 420
  - 410
  - 350
22. Using the graphical method for solving linear programming problem, the determination of optimal value for maximation problem is to select the
- Lowest value of the values obtained from corner points of the feasible region
  - Value obtained from the centre point of feasible region
  - Lowest value of the values obtained from the objective function using the corner points of feasible region
  - Highest value of the values obtained from corner points of the feasible region
  - Highest value of the values obtained from the objective function using the corner points of feasible region
23. Which of the following does **NOT** support the ideology of inventory control?
- It involves recording and monitoring of stock levels
  - It is used to decide on when and how many quantities to order
  - It aims at minimising the total cost associated with inventory/Stocks
  - It does not support the smoothing out of the fluctuations that may exist in the supply
  - It is to meet the variation in production and demand

24. In inventory control, a cost that cannot be regarded as the holding costs consists of
- Handling and storage costs
  - Insurance and security costs
  - Loss of sale and contribution earned from the sale
  - Loss due to pilferage and vermin damage
  - Cost of capital tied up including interest on such capital
25. Which of the following is **NOT** true about shortage costs?
- Loss of customers
  - Loss on production stoppages
  - Insurance and security costs
  - Loss on emergency purchase of stock at a higher price
  - Loss of sale and contribution earned from the sale
26. Which of the following is **NOT** an example of items that wear out gradually?
- Vehicles
  - Machines
  - Tyres
  - Boilers
  - Bulbs
27. A special case of transportation problem where the source and destination capacities are being equated to **ONE** is known as ..... model
- Inventory
  - Allocation
  - Assignment
  - Linear Programming
  - Replacement
28. The table below gives the unit transportation cost (GH¢'000), the quantities demanded and quantities supplied of a commodity from the source to destination.

	<b>Destination</b>			
<b>Source</b>	<b>U</b>	<b>V</b>	<b>W</b>	<b>Supply</b>
X	10	3	7	30
Y	8	6	9	70
Z	11	12	5	50
Demand	45	30	75	

Use the Least Cost Method for the allocations from source to destination to find the sum of allocations in cells XV and YW

- A. 50
- B. 55
- C. 70
- D. 75
- E. 80

29. The probability (P) of an event is a numerical value which can be expressed as

- A.  $0 < P < 1$
- B.  $0 \leq P < 1$
- C.  $0 \leq P \leq 1$
- D.  $-1 \leq P \leq 1$
- E.  $-1 < P \leq 1$

30. The classification table below shows the distribution of 120 professional delegates that attended an annual conference:

<b>PROFESSIONAL GENDER</b>	<b>CHARTERED ACCOUNTANT (A)</b>	<b>CHARTERED BANKER (B)</b>
MALE (M)	36	34
FEMALE (F)	20	30

If a delegate is selected at random, what is the probability that a Chartered Accountant or a female is selected?

- A. 0.17
- B. 0.55
- C. 0.71
- D. 0.72
- E. 0.88

**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 age of a Chartered Accountant is an example of .....data
2. A very easy method used to construct a frequency table, where there are many observations given, is known as.....

3. Calculate the Mean deviation from the following number of books sold in a market store: 16, 18, 15, 17, 19.....
4. The demand for a normal commodity and price of that commodity generally exhibit..... correlation.
5. The probabilistic component of the Time-Series is the.....
6. Use the information in the following table to calculate the value of b.

Time	Series	Trend	Seasonal
(t)	Y	$T=25 + 2.5t$	Variation using additive model
1	25		A
2	36	30	B
3	43		C

7. The index that measures changes in price level, overtime, using only the arithmetic mean and ignoring differences in the relative importance of the commodities, is called..... Price Index

8. Given the table below,

X	5	10	15	20
P(X)	$\frac{1}{5}$	$\frac{3}{10}$	$\frac{2}{15}$	$\frac{1}{10}$

the expected value of  $X^2$  is.....

9. If the profit function of a business is  $P(q) = 2q^2 + 16q - 50$  and the cost function is  $C(q) = 3q^2 + 4q + 150$ , calculate the revenue that will accrue when  $q = 8$ .
10. An employee with an initial salary of GH ₵ 25,000 receives an annual increment of GH ₵ 10,000. Calculate her total salary for 6 years.
11. A project is presently estimated to cost ₦1.3m. The net cash flows of the project for the first year was estimated as ₦450,000; if the discount rate is 5%, calculate the NPV for the project.
12. The gross annual profit of OMISUTAE Supermarkets is  $P(x) = -6x^2 + 24x - 14$ , where x is the number of products sold. Calculate the units of the product that will guarantee maximum profit.
13. Operations Research is defined as a scientific method of allocating..... resources to competing activities in an..... way.
14. In Inventory Control, stock-out occurs when there is a ..... for a stock item which is **NOT**.....



**Calculate:**

- i. Mean deposit (3½ Marks)
- ii. Modal deposit (3 Marks)

**(Total 12½ Marks)**

**QUESTION 2**

a. The income distribution of workers in a company is given below:

Income Boundary (Le'000)	Frequency (f)
16 – 20	3
21 – 25	5
26 – 30	8
31 – 35	12
36 – 40	5
41 – 45	2

- i. Draw the Ogive for the table (3 Marks)
- ii. Determine 10<sup>th</sup> and 70<sup>th</sup> percentiles from the Ogive (3 Marks)

b. A Marketing Manager has observed his record of quarterly sales volume (Le'000) in 2013, 2014, 2015 and 2016.

These are tabulated as follows:

Years	Sales Volume in (Le'000)			
	Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>	Q <sub>4</sub>
2013	26	38	94	55
2014	24	38	76	46
2015	20	44	78	32
2016	21	31	58	28

**Required:**

Use the Least Squares Method to find the trend line.

(Note: take  $x = 0$  for Q<sub>1</sub> in 2013,  $x = 1$  for Q<sub>2</sub> in 2013, etc.) (6½Marks)

**(Total 12½ Marks)**

**QUESTION 3**

a. Assuming that trend is absent in the quarterly Time Series data estimated for four years, as tabulated below:

- i. Determine if there is any seasonality in the quarterly time series (3 Marks)

- ii. What are the seasonal indices for the various quarters? (2 Marks)

Year	Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>	Q <sub>4</sub>
1980	2.6	3.0	4.2	3.8
1981	2.7	4.1	3.8	2.7
1982	3.0	3.8	3.6	3.4
1983	2.2	5.2	4.3	4.5

- b. Mr. AYAGET, a businessman, spends ₦2.5m to set up a workshop where some items are produced. If it costs ₦500 to produce an item and the sale price of an item is ₦1,500, find the minimum quantity of items to be produced and sold for the businessman to make a profit of:

- i. At least ₦950,000 (4 Marks)  
 ii. At most ₦1,500,000 (3½ Marks)

**(Total 12½ Marks)**

#### QUESTION 4

- a. A manufacturing company produces the following three types of products: Ceiling fan, Standing fan and Wall Fan. The three products have to be processed on two machines X and Y. The processing time required by each of the goods on both machines is tabulated as follows:

	Ceiling fan	Standing fan	Wall fan
Machine X	3	4	3
Machine Y	2	3	4

Machine X is available only for 300 hours and machine Y is available for 180 hours. The company should not produce more than 500 Ceiling fans, not more than 600 Standing fan, and not more than 300 Wall fans.

A Ceiling fan makes a contribution of ₦120, a Standing fan a contribution of ₦160 and a Wall fan a contribution of ₦90.

Formulate the above Linear Programming problem to maximise the contributions. (6 Marks)

- b. Assume that the binding constraints in the solution of a Linear Programming problem are:

$$3x + 2y \leq 180 \text{ (labour constraint)}$$

$$2x + 5y \leq 230 \text{ (machine constraint)}$$

Assume further that the objective function is given by  $200x + 100y$  with the original contribution of L\$7,000.

You are required to obtain the shadow cost for one machine hour.

(6½ Marks)

**(Total 12½ Marks)**

**QUESTION 5**

- a. The demand for a product is 240,000 units per annum. It costs GMD100 to make an order and the cost of each unit is GMD53.33. Annual holding cost is 15% of the price.

**You are required to find:**

- i. The number of orders for the product per year (3 Marks)
- ii. The number of days this supply would last (length of inventory cycle). (1 Mark)
- iii. The total cost per annum. Assume 1year = 356days (2 Marks)

- b. The following activities with their durations are required to complete a road project:

Activity	Preceding Activity	Duration (weeks)
K	-	5
L	K	7
M	K	4
N	L, M	6
O	L	8
P	N	1
Q	N	5
R	O,P	7

- i. Draw the AON network diagram for the program (3 Marks)
- ii. Identify all the paths and calculate their corresponding durations (3½ Marks)

**(Total 12½ Marks)**

**QUESTION 6**

- a. Three jobs are to be assigned to three employees such that each job can be assigned to one and only one employee. The cost distribution (in GH¢) of job on each employee is given in the following table:

	Jobs		
Employees	I	II	III
A	25	31	35
B	15	20	24
C	22	19	17

You are required to determine the job assignments which will minimise cost and hence obtain the total cost. (5 Marks)

b. If the demand function for a commodity is  $y = 130 + 14x - 3x^2$ , find the consumers' surplus when

i.  $x_0 = 10$  (4 Marks)

ii.  $y_0 = 50$  (3½ Marks)

**(Total 12½ Marks)**

## FORMULAE

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

**Economic Order Quantity**

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

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

**Slope of a regression equation**

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

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

**The 95% confidence interval for  $\mu$**

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

**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**

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

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

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

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

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

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

### **Spearman's rank correlation coefficient**

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

### **EOQ with gradual replenishment**

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

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

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

Production cost = *Ordering cost* + *Holdering cost*

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

## MULTIPLE CHOICE ANSWERS

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

26. E  
 27. C  
 28. B  
 29. C  
 30. D

**WORKINGS FOR MULTIPLE CHOICE QUESTIONS**

Q4. Coefficient of variation =  $\frac{Sd}{mean} \times \frac{100}{1}$   
 $SD = \sqrt{100,000,00} = 10,000$   
 $C.V = \frac{10,000}{50,000} \times \frac{100}{1} = 20\%$  (B)

Q5.  $R = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$   
 $d = R_x - R_y: -2, 1, -2, 1, 4$   
 $d^2: 4, 1, 4, 16$   
 $\sum d^2 = 26$   
 $R = 1 - \frac{6(26)}{5(5^2 - 1)} = 1 - 1.3 = -0.30$  (C)

Q7.  $X_t = 20 - 1.5t$

Year	t	$X_t$	$T_t = 20 - 1.5t$
1990	1	40	18.5
1991	2	45	17
1992	3	35	15.5
1993	4	50	14

$T_t$  is obtained by substituting for  $t = 1, 2, 3, 4$  values.  
 Using multiplicative model

$S_{1992} = \frac{X_t}{T_t} = \frac{35}{15.5} = 2.26$  (B)

Q9.

Commodities	Prices		$\frac{P_n}{P_o} \times 100$
	2010	2011	
X	50	70	140
Y	60	80	133.33
Z	75	80	106.67
			380

$$\begin{aligned} \therefore \text{SARPI} &= \frac{\sum \left( \frac{P_n}{P_o} \right) \times 100}{n} \\ &= \frac{380}{3} \times 100 \\ &= 126.67\% \end{aligned} \quad (\text{A})$$

$$\begin{aligned} \text{Q12. } t_c &= \frac{\bar{X} - \mu}{S/\sqrt{n}} = \frac{53,000 - 50,000}{6,000/\sqrt{16}} \\ &= \frac{3,000}{1,500} = 2 \end{aligned} \quad (\text{A})$$

$$\begin{aligned} \text{Q13. } P(x) &= x^2 - 10x - 200 \\ \text{When } P(x) &= 0 \\ x^2 - 10x - 200 &= 0 \\ (x + 10)(x - 20) &= 0 \\ \therefore x &= 20 \end{aligned} \quad (\text{A})$$

$$\begin{aligned} \text{Q14. } S(q) &= 4q + 30 \\ R(q) &= q S(q) \\ &= 4q^2 + 30q \\ \therefore P(q) &= 4q^2 + 30q - 3q^2 - 5q - 300 \\ &= q^2 + 25q - 300 \\ P(20) &= 20^2 + 25(20) - 300 \\ &= 400 + 500 - 300 \\ &= 600 \end{aligned} \quad (\text{B})$$

$$\begin{aligned} \text{Q15. } S_n &= \frac{a(r^n - 1)}{r - 1}, a = 1,000, r = \frac{2,000}{1,000} = \frac{4,000}{2,000} = 2 \\ S_n &= \frac{1,000(2^{12} - 1)}{2 - 1} \\ &= \text{L\$4,095,000.00} \end{aligned} \quad (\text{C})$$

$$\begin{aligned} \text{Q16. } NPV &= \frac{A_0}{(1-r)^0} + \frac{A_3}{(1-r)^3} = 0 \\ \frac{-95,000}{(1-r)^0} + \frac{120,000}{(1-r)^3} &= 0 \\ -(1+r)^3 95,000 + 120,000 &= 0 \\ (1+r)^3 &= \frac{120,000}{95,000} \\ (1+r)^3 &= 1.26316 \\ 1+r &= \sqrt[3]{1.26316} \\ 1+r &= 1.08098447 \\ r &= 1.08098447 - 1 \\ r &= 0.08098447 \\ r &= 0.08098 \end{aligned} \quad (\text{A})$$

Q18.  $MR = 40$   
 $TR = \int_0^{200} 40dq$   
 $= 40q \Big|_0^{200}$   
 $= 40 \times 200$   
 $= 1e8,000$

(D)

Q19.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>C</b>	<b>Supply</b>		
X	1,600	1,200			2,800	1,200	0
Y		600	1,950		2,550	1,950	0
Z			650	2,000	2,650	2,000	0
Dummy				1,300	1,300	0	
Demand	<del>1,600</del> 0	<del>1,800</del> 600 0	<del>2,600</del> 650 0	<del>2,300</del> 1,300 0			

∴ Fourth allocation = 1,950

(D)

Q21.

<b>P.D</b>	<b>Pr</b>	<b>% Cum Pr</b>	<b>MCR/N</b>
350	0.10	0.10	00 - 09
420	0.20	0.30	10 - 29
530	0.30	0.60	30 - 59
620	0.05	0.65	60 - 64
730	0.15	0.80	65 - 79
840	0.20	0.00	80 - 99

<b>R</b>	<b>R/N</b>	<b>F D</b>
1	38	530
2	07	350
3	90	840
4	95	840
5	78	730
6	64	620
7	22	420
8	10	420
9	15	420
10	04	350

Forecast demand for 7<sup>th</sup> day is 420 papers

Q28.

SOURCE	DESTINATION			SUPPLY
	U	V	W	
X	10	30 6	7	30 0
Y	45 8	6	25 9	70 250
Z	11	12	50 5	50 0
DEMAND	45 0	30 0	75 25 0	150

$$XV = 30$$

$$YW = 25$$

$$\underline{55}$$

(B)

Q30. P (Chartered accountants (A) or a female (F))

$$= P(A) + P(F) - P(A \cap F)$$

$$= \frac{36+20}{120} + \frac{20+30}{120} - \frac{20}{120}$$

$$= \frac{56}{120} + \frac{50}{120} - \frac{20}{120}$$

$$= \frac{56+50-20}{120} = \frac{86}{120} = \frac{43}{60} = 0.72$$

(D)

### EXAMINER'S REPORT

The Multiple Choice Questions (MCQ) are of good standard and the questions reasonably cover all the three areas of the Quantitative Analysis (QA) syllabus i.e. Business Statistics, Business Mathematics and Operation Research.

Out of all the Multiple Choice Question (MCQ) questions, about 46.67% is from Business Statistics, about 20% is from Business Mathematics while about 33.33% is from Operations Research section of the syllabus.

All the candidates are expected to attempt all questions in this section. The general performance was fairly okay.

### SHORT ANSWER SOLUTIONS

1. Continuous
2. Tally Method
3. 1.2

4. Negative
5. Irregular variation or Random/Residual
6. 6
7. Simple Aggregate
8. 105
9. 580
10. GH¢300,000.00
11. ~~₦~~871,424.57 or (~~₦~~871,428.57)
12. 2
13. Scarce or limited, Optimum (in that order)
14. Demand, available (in that order)
15. Stock costs
16. Network diagram
17. Dummy
18. Unbalanced
19. North West Corner Rule/Method
20. Simulation

### **WORKINGS FOR SHORT ANSWER QUESTIONS**

$$Q3. \quad \bar{x} = \frac{16+18+15+17+19}{5} = \frac{85}{5} = 17$$

$$M.D = \frac{\sum|x - \bar{x}|}{N} = \frac{|16 - 17| + |18 - 17| + |15 - 17| + |17 - 17| + |19 - 17|}{5}$$

$$= \frac{1+1+2+0+2}{5}$$

$$= 6/5 = 1\frac{1}{5} = 1.2$$

$$Q6. \quad \text{Seasonal variation} = Y - T$$

$$\therefore b = 36 - 30 = 6$$

$$Q8. \quad E(X^2) = 5^2 \left(\frac{1}{5}\right) + 10^2 \left(\frac{3}{10}\right) + 15^2 \left(\frac{2}{15}\right) + 20^2 \left(\frac{1}{10}\right)$$

$$= 5 + 30 + 30 + 40$$

$$= 105$$

Q9.  $P(q) = 2q^2 + 16q - 50$   
 $C(q) = 3q^2 + 4q + 150$   
 $R(q) = P(q) + C(q)$   
 $= 5q^2 + 20q + 100$   
 $\therefore R(8) = 5 \times 64 + 20 \times 8 + 100$   
 $= 580$

Q10.  $S_n = \frac{n}{2} \{2a + (n - 1) d\}$   
 $= \frac{6}{2} \{2 \times 25,000 + 5 (10,000)\}$   
 $= 3 \times 100,000$   
 $= \text{GH}\text{¢}300,000.00$

Q11.

Year	Net cash flow (₵)	Discounting factor (5%)	Present value (₵)
0	-1.3m	$\frac{1}{(1 + 0.05)^0}$	-1.3m
1	450,000	$\frac{1}{(1 + 0.05)^1}$	<u>428,571.43</u>
NPV =			<u>-871,428.57</u>

The NPV is negative i.e. - ~~₵~~871,28.57 or (~~₵~~871,428.57)

Q12.  $P(x) = -6x^2 + 24x - 14$

$$\frac{dP(x)}{dx} = -12x + 24$$

For turning point,  $\frac{dP(x)}{dx} = 0$

$$\therefore -12x + 24 = 0$$

$$24 = 12x$$

$$x = \frac{24}{12} = 2$$

$$\therefore \frac{d^2 P(x)}{dx^2} = -12 \text{ at } x = 2$$

This shows that  $x = 2$  is a maximum point since  $\frac{d^2 P(x)}{dx^2}$  is negative

## EXAMINER'S REPORT

The Short Answer Questions (SAQ) are of good standard and the questions cover all the relevant areas of the Quantitative Analysis (QA) syllabus.

About 40% of the questions is from Business Statistics syllabus, about 20% is from Business Mathematics and about 40% is from Operation Research.

This section is also compulsory for all the candidates. The general performance in this section was below average.

**SOLUTION 1a**

Returns (GH¢)	P(A)	Exp (A)	P (B)	Exp (B)
4,000,000	0.20	800,000	0.22	880,000
6,000,000	0.50	3,000,000	0.53	3,180,000
(3,000,000)	0.16	(480,000)	0.17	(510,000)
12,000,000	0.14	<u>1,680,000</u>	0.08	<u>960,000</u>
		GH¢5,000,000		GH¢4,510,000

The new plant should be sited at location A because it has the higher expected returns.

Class Interval	f	x	fx
1 - 10	9	5.5	49.5
11 - 20	12	15.5	186
21 - 30	10	25.5	255
31 - 40	14	35.5	497
41 - 50	3	45.5	136.5
51 - 60	2	55.5	111
	$\sum f = 50$		$\sum fx = 1235$

(b)

$$(i) \quad \text{Mean} = \frac{\sum fx}{\sum f}$$

$$= \frac{1235}{50}$$

$$= 24.7$$

Mean deposit = L\$24,700

$$(ii) \quad \text{Mode} = L_{mo} + \left( \frac{\Delta_1}{\Delta_1 + \Delta_2} \right) C$$

Modal class = 31 – 40 (highest frequency of 14)

$$\Delta_1 = 14 - 10 = 4, \quad \Delta_2 = 14 - 3 = 11$$

$$\text{Mode} = 30.5 + \left( \frac{4}{4 + 11} \right) 10$$

$$\text{Mode} = 30.5 + 2.667$$

$$\text{Mode} = 33.167$$

Mode deposit = L\$33,167

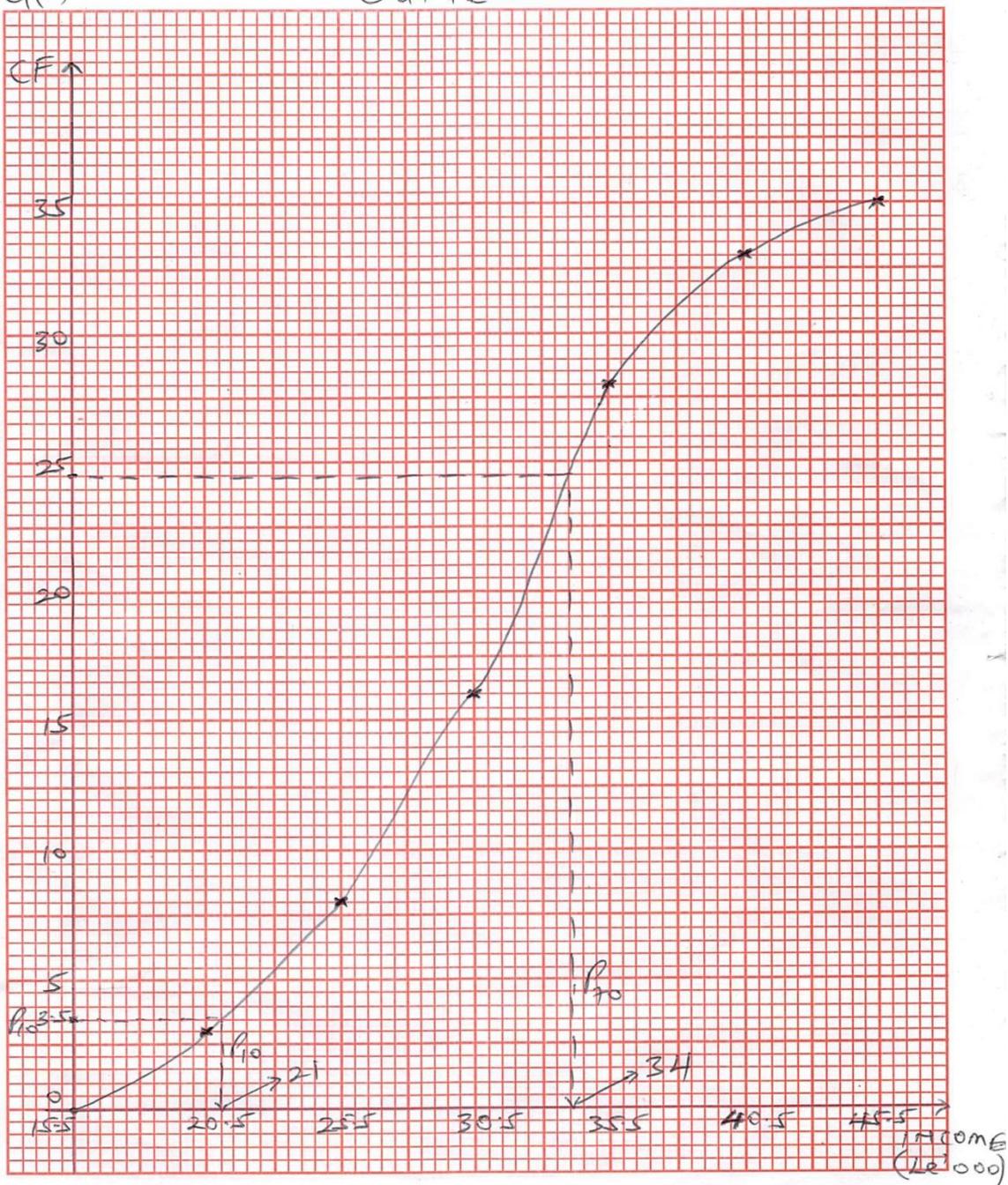
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No Of Question..... Q2 .....

Candidate's No.....

q(1)

OGIVE



G. 5

## EXAMINER'S REPORT

- (a) The question tests the candidates' knowledge on the computation of expectation and its application in finding expected returns of a company given probability distribution.

This question is taken from Business Mathematics syllabus.

- (b) This is a Business Statistics question, which tests the candidates' knowledge on the application of measure of central tendency or location i.e. finding mean and mode using their formulae.

The questions 1 (a) and (b) are of good standard. The candidates' performance in part a was below average, while their performance in part a was averagely okay.

## SOLUTION 2a

- (i)

Income boundary	frequency	Cumulative frequency (c.f)
Less than 20.5	3	3
" " 25.5	5	8
" " 30.5	8	16
" " 35.5	12	28
" " 40.5	5	33
" " 45.5	2	35

- (ii)  $n^{\text{th}}$  percentile is at  $\frac{\sum f}{100} \times (n)$

$$\therefore 10^{\text{th}} \text{ percentile is at } \frac{N}{100} \times 10 = \frac{35}{100} \times 10 = 3.5^{\text{th}}$$

i.e.  $P_{10}$  reading from Ogive = 21

$$\Rightarrow P_{10} = \text{Le}21,000$$

$$70^{\text{th}} \text{ percentile is at } \frac{N}{100} \times 70 = \frac{35}{100} \times 70 = 24.5^{\text{th}}$$

$P_{70}$  reading from Ogive = 34

$$\Rightarrow P_{70} = \text{Le}34,000$$

b.

<b>x</b>	<b>y</b>	<b>xy</b>	<b>x<sup>2</sup></b>
0	26	0	0
1	38	38	1
2	94	188	4
3	55	165	9
4	24	96	16
5	38	190	25
6	76	456	36
7	46	322	49
8	20	160	64
9	44	396	81
10	78	780	100
11	32	352	121
12	21	252	144
13	31	403	169
14	58	812	196
<u>15</u>	<u>28</u>	<u>420</u>	<u>225</u>
<b>120</b>	<b>709</b>	<b>5,030</b>	<b>1,240</b>

The trend line is given as

$$y = mx + c$$

$$\text{Where, } m = \frac{n\sum xy - (\sum x)(\sum y)}{n\sum x^2 - (\sum x)^2} = \frac{16(5,030) - 120(709)}{16(1,240) - 120^2}$$

$$m = -\frac{4,600}{5,440} = -0.8456$$

$$\text{and, } c = \frac{\sum y}{n} - m \frac{\sum x}{n} = \frac{709}{16} + 0.8456 \left( \frac{120}{16} \right)$$

$$C = 44.3125 + 6.342$$

$$C = 50.6545$$

∴ The trend line is  $y = 50.65 - 0.85x$

### ALITER TO SOLUTION 2B

<b>x</b>	<b>y</b>	<b>t = x-7.5</b>	<b>t<sup>2</sup></b>	<b>ty</b>
0	26	-7.5	56.25	-195
1	38	-6.5	42.25	-247
2	94	-5.5	30.25	-517
3	55	-4.5	20.25	-245.5
4	24	-3.5	12.25	-84
5	38	-2.5	6.25	-95
6	76	-1.5	2.25	-114
7	46	-0.5	0.25	-23
8	20	0.5	0.25	20
9	44	1.5	2.25	66
10	78	2.5	6.25	195

11	32	3.5	12.25	112
12	21	4.5	20.25	94.5
13	31	5.5	30.25	170.5
14	58	6.5	42.25	377
<u>15</u>	<u>28</u>	7.5	<u>56.25</u>	<u>210</u>
$\Sigma x=120$	$\Sigma y=709$		$\Sigma t^2=340$	$\Sigma ty=287.5$

The trend is given as:

$$y = mx + c$$

$$\text{Where } m = \frac{\Sigma ty}{\Sigma t^2} = \frac{-287.5}{340} = -0.8456$$

$$\text{and } c = -\frac{\Sigma y}{n} - m \frac{\Sigma x}{n} = \frac{709}{16} - (-0.8456) \frac{120}{16}$$

$$C = 44.5125 + 6.342$$

$$C = 50.6545$$

$\therefore$  The trend is  $y = 50.6545 + 0.8456x$

### EXAMINER'S REPORT

- (a) This is a Business Statistics question testing candidates' knowledge on graphical representation of Ogive and computation of the 10<sup>th</sup> and 70<sup>th</sup> percentiles from the Ogive.
- (b) This is also a Business Statistics question testing candidates' knowledge on time series analysis to find the trend line using least squares method.

The questions 2(a) and (b) are of good standard and quality. The general performance of the candidates was above average.

### SOLUTION 3a

Computation of seasonal indices

Year	Q1	Q2	Q3	Q4
1980	2.6	3.0	4.2	3.8
1981	2.7	4.1	3.8	2.7
1982	3.0	3.8	3.6	3.4
<u>1983</u>	<u>2.2</u>	<u>5.2</u>	<u>4.3</u>	<u>4.5</u>
Total	10.5	16.1	15.9	14.4
Average	2.625	4.025	3.975	3.6
Seasonal Index	73.81	113.18	111.78	101.23

The average of averages

$$\begin{aligned}
&= \frac{2.625+4.025+3.975+3.6}{4} \\
&= \frac{14.225}{4} \\
&= 3.55625 \\
\therefore \text{Seasonal Index} &= \frac{\text{Quarterly Average}}{\text{Average of Averages}} \times 100
\end{aligned}$$

$$\text{SI for } Q_1 = \frac{2.625}{3.55625} \times 100 = 73.81$$

$$\text{SI for } Q_2 = \frac{4.025}{3.55625} \times 100 = 113.18$$

$$\text{SI for } Q_3 = \frac{3.975}{3.55625} \times 100 = 111.78$$

$$\text{SI for } Q_4 = \frac{3.6}{3.55625} \times 100 = 101.23$$

(b)

(i) Let  $x$  represent the number of items produced and sold

$$C(x) = \text{N}2,500,000 + \text{N}500x$$

$$R(x) = \text{N}1,500x$$

$$\Rightarrow P(x) = R(x) - C(x)$$

$$P(x) = \text{N}1,500x - \text{N}(2,500,000 + 500x)$$

$$\therefore P(x) = \text{N}1,000x - \text{N}2,500,000$$

To make a profit of at least  $\text{N}950,000$

$$P(x) \geq 950,000$$

$$\Rightarrow 1,000x - 2,500,000 \geq 950,000$$

$$1,000x \geq 950,000 + 2,500,000$$

$$1,000x \geq 3,450,000$$

$$x \geq 3,450$$

i.e. at least 3,450 items must be produced and sold to make a profit of at least  $\text{N}950,000$

(ii) To make a profit of at most  $\text{N}1,500,000$

$$P(x) \leq \text{N}1,500,000$$

$$\Rightarrow 1,000x - 2,500,000 \leq 1,500,000$$

$$1,000x \leq 1,500,000 + 2,500,000$$

$$1,000x \leq 4,000,000$$

$$x \leq \frac{4,000,000}{1,000}$$

$$\therefore x \leq 4,000$$

$\therefore$  At most 4,000 items must be produced and sold to make a profit of at most  $\text{N}1,500,000$

### EXAMINER'S REPORT

- (a) This question is from Business Statistics testing candidates' knowledge on the time series analysis to determine the seasonality component of quarterly time series data by finding the quarterly seasonal indices.
- (b) This is a Business Mathematics question, which tests the candidates' knowledge on the application of inequalities to determine profit.
- The questions 3(a) and (b) are of good quality and standard. The general performance of the candidates was averagely okay.

### SOLUTION 4a

Let  $x_1$  represent number of ceiling fans produced

Let  $x_2$  represent number of standing fans produced

Let  $x_3$  represent number of wall fans produced

Let P represent contributions generated

P = objective function which is to be maximised

$$\therefore \text{Max: } P = 120x_1 + 160x_2 + 90x_3$$

Subject to:

$$3x_1 + 4x_2 + 3x_3 \leq 300$$

$$2x_1 + 3x_2 + 4x_3 \leq 180$$

$$x_1 \leq 500$$

$$x_2 \leq 600$$

$$x_3 \leq 300$$

Non-negativity constraints  $x_1 \geq 0, x_2 \geq 0, x_3 \geq 0$

$$\begin{array}{rcl} \text{(b)} & 3x + 2y = 180 & \text{..... (i)} \\ & 2x + 5y = 231 & \text{..... (ii)} \\ \text{(i) } \times 2 & 6x + 4y = 360 & \\ \text{(ii) } \times 3 & 6x + 15y = 693 & \\ & 11y = 333 & \\ & y = 30.27 & \end{array}$$

Sub in (i) to get x

$$3x + 60.54 = 180$$

$$x = 39.82$$

$\therefore$  New contribution is

$$200 \times 39.82 + 100 \times 30.27 = \text{L\$}10,991$$

$\therefore$  the reqd shadow cost is

$$\text{L\$}10,991 - \text{L\$}7,000 = \text{L\$}3,991$$

## EXAMINER'S REPORT

- (a) This question is on Operations Research testing candidates' knowledge on the formulation of linear programming problem with three decision variables and five constraints.
- (b) This is also an Operation Research question, which tests the candidates' knowledge on how to obtain the shadow cost given 2 decision variables and 2 constraints.

These questions 4(a) and (b) are of good standard and of high quality. The general performance of the candidates in these questions was below average.

## SOLUTION 5

- (a) The demand for a product is 240,000 unit per year

$$d = 240,000$$

- (i) No of orders per year =  $\frac{d}{Q}$

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

$$C = \text{GMD}100$$

$$h = 15\% \text{ of GMD}53.33 = 0.15 \times 53.33 = \text{GMD}7.9995$$

$$Q = \sqrt{\frac{2 \times 100 \times 240,000}{7.9995}}$$
$$= 2,449.57$$

$$Q \approx 2,450 \text{ units of the product}$$

$$\therefore \text{No of orders per year} = \frac{240,000}{2,450}$$

$$= 97.958$$

$$\approx 98 \text{ orders}$$

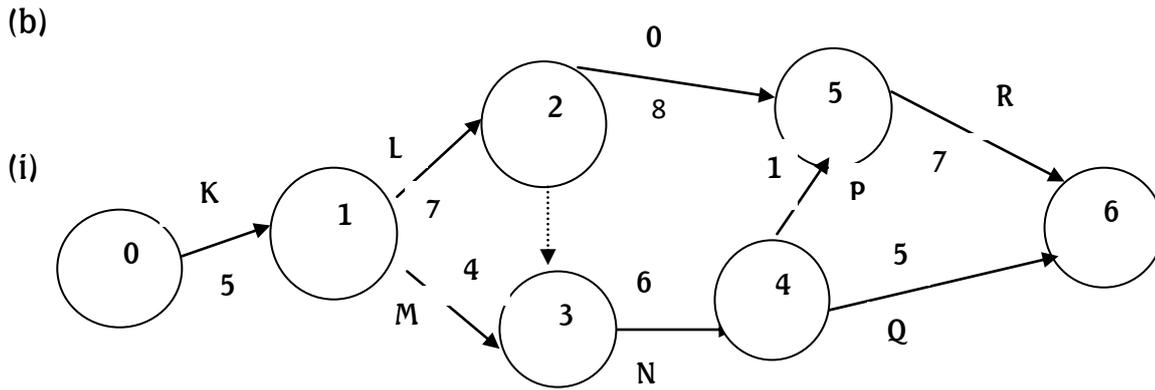
- (ii) Number of days the supply would last =  $\frac{356}{98} \approx 3.63 \text{ days}$

- (iii) Total cost per annum =  $\frac{cd}{Q} + \frac{Qh}{2}$

$$= 100 \times 98 + \frac{2,450 \times 7.9995}{2}$$

$$= 9,800 + 9,799.39$$

$$= \text{GMD}19,599.39$$



(ii)

<b>Path</b>	<b>Duration</b>
K → L → O → R	5 + 7 + 8 + 7 = 27 weeks
K → M → N → Q	5 + 4 + 6 + 5 = 20 weeks
K → M → N → P → R	5 + 4 + 6 + 1 + 7 = 23 weeks
K → L → Dummy → N → Q	5 + 7 + 0 + 6 + 5 = 23 weeks
K → L → Dummy → N → P → R	5 + 7 + 0 + 6 + 1 + 7 = 26 weeks

### EXAMINER'S REPORT

- (a) This part of the question is on Operations Research question, testing candidates' knowledge on determining the number of orders, length of inventory cycle and the total cost in an inventory control problem.
- (b) This question is also an Operations Research question, which tests the candidates' knowledge on Network Analysis. The question involves how to draw activity on node, drawing of network diagram, identification of various paths within the network diagram and calculation of their corresponding durations.

The questions 5(a) and (b) are of high quality. The general performance of the candidates was on the average.

### SOLUTION 6a

	<b>Jobs</b>		
	<b>I</b>	<b>II</b>	<b>III</b>
A	25	31	35
Employee B	15	20	24
C	22	19	17

Balance

Step 1 and step 2. By removing the smallest entry in each row

Row iteration			
	I	II	III
A	0	6	10
B	0	5	9
C	5	2	0

Column iteration			
	I	II	III
A	0	4	10
B	0	3	9
C	5	0	0

Subtract the lowest entry in each column to have column iteration

	I	II	III
A	0	1	7
B	0	0	6
C	5	0	0

We assign	Cost (In GH¢)
Job I → Employee A	25
Job II → Employee B	20
Job III → Employee C	<u>17</u>
Total cost =	<u>62</u>

(b)

(i)  $y = 130 + 14x - 3x^2$

When  $x_0 = 10$ ,  $y_0 = 130 + 140 - 300$

$\therefore y_0 = -30$

Consumers' surplus =  $\int_0^{10} (130 + 14x - 3x^2) dx - x_0 y_0$

i.e.  $\left(130x + \frac{14}{2}x^2 - x^3\right) \Big|_0^{10} - (-30(10))$

$= 1,300 + 700 - 1,000 + 300$

$= 1,300$

(ii)  $y = 130 + 14x - 3x^2$ ,

When  $y_0 = 50$ ,

$50 = 130 + 14x - 3x^2$

$0 = 80 + 14x - 3x^2$

$3x^2 - 14x - 80 = 0$

$$3x^2 - 24x + 10x - 80 = 0$$

$$3x(x - 8) + 10(x - 8) = 0$$

$$(3x + 10)(x - 8) = 0$$

$$\Rightarrow x = -\frac{10}{3} \text{ or } 8$$

Since negative is not relevant,

$$\therefore x_0 = 8$$

$$\begin{aligned} \text{Consumers' surplus} &= \int_0^8 (130 + 14x - 3x^2) dx - x_0 y_0 \\ &= [130x + 7x^2 - x^3]_0^8 - 8(50) \\ &= 130(8) + 7(64) - 512 - 400 \\ &= 1,040 + 448 - 512 - 400 \\ &= 576 \end{aligned}$$

### ALITER FOR 6a

		Jobs		
		I	II	III
Employee	A	25	31	35
	B	15	20	24
	C	22	19	17

Step 1: By removing the smallest entry in each column

Column iteration			
	I	II	III
A	10	12	18
B	0	1	7
C	7	0	0

Step 2: By removing the smallest entry in each row

Row iteration			
	I	II	III
A	0	2	8
B	0	1	7
C	7	0	0

Step 3: Cover all zeros with minimum lines

	I	II	III
A	0	2	8
B	0	1	7
C	7	0	0

Step 4: Subtract 1 (the smallest value) from the uncovered values and add it to the value that the lines crossed twice e.g. 7

	I	II	III
A	0	1	7
B	0	0	6
C	8	0	0

Since the minimum number of lines that covered all the zero i.e. 3 lines equal to the number of rows/number of columns. The optimal solution is reached. Therefore, we assign.

	Cost (in GH¢)
Job I → Employee A	25
Job II → Employee B	20
Job III → Employee C	<u>17</u>
Total cost	<u>62</u>

### EXAMINER'S REPORT

- (a) This is an Operations Research question testing candidates' knowledge on assignment problem to determine the optimal assignment of three jobs to be allocated to three employees in order to minimise the cost and then obtain the total cost.
- (b) This question is from Business Mathematics testing candidates' knowledge on the application of integration to determine consumers' surplus given a demand function.

The question 6(a) and (b) are of good standard and the general performance of the candidates in these questions was below average.