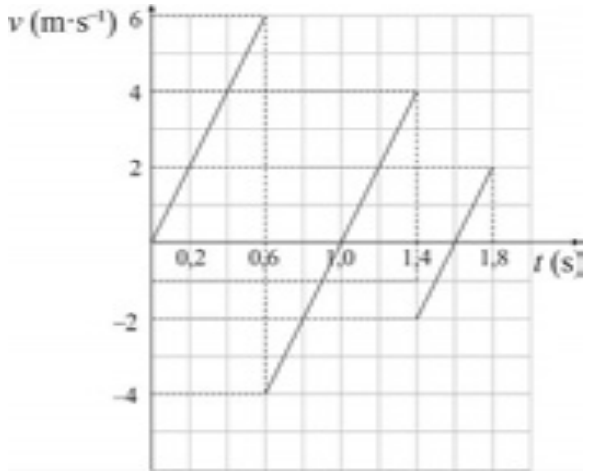
SECTION B

QUESTION 4



The graph illustrates the motion of a ball that was dropped from a height of 1,8 m.

4.1 Describe the motion of the ball from the instant it was dropped up to $t = 1,8$ s. (6)

4.2 Use the graph (not equations of motion) to determine the distance the ball falls between 1, 0 s and 1, 4 s. (3)

4.3 Draw an acceleration versus time graph for the motion of the ball. (3)

4.4 Calculate the position of the ball relative to the starting point after 1,8 s. (3)

(15)

QUESTION 5

The driver of a car of mass 1 200 kg, which is moving at 80 km·h^{-1}, has a mass of 90 kg. He loses control and the car hits a wall head on and comes to rest in 0,01 s.

5.1 Convert 80 km·h^{-1} to m·s^{-1}. Show your calculations. (2)

5.2 Calculate the force exerted on the driver as the car comes to rest. (4)

5.3 Calculate the work done in bringing the car to rest. (3)

5.4 Modern cars have a crumple zone as part of the design, which serves as a safety feature, as do air bags in the interior. Explain how these two features make a car safer during a collision. (4)

(13)

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QUESTION 6

A car of mass 1 500 kg starts from rest on a straight horizontal road and accelerates at 1,5 m·s^{-2} for 15 s until it reaches a constant speed. At this point, the fictional forces on the car total 2 500 N.

6.1 What constant speed does the car reach? (3)

6.2 Calculate the power output of the car's engine when it is moving at constant speed. (4)

(7)

QUESTION 7

The siren of a fire engine at rest emits a sound of frequency 1 200 Hz. Determine the frequency that a stationary observer would hear if:

7.1 the fire engine is moving away from him/her at 20 m·s^{-1}. (3)

7.2 the fire engine is moving towards him/her at 20 m·s^{-1} (2)

7.3 In which case does the sound heard have a higher pitch than the source? (1)

7.4 Give a reason why you gave the answer in 7.3. (2)

(8)

QUESTION 8

Monochromatic light of wavelength 570 nm shines on a very narrow slit of width 10 µm.

8.1 What must be the width of the slit for diffraction to occur? (1)

8.2 What happens to the separation of the bands (fringes), as the wavelength of the light increases? Explain your answer. (3)

8.3 Calculate the position (in degrees) of the second dark band in the diffraction pattern. (5)

(9)

QUESTION 9

All moving objects have a De Broglie wavelength associated with them.

9.1 Calculate the wavelength of a tennis ball of mass 50 g moving at a speed of 80 m·s^{-1}. (3)

9.2 Explain why it is impossible to observe diffraction of these waves. (3)

9.3 What characteristic should objects have, in order for the waves to be able to undergo diffraction? (1)

(7)

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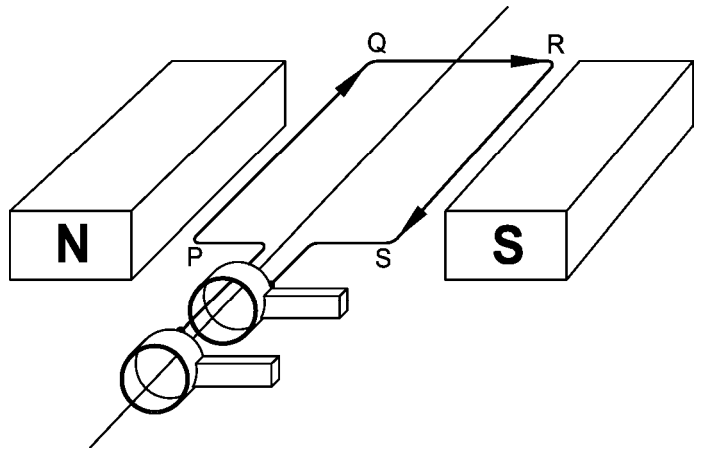
QUESTION 10

The diagram shows an illustration of an alternating-current generator.



10.1 Described the role played by the slip rings in this generator. (2)
10.2 Explained how the coil rotates in the magnetic field. (1)
10.3 Explain why the current produced is alternating-current. (4)
10.4 Draw a graph of one cycle of alternating-current. (2)
10.5 What kind of energy conversion takes place in a generator? (1)
10.6 If the generator produces alternating-current at a peak voltage of 325 V, calculate the rms voltage. (2)
(12)

QUESTION 11

A solid-state diode is made up of two doped semiconductors.

11.1 For what purpose is a diode used in electronics? (1)
11.2 Explain how a diode performs this function. (6)
11.3 What other function could a diode perform? (1)
(8)

QUESTION 12

When light of the correct frequency shines on the surface of a metal, electrons are emitted from the surface of that metal.

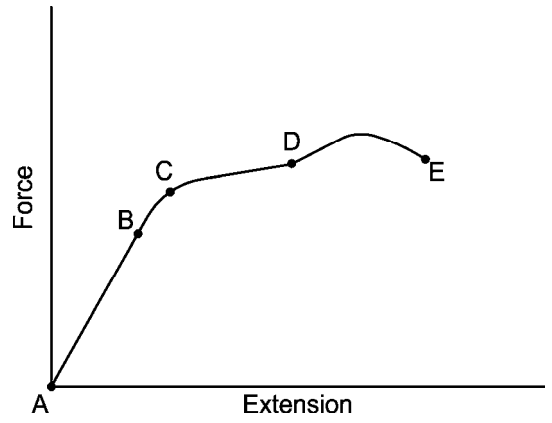
12.1 What term is used to describe the observation above. (1)
12.2 Light of a certain frequency causes emission of electrons from the surface of a particular metal. Does this mean that it causes emission from the surface of any metal? Explain your answer. (4)
12.3 Calculate the energy of a photon of light of frequency 380 nm. (4)
12.4 What is meant by threshold frequency? (2)
12.5 Light above the threshold frequency shines on the surface of a metal. If the light is made more intense, what effect would this have? (2)
(13)

QUESTION 13

13.1 Name four applications of lasers. (4)
13.2 List advantages OR disadvantages of the applications you mentioned in 13.1. (8)
(12)

QUESTION 14

The graph shows the behaviour of a spring as masses of increasing size are suspended from one end.



Describe what happens in each of the sections shown, and also give the name of each section.

14.1 AB
14.2 Point C
14.3 CD
14.4 DE (12)
14.5 Creep and fracture are two different modes of failure in materials. Compare the two processes. (5)
14.6 A steel beam is made to support very heavy loads. List four possible ways by which the steel used can be strengthened. (4)
(21)

TOTAL SECTION B: 125

TOTAL MARKS: 150

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SECTION A: COMPULSORY

QUESTION 1

Four possible options are provided as answers to the following questions.

Choose the answer and write only the letter (A-D) next to the question number (1.1.1 – 1.1.6), for example 1.1 D

1.1. Business Development Corporation has identified a need for a strategic plan to address the high turnover of staff in its marketing department. This challenge is part of the…… environment.

A. Macro
B. Micro
C. SMME
D. Market

1.2. The…… is responsible for the selection process when advertising a management vacancy in a large gold mine.

A. Executive management
B. Board of Directors
C. Human Resources Department
D. Directors

1.3. Workers have the right to join unions and employers have the right to belong to Employer's organizations.

A. Organisational rights
B. Bargaining Councils
C. Freedom of association
D. Workplace Forum

1.4. Limited liability is when the shareholders……

A. Are only responsible for their personal debts with the business.
B. Are not responsible for the debts of the business, but lose the amount of money they have invested in the business.
C. Are responsible for some of the debts of the business and also lose the amount they have invested in the business.
D. Pay back the total dividends received to make money available to pay for the debts of the business.

1.5. ……means that investors can choose where they want to invest.

A. Migrant
B. Philosophy
C. Globalisation
D. Chabilitating

1.6. The ……approach tried to eliminate the defects of other theories and like the systems approach, attempted to intergrate the ideas of the different schools.

A. Quantitative School
B. Strategic Management Approach
C. Systems Approach
D. Contingency Approach

QUESTION 2

Indicate whether the following statements are **TRUE** or **FALSE**

2.1 Creative thinking should be encouraged in all members of staff.
2.2 The internal environment is also known as macro-environment.
2.3 Companies issue shares in order to raise capital for their operations.
2.4 A horizontal merger is an amalgamation of two business enterprises in the same Industry.
2.5 Bureaucratic leaders do not live by fixed rules and not rigid formal routines.

(6 x 2) (12)

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QUESTION 3

Match the concepts in column B with the statement in column A. Write answers only next to the correct number, for example 1.3.6 F

A	B
3.1. Measures are designed to ensure that suitably qualified people from designated groups have equal employment opportunities in workplace.	A. Strategic Plan
3.2. The first piece of legislation to raise employee awareness of the issue of sexual harassment.	B. Affirmative Action
3.3. Creating and sustaining effective labour relation.	C. Debenture
3.4. A written acknowledgement of debt issued by a business to the institution or person from whom it has borrowed money.	D. Employment Equity Act
3.5. Used when a business is looking at growth.	E. Human Resource Management

(5 x 2) (10)

TOTAL SECTION A: 40

SECTION B (COMPULSORY)

QUESTION 4

4.1. Describe FIVE examples of recent changes in the South African business environment. (15)

4.2. Describe the characteristics of the business environment and use appropriate examples (20)

4.3. List the environmental factors of the macro-environment. (8)

4.4. Identify four aims of corporate social responsibility (12)

4.5. Mention any FIVE purposes of skill development Act. (15)

4.6. Explain the following concept in a business:

4.6.1. vision

4.6.2. mission

4.6.3. objective

4.6.4. strategies

4.6.5. policies (20)

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QUESTION 5

5.1. Choose any SEVEN entrepreneurial characteristics and describe how they are regarded as successful in South Africa. (21)

5.2. Distinguish between insurance and assurance. (4)

5.3. Compare the characteristics of partnership and Private companies in a table form. (20)

5.4. List FIVE factors which will help to achieve excellent presentation. (15)

5.5. Describe the concept of human rights and inclusivity as protected by South African constitution. (10)

5.6. In any presentation of a product by a company representative, there is time to give audience chance to ask questions for clarity. Which skill should a presenter use to respond professionally to questions and feedback? (20)

(90)

SECTION B TOTAL: 180

SECTION C

Answer any **TWO** questions from this section. Indicate your choice clearly.

QUESTION 6

Read the case study below and answer the questions that follow:

Mustardseed & Sunshine

Mpho teamed up with an artist friend in 1995 to design and manufacture upmarket earthenware crockery items and formed a partnership. They initially employed two assista and worked from Mpho's home in Durban.

By 1999 the business had grown well and Mpho attended the New York International Gift Fair. Mpho showcased her product at the stall of a South African merchandisising agent where they were so popular that 85% of her products were soon going to the export marke Mpho emphasizes that trade fairs are crucial to attracting new overseas clients to service repeat-clients and to showcase new designs. Visiting fairs and local shops gives the entrepreneur opportunities to do some research and evaluate the market to determine wher product line fit in before spending a great deal of money getting goods overseas, perhaps t the wrong venue.

Nowadays the business employs thirty people and operates from a Woodstock factory. Mp

has become better known in South Africa and markets 60% of her products locally even when her exports are going well. She reflects that her best piece of Public Relations was when one of her products, the Nightlilly Rooibos Cup, was featured on Oprah Winfrey's C list in May 2006! Her worst setback was when she discovered that her merchandising ager was having cheap copies of her earthenware made in Japan and selling these to her clients and doubling her market.

Her experience over the years has taught her the importance of regular visits to trade fairs Europe (Milan and Paris) and the USA (New York and Atlanta) as well as finding the rigl forwarding agents to represent her in transporting goods to their destination and handling the paperwork involved. She also recommends having someone local at the export destina who understands the export culture regulations language and business customs, to represer the business.

Questions:

6.1. Explain the principles of planning to Mpho from Mustardseed and Sunshine. (14)

6.2. Draw up an outline for a strategic plan that Mpho can use to design a corporate social investment programme for Mustardseed and Sunshine.

Give examples or suggestions of the infomration she needs to write in the strategic plan Outline.

A: Define corporate mission (2)

B: Analyse Strategy
Take internal and external factors into account. (8)

C: Formulate strategy
Take strengths and weaknesses into account (8)

D: Implement strategy
Introduce change to ensure fit (6)

E: Evaluation and feedback
Redefine if necessary organizational renewal (2)

(26)

(40)

QUESTION 7

Legislation controls the way business operate in South Africa. Most of the laws were developed to treat the division of the past and to transform society and are guided by the Acts or Legislation to redress equity in workforce. Discuss and analyse the impact of those Acts in response to the redress and the equity in the workforce. (40)

QUESTION 8

Our business environments amongst other are affected and challenged by the micro market and macro environment as external factors. Identify and advise on strategies for how business can respond to those challenges experienced within the macro environment. (40)

SECTION C TOTAL: 80

GRAND TOTAL: 300

ACCOUNTING

Question	The topic of the question is:	Marks
1	Accounting concepts: Multiple choice questions	14
2	Break even Analysis	36
3	Assets Disposal	78
4	Income Statements: Analysis and Interpretation	68
5	Manufacturing and Trading Account	38
6	Sports Club	66

Question 1

1.1 The fundamental objective of an external audit of a limited company is to
- A. give advice to shareholders
- B. detect fraud and errors
- C. measure the performance and financial position of a company
- D. provide an opinion on the financial statements

1.2 Which one of the following statements most closely expresses the meaning of "true and fair"?
- A. There is only one true and fair view of a company's financial statements.
- B. True and fair is determined by compliance with accounting standards.
- C. True and fair is determined by compliance with company law.
- D. True and fair is largely determined by reference to generally accepted accounting practice.

1.3. A company includes in stock goods received before the year-end, but for which invoices are not received until after the year-end. This is in accordance with
- A. the historical cost convention.
- B. the accruals concept.
- C. the consistency concept.
- D. the materiality concept.

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1.4. Which one of the following sentences does **NOT** explain the distinction between financial accounts and management accounts?

A. Financial accounts are primarily for external users and management accounts are primarily for internal users.
B. Financial accounts are normally produced annually and management accounts are normally produced monthly.
C. Financial accounts are more accurate than management accounts.
D. Financial accounts are audited by an external auditor and management accounts do not normally have an external audit.

1.5 When there is inflation, the historical cost convention has the effect of

A overstating profits and understating balance sheet values.
B understating profits and overstating balance sheet values.
C understating cash flow and overstating cash in the balance sheet.
D overstating cash flow and understating cash in the balance sheet.

1.6 A fixed asset register is

A an alternative name for the fixed asset ledger account.
B a list of the physical fixed assets rather than their financial cost.
C a schedule of planned maintenance of fixed assets for use by the plant engineer.
D a schedule of the cost and other information about each individual fixed asset.

1.7 The difference between a profit and loss account (which may also be referred to as an "income statement") and an income and expenditure account is that

A an income and expenditure account is an international term for a profit and loss account.
B a profit and loss account is prepared for a business and an income and expenditure ac count is prepared for a not-for-profit making organisation.
C a profit and loss account is prepared on an accruals basis and an income and expenditure account is prepared on a cash flow basis.
D a profit and loss account is prepared for a manufacturing business and an income and expend iture account is prepared for a non-manufacturing business.

Question 2

Dragon Ltd manufactures a single product. Its costs and sales for the year ended 30 November 2000 were as follows:

• Units sold	21,000
• Selling price	R40 per unit
• Variable costs per unit	
• Wages	R8
• Materials	R18
• Overheads	R4
• Fixed costs	R187, 000

To improve profit for the year commencing 1 December 2000 the following changes are expected to take place.

Units to be sold are 22,500.
Selling price is to be maintained at R40 per unit.
Wages are to be increased by 5% per unit.
Material costs are to be reduced by 10% per unit, this being achieved by committing to a long term contract with a single supplier only.
Variable overheads are to be reduced by R0.10 per unit.
Fixed costs are to increase by R20, 000.

REQUIRED

Using the data for the year commencing 1 December 2000, calculate:

(i) the break-even in units and sales value; (20)
(ii) the profit for the year; (6)
(iii) the sales in units required to maintain the profit level of the year ended 30 November 2000. (10)

[Total: 36]

Question 3

3.1 Gemma Bay started business on 1 January 1998. The following information is available for the purchases of machinery and office equipment:

Machinery

1 January 1998	Three machines purchased, M1 and M2 costing R15, 000 each, and M3 costing R20, 000.
1 January 2000	Two machines purchased, M4 and M5 costing R12, 000 each.
1 October 2000	Two machines purchased, M6 costing R15, 000 and M7 costing R25, 000.

Office Equipment

1 January 1998 Office equipment purchased costing R25, 000.

Machinery is depreciated at the rate of 20% per annum by the reducing balance method.
Office equipment is depreciated by the straight-line method over an estimated life of 10 years, taking into account a residual value of 10% on cost price. Machine M2 was disposed of on 30 June 1999 for R10, 200 and Machine M3 was disposed of on 30 September 2000 for R13, 000. No office equipment was disposed of during the period.
A full year's depreciation is provided in the year that machinery is purchased. No depreciation is provided in the year of disposal. The financial year-end is 31 December.

REQUIRED

(a) Prepare the following accounts for each of the years 1998, 1999 and 2000:
(i) Machinery Account;
(ii) Provision for Depreciation of Machinery Account. [28]

(b) Prepare the Machinery Disposals Account for each of the years 1999 and 2000. [16]

(c) Prepare the Balance Sheet extract as at 31 December 2000 for Machinery and Office Equipment. [12]

(d) Evaluate the choice of depreciation methods used by the business for these types of fixed asset. [16]

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3.2 A car was purchased for R12, 000 on 1 April 1997 and has been depreciated at 20% each year straight line, assuming no residual value. The company policy is to charge a full year's depreciation in the year of purchase and no depreciation in the year of sale. The car was traded in for a replacement vehicle on 1 August 2000 for an agreed figure of R5, 000.
What was the profit or loss on the disposal of the vehicle for the year ended 31 December 2000?

[Total: 78]

Question 4

4.1 Adile Zakhele is concerned about the lack of cash in his business and why he has found it difficult to meet orders for customers in the last year.

The following summary information relates to his business for the last two years. [6]

Summarised Profit and Loss Account for the years ended:

	31st December 1999 R'000	31st December 2000 R'000
Sales	90	120
Cost of goods sold	45	80
Gross profit	45	40
Sundry expenses	30	34
Net profit	15	6

4.2 The turnover in a company was R2 million and its debtors were 5% of turnover. The company wishes to have a provision for doubtful debts of 4% of debtors, which would make the provision 33% higher than the current provision.

What figure would appear in the profit and loss account in respect of doubtful debts? Calculate. [10]

4.3 Extracts from the financial statements of CFS Ltd are set out below:
Profit and loss account for the year ended 31 December 2000

	R000	R000
Turnover		300
Cost of sales		150
Gross profit		150
Profit on sale of fixed asset		75
		225
Expenses	15	
Depreciation	30	
		45
Net profit		180

Balances at 31 December

	1999 R000	2000 R000
Stock, debtors, current liabilities (net)	40	50

What figure would appear in the cash flow statement of CFS Ltd for the year ended 31 December 2000 in respect of net cash flow for cash from operating activities?

[10]

Summarised Profit and Loss Account for the years ended:

	31st December 1999 R'000	31st December 2000 R'000
Sales	90	120
Cost of goods sold	45	80
Gross profit	45	40
Sundry expenses	30	34
Net profit	15	6

Opening stock as at 1 January 1999 was R15, 00

Balance Sheets as at:	31st December 1999		31st December 2000	
	R'000	R'000	R'000	R'000
Net fixed assets		40		30
Current assets	5		20	
Stock	10		20	
Debtors	3			
Cash at bank	18		40	
Current Liabilities				
Bank overdraft	-		10	
Creditors	9		30	
	9	9	40	
		49		30
Financed By				
Opening capital		40		49
Net profit for year		15		6
		55		55
Less: Drawings		6		25
Closing capital		49		30

REQUIRED

(a) A calculation of the following ratios:
- return on capital employed (based on closing capital)
- gross profit as a percentage of sales
- net profit as a percentage of sales
- current ratio
- liquid (acid test) ratio
- stock turnover

[24]

(b) An analysis and interpretation of the changes between the two years, based on the ratios calculated and information available in the financial statements. Suggest how Adile Zakhele could tackle his concerns and improve future liquidity.

[24]

QUESTION 5

5.1 On 28th February 1999 the following balances were extracted from the books of Barber Manufacturing, a local business solely owned by Ken Barber.

Stocks - 1 March 1998 Raw materials Work in progress Finished goods	 38,300 40,200 58,590
Purchases - raw materials	573,000
Direct expenses	63,100
Direct wages	146,200
Indirect wages	38,300
Sales	1,163,400
Debtors	93,600
Loan interest	500
Rent and Rates	16,100
Insurance	920
Sundry office expenses	15,760
Premises at cost	120,000
Provision for depreciation – premises	24,000
Plant and machinery at cost	80,000
Provision for depreciation - plant and machinery	52,560
Provision for unrealised profit and goods manufactured	2,790
Bad debts	720
Provision for doubtful debts	3,120
Loan (10% p.a. interest)	10,000

The following information is also relevant:

- Stocks as at 28 February 1999:
  Raw materials R35, 400
  Work in progress R36, 476
  Finished goods R74, 340
- The business transfers finished goods from the factory to the Trading Account at factory cost plus 5% profit on manufacture.
- A provision is to the made for unrealised profit on the stock of finished goods on 28th February 1999 of R3, 540.
- The loan was taken out on March 1 1997 and is for a five-year period.
- Rent and rates are apportioned between the factory and office on the basis 5:1.
- Rent of R1, 900 is outstanding.
- Insurance, which includes a prepayment of R80, is apportioned between factory and office on the basis 6:1.
- Provision for depreciation is to be made as follows:
- Premises: 5% on cost, to be apportioned 5:1 between factory and office;
- Plant and machinery: 30% on the reducing balance basis, to be apportioned 6:1 between factory and office.
- Provision for doubtful debts is to be provided at 4% of debtors.

REQUIRED

(a) Prepare a Manufacturing and Trading Account for the year ended 28 February 1999 (for internal use only) to determine the gross profit on the finished goods sold. [28]

5.2 The following information relates to M Ltd:

At 30 September	2000 R000	1999 R000
Stock of raw materials	75	45
Work-in-progress stock	60	70
Stock of finished goods	100	90

For the year ended 30 September 2000	
Purchases of raw materials	R150, 000
Manufacturing wages	R50, 000
Factory overheads	R40, 000

Calculate the prime cost of production in the manufacturing account for the year ended 30 September 2000

[10]
[Total: 38]

Question 6

Nick Morgan, a member of Sandfields Sports Club, has taken over the duties of Treasurer of the Club, the previous Treasurer having recently moved away from the area. The following statement has been prepared for presentation to members at the Club's annual general meeting.

Balance Sheet for the year-end 31 December 1999

Balances for 1998	R	Payments	R
Premises	12,000	Equipment	1,100
Equipment	2,400	Donations	250
Bank	810	Rates and Insurance	1,840
	15,210	Postages	235
		Depreciation and equipment	480
Subscriptions Received		Part-time wages	2,707
1998	279		
		1999	4,314
		2000	168 4,761
		Balances to 2000	
		Premises	12,000
Life Membership	600	Equipment	1,920
		Bank	1,439
Premises sub-let	1,300		
Premises sub-let advance payments	100		
	21,971		21,971

- A life membership scheme was introduced during 1999 and any such fees received are to be capitalised and transferred to income over five years by equal instalments each year, commencing in the year received.
- Premises are not depreciated, while equipment is depreciated by 20% of the balance brought forward from the year before. Provision should be made on new equipment bought during the year. The depreciation rate is applied for the full year irrespective of date of purchase. No assets were disposed of during the year.
- At 31 December 1999 R40 owed for part-time wages, and rates of R110 had be prepaid.

REQUIRED

(a) An Income and Expenditure Account for the year ending 31 December 1999, together with a Balance Sheet as at that date, to good accounting format, for submission to members.

[38]

(b) Explain to the new Treasurer the differences between Receipts and Payments Account, and an Income and Expenditure Account. Indicate when one would be used in preference to the other. [28]

[Total: 66]

LIFE SCIENCES

SECTION A

QUESTION 1

1.1 Various possible answers are provided as answers to the following questions. Choose the correct answer and write only the letter (A – D) next to the question number (1.1.1 – 1.1.5) in the ANSWER BOOK, for example 1.1.6 D.

1.1.1 The organism with the greatest biomass in a terrestrial food chain would be ….
A. decomposers such as bacteria and fungi.
B. producers such as grass.
C. primary consumers such as herbivores.
D. secondary consumers such as carnivores.

1.1.2 Organisms that can convert nitrogen-rich organic molecules into nitrates would be …
A. decomposers such as bacteria and fungi.
B. producers such as grass.
C. primary consumers such as herbivores.
D. secondary consumers such as carnivores.

1.1.3 Organisms with the most cellulose digesting symbionts in their gut would be…
A. decomposers such as bacteria and fungi.
B. producers such as grass.
C. primary consumers such as herbivores.
D. secondary consumers such as carnivores.

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1.1.4 Which one of the following individuals is the most fit in terms of natural selection?
A. A child who does not easily become infected with common diseases such as measles
B. A man of 25 years who can run a 1500 m race in 4 minutes and has one child
C. A woman of 50 years with six adult children
D. A man of 100 years with one adult child

1.1.5 Which one of the following statements about natural selection is NOT TRUE? It can…
A. stabilise a gene pool.
B. reduce the proportion of harmful genes in a gene pool.
C. improve the adaptation of a species to its environment.
D. increase the mutation rate.

(5 × 2) **(10)**

1.2 Give the correct biological term for each of the following descriptions. Write only the term next to the question number (1.2.1 – 1.2.6) in the ANSWER BOOK.

1.2.1 The condition when too much nitrate and phosphate have entered water leading to a short of oxygen and the death of many organisms.

1.2.2 A measure of the number of different species that are present in the area.

1.2.3 The agreement between governments to control the hunting and use of rare species.

1.2.4 A way to use resources which can continue indefinitely since it does not harm the environment.

1.2.5 Any pollutant that causes damage to the growth of a baby in the uterus e.g. alcohol.

1.2.6 A plant that is well adapted for life in very dry conditions.

(6)

1.3 Choose an item from COLUMN B that matches a description in COLUMN A. Write only the letter (A – H) next to the question number (1.3.1 – 1.3.5) in the ANSWER BOOK, for example 1.3.6 J.

	COLUMN A	COLUMN B
1.3.1	The study of man's past	A. Pangaea
1.3.2	The ancient land mass made of all the continents joined	B. anthropology
1.3.3	The study of human cultures	C. Gondwana
1.3.4	The fusion of gametes of closely related individuals	D. palaeontology
1.3.5	Any group of individuals that resemble each other and that can interbreed	E. species
		F. archaeology
		G. inbreeding
		H. race

(5)

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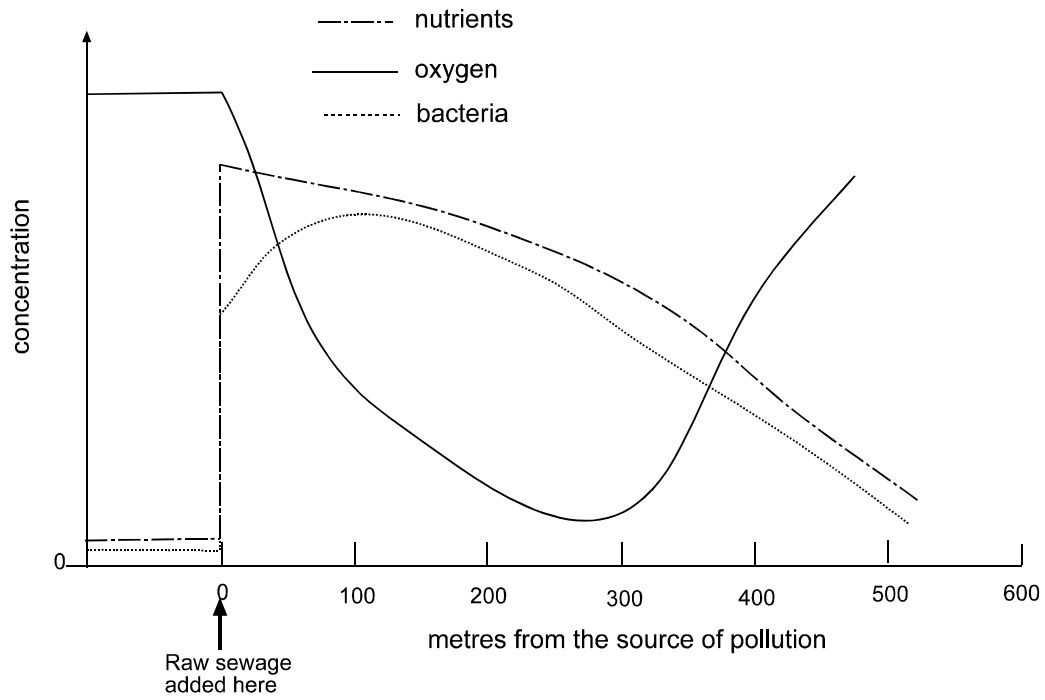
1.4 The graph below shows the effects on oxygen, nutrients and bacteria levels of adding raw sewage to a river.



1.4.1 List TWO important causes of water pollution other than adding sewage to a river. (2)

1.4.2 Define the term 'pollution' as used in Question 1.4.1. (1)

1.4.3 Explain what causes the reduction of oxygen in the river water when raw sewage is added. (2)

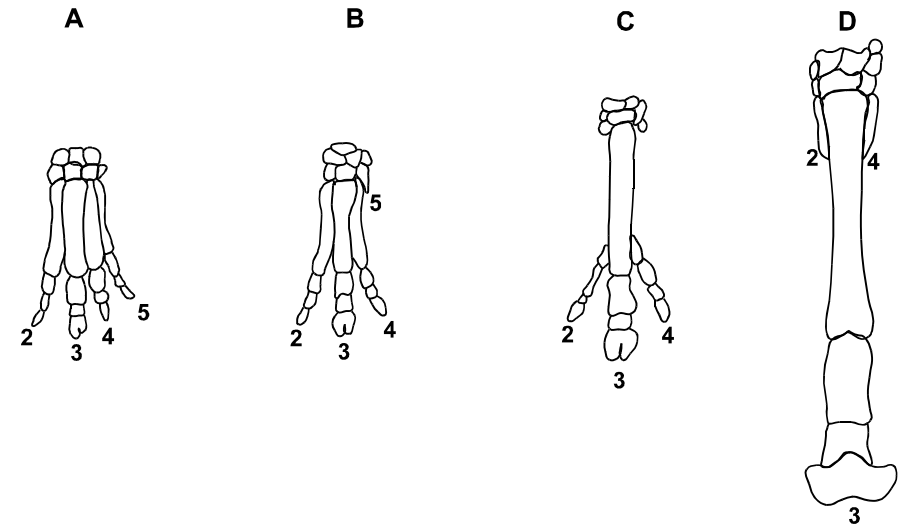
1.4.4 (a) How far along the river might it be before the oxygen level has returned to normal? (1)

(b) Explain how you got your answer to Question 1.4.4 (a). (2)

1.4.5 The raw sewage is being added continuously to this river. Give a reason why the level of nutrients falls the further you get from the entry point. (2)

1.4.6 List THREE ways in which water pollution can be controlled by a community. (3)
(13)

1.5 The diagram shows the fossilised forelimbs of four different, but related, mammals. They are in sequence of their age, with A being the oldest fossil and D the youngest fossil. The digits are numbered to help you understand the diagrams.



1.5.1 Name the important biological process that is illustrated by the diagrams. (1)

1.5.2 Explain the meaning of the term 'fossil' that is used. (1)

1.5.3 What modern mammal is related to these fossils? (1)

1.5.4 Briefly list the structural changes that are taking place in this sequence of fossils. (4)

1.5.5 Suggest TWO possible advantages of the changes in structure illustrated in the diagram. (4)

1.5.6 Suggest ONE disadvantage of the changes in structure illustrated. (1)
(12)

1.6.1 Explain the difference between each of the following pairs:

(a) Microevolution and macroevolution (2)

(b) Natural selection and artificial selection (2)
(4)

Total Question 1: 50
TOTAL SECTION A: 50

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SECTION B

QUESTION 2

2.1 Read the text below which is taken from an internet site advertising powdered *Hoodia gordonii* plant extract for sale.

Hoodia gordonii *cactus is the plant with the new wonder ingredient that curbs one's appetite and helps one to slim.* Hoodia gordonii *is actually a succulent plant from the Kalahari desert, home of the San people. The San have been using the* Hoodia gordonii *succulent for centuries to stave off hunger during their long and arduous hunting trips in the harsh South African wild. Now you too can lose weight with this miracle diet pill.*
The discovery of the active ingredient in the Hoodia gordonii *plant is proven with clinical research to suppress one's appetite by up to 2 000 calories a day. This amazing and all natural and organic ingredient is the result of 30 years of research by the CSIR (Council for Scientific and Industrial Research) in South Africa.*
Hoodia gordonii *is currently in short supply and prices are about to sky-rocket.*

2.1.1 Comment on the statement that this is a 'new' wonder ingredient. (2)

2.1.2 Why is *Hoodia* a 'succulent plant'? (3)

2.1.3 The text says that '*Hoodia gordonii* is currently in short supply'. Give THREE reasons why this may have happened. (3)

2.1.4 If you were in charge of the *Hoodia* programme for the San people, what would you suggest doing to make the supply of *Hoodia* more sustainable? (4)

2.1.5 The CSIR has patented the active ingredient in the *Hoodia* plant and licensed it to a company in Britain to develop pills. This company will pay money to the CSIR for every pill they sell. This means that nobody else, except the one company, can make and sell slimming pills based on the *Hoodia* plant extract. Explain why it was thought important to do this. (2)

2.1.6 The CSIR has agreed to pay 6% of all money earned from the British company into a trust fund set up by the South African San Council.

(a) Why are they paying money to the San people? Use the term 'indigenous knowledge' in your answer. (2)

(b) Do you think the amount being paid is fair? (1)

(c) Explain your answer to 2.1.6 (b). (1)
(18)

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2.2 Acid rain is an important environmental problem in South Africa. Rainwater naturally contains impurities from the air; for instance it absorbs carbon dioxide that makes it pH 6 or even lower. For this reason any rain above pH 5,6 is considered to be normal rain. On the Eastern Highveld of South Africa rain has been recorded with pH 3,6.

2.2.1 Explain the meaning of pH. (1)

2.2.2 What TWO pollutant gases contribute mostly to forming acid rain? (2)

2.2.3 Give THREE of the most important sources of these gases in South Africa. (3)

2.2.4 A group of learners carried out an investigation to find out if acidity affected the growth of vegetables. They grew radish and carrot seeds in cotton wool on liquids of different pH. They put 20 healthy carrot seeds in six containers, each at a different pH. They then repeated the procedure with 20 healthy radish seeds in six containers. After three weeks they collected the seedlings, dried them and found their total mass as a measure of how well they had grown. The results are shown in this table.

pH of container	Dry mass (g)	
	Carrot	Radish
4	0,7	0,9
5	10	0,9
6	56	46
7	49	44
8	9	12
9	0,7	0,9

(a) Suggest a hypothesis the learners were testing. (1)

(b) What is the independent (manipulated) variable in the investigation? (1)

(c) What is the dependent (responding) variable in the investigation? (1)

(d) What conclusion (if any) could the learners reach from these results? (1)

2.2.5 Acid rain can change the pH of soil. What should a South African vegetable farmer do to make sure that acid rain does not damage his/her crops? (2)
(12)

QUESTION 3

3.1 Pollution is often caused by people's activities.
3.1.1 Give FOUR examples of human activities that cause soil pollution, naming at least one of the pollutants in each case. (8)

3.2.2 List THREE different ways in which each person could reduce the amount of waste they produce. (3)
(11)

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3.2

3.2.1 What are the advantages of a landfill as a way of dealing with people's waste? (3)

3.2.2 The town council has asked for your advice on building a new landfill. Write down FOUR important things for the council to remember when they are designing the new facility. In each case you will need to briefly explain the reason. (8)
(11)

3.3 One of the most important problems that occur near poorly managed landfills is houseflies.

3.3.1 Why is there a health problem with the way houseflies breed and find food? (2)

3.3.2 List any THREE fatal diseases that are important in South Africa that are spread by houseflies. (3)

3.3.3 How can housefly numbers near landfill sites be controlled? (3)
(8)

Total Question 3: 30
TOTAL SECTION B: 60

SECTION C

QUESTION 4

4.1 In the study of the evolution of humans, it is important to be able to distinguish fossil apes from fossil hominids.

Give any FIVE features that might be present in fossil skeletal remains that would be useful in distinguishing the two. In each case, give a reason for the difference. **(15)**

4.2 Answer each of these questions with a single sentence.

4.2.1 What is the 'Taung Child'? (2)

4.2.2 What was the first hominid species to migrate out of Africa and when did this happen? (2)

4.2.3 What hominid species was the first we know of to use stone tools? (2)

4.2.4 The Australopithecus genus can be divided into two main groups.
What is the difference between these two groups? (2)

4.2.5 Approximately how many years ago did the first hominid types appear on Earth and where were they to be found? (2)
(10)

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4.3 Write an essay in which you discuss some of the mechanisms by which a new species might be formed and a previous species might become extinct.

Note: NO marks will be awarded for answers in the form of flow charts or diagrams.

The following rubric will be used to assess the essay.

CRITERION	Marks			
	1	2	3	4
Methods of speciation	One method given	Two methods given	Three methods given	Four methods given
Description of the methods	One correct description	Two correct descriptions	Three correct descriptions	Four correct descriptions
Causes of extinction	One cause adequately explained	Two causes adequately explained	Three causes adequately explained	Four causes adequately explained
Synthesis	Significant gaps in the logic and flow of the answer	Minor gaps in the logic and flow of the answer	Well-structured, demonstrates insight and understanding	

(15)

Total Question 4: 40
TOTAL SECTION C: 40

GRAND TOTAL: 150

GEOGRAPHY

Section A

Answer ONE question from this section.

Question 1

Short questions

1.1 Multiple choice questions. Write down the number of the question and the correct answer alongside.

1.1.1 Anabatic winds are
A Cool winds that sink down the valley sides during the night
B Warm winds that sink down the valley sides during the day
C Warm winds that rise up the valley sides during the day
D Cool winds that rise up a valley slope during the day. (2)

1.1.2 Urban areas generally have
A higher precipitation, gusty winds, higher temperatures
B lower precipitation, gusty winds, higher temperatures
C higher precipitation, gusty winds, lower temperatures
D higher precipitation, gentle winds, lower temperatures. (2)