



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

**MARINE SCIENCES P1**

**MAY/JUNE 2024**

**MARKING GUIDELINES**

Final Accepted

R. Toefy

15.06.2024

External Moderator

MARKS: 150

Final accepted  
M Wheeler  
15/06/2024  
Internal moderator

These marking guidelines consist of 17 pages.

DEPARTMENT OF BASIC  
EDUCATION

PRIVATE BAG X895, PRETORIA 0001

2024-03-16

APPROVED MARKING GUIDELINE

PUBLIC EXAMINATION

Copyright reserved

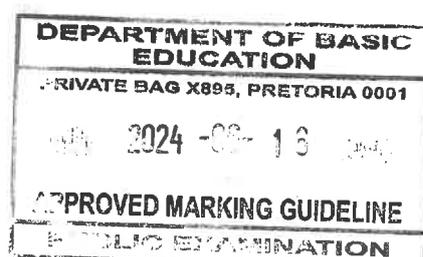
Please turn over

**PRINCIPLES RELATED TO MARKING MARINE SCIENCES**

1. **If more information is given than marks allocated**  
Stop marking when the maximum number of marks is reached, and draw a wavy line and write 'max' in the right-hand margin.
2. **If, for example, three reasons are required and five are given**  
Mark the first three reasons irrespective of whether these first three are correct or not.
3. **If a whole process is given when only a part of the process is required**  
Read the whole process given and credit the relevant part.
4. **If comparisons are asked for, but descriptions are given**  
Accept the description if the differences or similarities are clearly stated.
5. **If diagrams are given with annotations when descriptions are required**  
Mark the description.
6. **If flow charts are given instead of descriptions**  
Mark the description only.
7. **If a described sequence is muddled and links do not make sense**  
Where sequence and links are correct marks are given. Should a logical sequence resume, marks are given.
8. **Non-recognised abbreviations**  
Accept the abbreviation if it is first defined in the answer. If the definition is not defined, do not give credit for the unrecognised abbreviation, but credit the rest of the answer if correct.
9. **Wrong numbering**  
If the answer fits into the correct sequence of questions, but the wrong number is given, credit the answer if the answer is in the correct order.
10. **If the language that is used changes the intended meaning**  
Do not accept the answer.
11. **Spelling errors**  
If a word is recognisable (if read out loud), accept the answer, provided it does not mean something else in Marine Sciences terminology or if it is out of context.
12. **In SECTION A, only accept and credit the correct letter.**
13. **Be sensitive to the sense of an answer, which may be stated in a different way.**
14. **Title**  
All illustrations (e.g. diagrams, graphs and tables) must have a title written above or below.

Copyright reserved

Please turn over



*[Handwritten signature]*

15. **Code-switching of official languages (terms and concepts)**  
A term or concept written in any official language other than the learner's assessment language used in their answers should be credited, if it is correct. A marker that is proficient in Marine Sciences content and the official language used should be consulted. This is applicable to all official languages.
16. **Changes to the marking guidelines**  
No changes must be made to the marking guidelines. The provincial internal moderator must be consulted, who in turn will consult with the national internal moderator (and the Umalusi moderators who will be consulted).
17. **Official marking guidelines**  
Only marking guidelines bearing the signatures of the national internal moderator and the Umalusi moderators and distributed by the National Department of Basic Education via the provinces must be used.



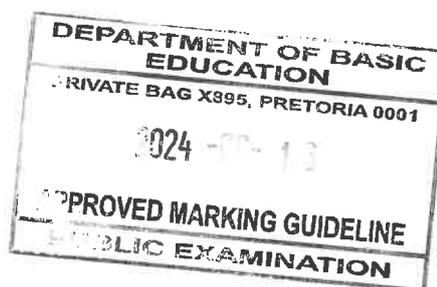
Copyright reserved

Please turn over

**SECTION A**

**QUESTION 1**

|     |        |   |  |                         |           |
|-----|--------|---|--|-------------------------|-----------|
| 1.1 | 1.1.1  | C ✓✓  |  | (10 x 2)                | (20)      |
|     | 1.1.2  | C ✓✓  |  |                         |           |
|     | 1.1.3  | B ✓✓  |  |                         |           |
|     | 1.1.4  | D ✓✓  |  |                         |           |
|     | 1.1.5  | C ✓✓  |  |                         |           |
|     | 1.1.6  | A ✓✓  |  |                         |           |
|     | 1.1.7  | B ✓✓  |  |                         |           |
|     | 1.1.8  | C ✓✓  |  |                         |           |
|     | 1.1.9  | D ✓✓  |  |                         |           |
|     | 1.1.10 | B ✓✓  |  |                         |           |
| 1.2 | 1.2.1  | Climograph ✓  |  | (10 x 1)                | (10)      |
|     | 1.2.2  | Weightlessness ✓ / Neutral buoyancy                 |  |                         |           |
|     | 1.2.3  | Amplitude ✓   |  |                         |           |
|     | 1.2.4  | Maximum Sustainable Yield ✓ / Total Allowable Catch |  |                         |           |
|     | 1.2.5  | Turbine ✓   |  |                         |           |
|     | 1.2.6  | Cation ✓  |  |                         |           |
|     | 1.2.7  | Albedo ✓  |  |                         |           |
|     | 1.2.8  | Restoring ✓ force                                   |  |                         |           |
|     | 1.2.9  | Levees ✓  |  |                         |           |
|     | 1.2.10 | Culture media ✓                                     |  |                         |           |
| 1.3 | 1.3.1  | Both A and B ✓✓                                     |  | (5 x 2)                 | (10)      |
|     | 1.3.2  | A only ✓✓   |  |                         |           |
|     | 1.3.3  | B only ✓✓   |  |                         |           |
|     | 1.3.4  | None ✓✓   |  |                         |           |
|     | 1.3.5  | Both A and B ✓✓                                     |  |                         |           |
|     |        |   |  | <b>TOTAL SECTION A:</b> | <b>40</b> |



Copyright reserved

Please turn over

SECTION B

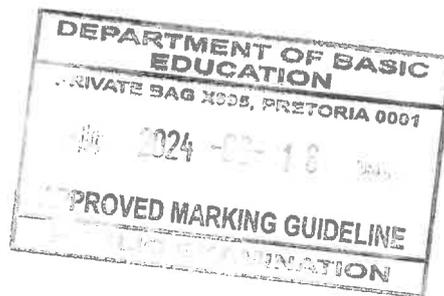
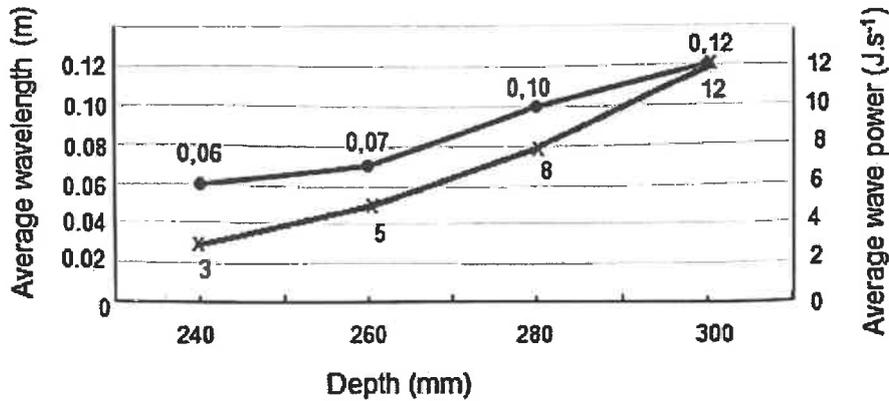
QUESTION 2

2.1 2.1.1

| CRITERIA                                | MARK ALLOCATED |
|---|----------------|
| Descriptive heading (H)                 | ½              |
| Both variables in caption (V)           | ½              |
| Type of graph: line graph (T)           | ½              |
| Same set of axes (B)                    | ½              |
| Independent variable (X-axis) (I)       | ½              |
| Dependent variable (Y-axes) (D) x 2     | 2 x ½          |
| Label for X-axis (XL)                   | ½              |
| Label for Y-axis (YL) x 2               | 2 x ½          |
| Unit of measurement for X-axis (XM)     | ½              |
| Appropriate scale for X-axis (XS)       | ½              |
| Appropriate scale for Y-axes (YS) x 2   | 2 x ½          |
| Plotting (P):                           |                |
| Average wavelength (m)                  | Any 3 x ½      |
| Average wave power (J.s <sup>-1</sup> ) | Any 3 x ½      |

(10)

The wavelength (m) and wave power (J.s<sup>-1</sup>) of water waves at different depths (mm) in sea water

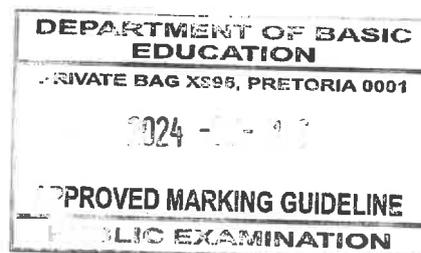


Copyright reserved

Please turn over

- 2.1.2 300 + 2 ✓ = 150 ✓ mm  
OR  
300 x ½ ✓ = 150 ✓ mm (2)
- 2.1.3 As the mean depth (mm) of the water increases the average wavelength (m) increase ✓✓ (2)
- 2.1.4 (a) 300 ✓ mm (1)  
(b) Waves generate increasingly more power ✓ as the water depth increases ✓  
OR  
Waves generate less power ✓ as the water depth decreases ✓ (2)  
(17)
- 2.2 2.2.1 El Niño ✓ (1)  
2.2.2 The thermocline ✓ / Upwelling is far below the surface layer ✓ (2)  
2.2.3 (SE) trade winds ✓ (1)  
2.2.4 - Upwelling provides (colder), nutrient-rich water ✓  
- that is essential for the health (in terms of nutrients and water temperature) ✓ / well-being of the fish (2)  
2.2.5 - The SE trade winds weaken ✓  
- driving less warm surface water ✓ towards the western Pacific/away from the coast  
- causing less upwelling at the South American coast ✓  
- moving less cold water to the surface ✓ (4)
- 2.2.6  $\frac{150000 - 10000}{10000} \checkmark \times 100 \checkmark = 1400 \checkmark \%$  (3)  
[13]
- 2.3 2.3.1 Sea cage(s) ✓ (1)  
2.3.2 - Sea cages are placed where currents provide a stronger through flow and disperse the nutrients. ✓  
- Farmers have multi-layered cages ✓ where  
- the upper layers contain fish species ✓ and  
- the lower layers / sea pens contain seaweed ✓ / bivalves / filter feeders  
- to consume the waste products that settle down ✓ / and thus cleans the water  
(Any 3) (3)

Copyright reserved



Please turn over

*[Handwritten signature]*

**2.3.3 IF YES**

- More food will be produced and be available to export, providing extra foreign investment ✓
- More people are able to buy food ✓ (as there will be greater employment opportunities)

**IF NO**

- The food will be sold at higher prices that not everybody can afford ✓
- El Niño event would result in the collapse of the industry impacting upon unemployment and provision of protein-rich foods ✓

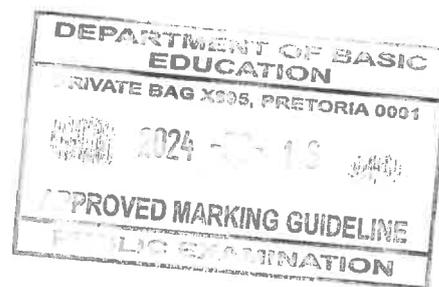
Mark only allocated for Yes or No if answer is motivated  
(Open-ended. Accept any relevant answer)

(2)  
(6)

**2.4**

- Size frequency of the fish caught in the samples ✓\*
  - shows the success of the recruitment of the fish stock ✓
  - The growth rate of the species measured ✓\*
  - shows how much a fish stock has recovered from overexploitation in the past ✓
  - The number of tagged fish per sample ✓\*
  - monitoring population sizes ✓
  - Abundance ✓\*
  - to measure / analyse the demographics ✓ (sex, the number of eggs per female, the age, the mass and the length) of the sample of fish
- (Mark first 2 pairs)(Mark first 2 pairs)

(4)  
[40]



Copyright reserved

Please turn over

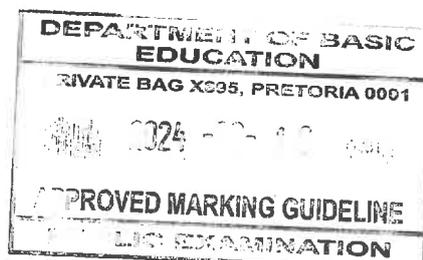
*[Handwritten signature]*

## QUESTION 3

- 3.1 3.1.1 (a) Covalent ✓ bonds (1)
- (b) It is a non-polar molecule ✓ (1)
- 3.1.2 Greenhouse ✓ gas (1)
- 3.1.3 - There is a greater degree of / more heat insulation in the atmosphere ✓  
- as more of the heat radiated by the earth / re-radiated solar radiation is trapped in the atmosphere ✓  
- the average global temperatures increase ✓ (Any 2) (2)
- 3.1.4 - An increased proportion of carbon dioxide will result in an increase in CO<sub>2</sub> absorption ✓  
- and consequently more carbonic acid (H<sub>2</sub>CO<sub>3</sub>) ✓  
- A reduced availability of carbonate ions ✓ (CO<sub>3</sub><sup>2-</sup>)  
- and aragonite ✓  
- as a result of ocean acidification ✓  
- would mean less calcium carbonate for sea urchins ✓  
- to build exoskeletons ✓ / tests / thinning of exoskeletons (Any 3) (3)
- 3.1.5 **IF YES**  
- Increased CO<sub>2</sub> results in an increased rate of photosynthesis ✓  
- thereby increasing the productivity of the algae ✓ / predation by herbivores decrease
- IF NO**  
- Increased CO<sub>2</sub> decreases pH / results in ocean acidification ✓  
- which is not optimal for algal growth ✓ / enzyme activity / metabolic functions
- Mark only allocated for Yes or No if answer is motivated  
(Open-ended. Accept any relevant answer)**
- (3)  
(11)
- 3.2 3.2.1 Thermohaline ✓ circulation (1)
- 3.2.2 - **Overtake** ✓\*  
- As the ice forms the salts are exuded ✓ into the surrounding water  
- Water with higher salinity is more dense ✓  
- resulting in less buoyant / dense water on the surface ✓  
- which then sinks ✓  
- and is replaced by less dense water ✓ moving from lower latitudes  
1 compulsory ✓\* + any 3 (4)
- 3.2.3 - Melting ice at the Arctic ✓ / at the poles  
- is resulting in an influx of fresh water ✓ / less saline water  
- slowing the vertical movement ✓  
- Resulting in a drop / reduced rate in the thermohaline current ✓  
- which might reduce the force of movement in the Gulf Stream ✓  
- with less heat available to moderate the climate ✓\* / freezing of Europe  
1 compulsory ✓\* + any 4 (5)  
(10)

Copyright reserved

Please turn over



- 3.3 3.3.1 (a) Nitrogen narcosis ✓ (1)
- (b) - They descended too deep and too fast ✓  
 - resulting in the partial pressure of nitrogen becoming very high ✓  
 - The diver will show signs of euphoria ✓ (3)

- 3.3.2 (a)  $P_1 = 1,6 + 1 = 2,6$  bar  $P_2 = 1$  bar  
 $V_1 = 2$  litres  $V_2 = X$  litres

$P_1V_1 = P_2V_2$  OR  $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

$V_2 = \frac{P_1V_1}{P_2}$

1 mark ✓ – correct formula OR rearranging formula)

$V_2 = \frac{(2,6)(2)}{1}$  ✓  
 $= 5,20$  ✓ litres ✓ (4)

- (b) - The air is less dense than water ✓  
 - Making the balloon positively buoyant ✓ (2)

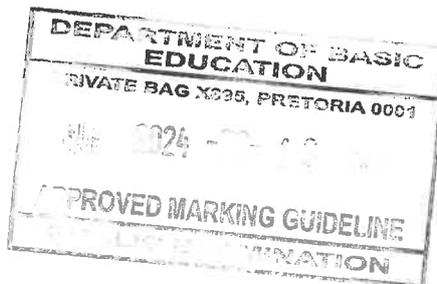
- 3.3.3 - Sea Lettuce ✓  
 - Purple Laver ✓  
 - Kelp  
 (Accept other relevant examples) (Mark first 2) (2)

- 3.3.4 IF YES  
 - Measures are put in place to reduce the possible over-harvesting of seaweed ✓ / strip harvesting of Kelp  
 - Limited access to where algae grows (preventing over-harvesting) ✓  
 OR  
 IF NO  
 - Over-harvesting could reduce the productivity of food chains ✓ / ecosystems  
 - Over-harvesting could reduce the biodiversity ✓

Mark only allocated for Yes or No if answer is motivated (Open-ended. Accept any relevant answer)

(2)  
(14)  
[35]

TOTAL SECTION B: 75



Copyright reserved

Please turn over

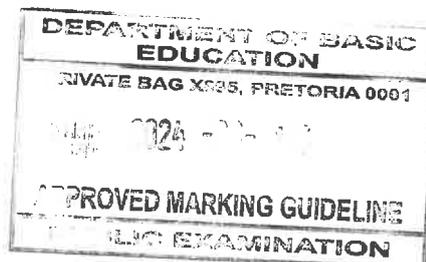
**SECTION C**

**When marking essays, be aware of maximum marks per subsection (indicate with the designated letter to keep track) and compulsory marks per section (indicate with C). The breakdown of the synthesis marks is indicated for each question. Credit valid points content points which may come from external reading, but keep to maximum allocations per subsection.**

**ASSESSING THE PRESENTATION OF THE ESSAY**

| <b>MARK ALLOCATION</b>                         | <b>2</b>   | <b>1</b>  | <b>0</b>   |
|--|--|---|--|
| <b>INTRODUCTION<br/>2 marks<br/>(INTR)</b>     | The introduction shows a contextual link that the candidate understands what the question is, by:<br><br>Correctly stating in their own words what the question is about AND describing the intention/ purpose of the essay. | Some attempt to write an introduction/ stated intention of essay but to a large extent using the wording from the question.<br>Unclear that candidate fully understands the topic.<br><br>Stated the intention of the essay in their own words. | There is no introduction. Starts with the asked content straight away. Provides randomly arranged facts.<br><br>Restating the question |
| <b>USE OF PARAGRAPHS<br/>2 marks<br/>(PAR)</b> | The internal structure of a paragraph clearly planned. One main aspect / idea discussed in a paragraph. If more than one aspect is discussed in a paragraph, the connection is clearly visible.                              | Some paragraph division but is unclear (not linked) why content is grouped in these paragraphs.   | All content sections written as one paragraph.   |
| <b>RELEVANCE<br/>2 marks<br/>(REL)</b>         | Sufficient information with many good points made, more than 50% of the content is relevant to the question asked.   | An attempt to write on the topic, but only 26% to 49% of the content discussed in the essay is relevant to the question asked.  | Less than 25% of content that the learner addressed is relevant to the question asked.   |

Copyright reserved



Please turn over

*[Handwritten signature]*

|   |  |   |   |
|---|--|---|---|
| <p><b>LOGICAL SEQUENCE</b><br/>2 marks<br/>(LSEQ)</p> | <p>Paragraphs show logical sequence and are demonstrably linked to each other.</p>                     | <p>Generally clear sequence but some facts not in place - content provided is correct but is meant to be in a different (relevant) paragraph. Essay poorly planned.</p> | <p>Very difficult to read the essay as no logical sequence. Many facts with no clear layout. Clearly unplanned.</p> |
| <p><b>CONCLUSION</b><br/>2 marks<br/>(CONC)</p>       | <p>Clearly bringing the aspects discussed in the essay together in a final paragraph in own words.</p> | <p>An attempt to write a conclusion, but closely quotes the words of the question asked. Still shows linkage of the topic to their response.</p>                        | <p>No conclusion. Learner clearly stopped after the content paragraphs – no attempt to pull the ideas together.</p> |

(10)



Copyright reserved

Please turn over

**QUESTION 4****INTRODUCTION GUIDELINE**

- Incorporates the wave-cut platform, hard engineering, early human indigenous content and Environmental Impact Assessment
- Does not repeat / reproduce wording of the question

**TYPES OF EROSION (TE)**

- **Hydraulic action** ✓\* occurs when
  - water and air are driven forcefully into openings ✓ / cracks / potholes in the rocks.
- **Abrasion** ✓\* occurs when
  - rocks / sediment rubs against other rocks / sediment and are worn down into smaller particles ✓ / pieces.
- **Corrosion** ✓\* occurs when
  - rocks break down chemically when dissolved salts / chemicals filter into a rock and cause the rock to dissolve ✓ / weaken / break down.
- **Attrition** ✓\* occurs when
  - rocks bump into other rocks, breaking / wearing the rocks down ✓.

Mark first 2 pairs. Compulsory mark ✓\* and corresponding explanation

Max

(4)

**FORMATION OF A WAVE-CUT PLATFORM (FW)**

- Develops when high-energy waves form a notch ✓
- in a weak area at the bottom of the cliff ✓.
- The destructive waves scour away at the base of the cliff ✓
- through erosive processes ✓ / hydraulic action / abrasion / corrosion / attrition.
- The notch enlarges ✓ and the
- cliff face is undermined ✓ / weakened
- until the cliff collapses under its own weight ✓.
- The debris is carried away by wave action ✓
- and a wave-cut platform is left behind ✓.

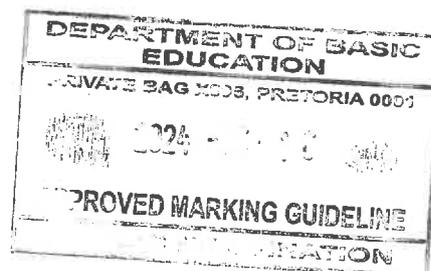
minimum 2

**CHARACTERISTICS OF A WAVE-CUT PLATFORM (CW)**

- Wave action may leave only small islands (of the wave-cut platform) visible ✓ from mid to low tide.
- Wave-cut platforms tend to protect the cliff as they absorb the forces of the incoming waves ✓.
- They usually slope gently down from the cliff at an angle ✓ (of approximately four degrees).
- The bedrock is hard ✓ and
- erosion occurs in weak areas allowing rock pools ✓ to develop.
- In some areas there is undercutting from below ✓ the wave-cut platform
- and a blowhole ✓ can develop.

minimum 2 (2)  
Max (7)

Copyright reserved



Please turn over

**HARD ENGINEERING****REVETMENTS (RE)**

- Revetment are open slanted stone ✓\* / concrete / wooden facings

**ROCK ARMOUR (RA)**

- Rock armour / riprap / dolosse consists of huge chunks of crushed granite boulders ✓\* / hard rocks

**COMPARING REVETMENTS AND ROCK ARMOUR (C)**

- Revetments are built to protect the coast against eroding wave action ✓ / currents etc.
- Whereas rock armour is placed at the base of the coast ✓.
- Revetments offer only partial resistance ✓, allowing some sea water to pass through
- Whereas rock armour rocks absorb the energy of the wave action ✓ but do allow some to pass through.
- Revetments are usually not high enough to protect against flooding due to heavy wave action ✓ / rise in sea level
- Whereas rock armour is high enough to slow down the force of destructive waves ✓.
- Revetments are often used to supplement other protective structures ✓
- Whereas rock armour are in places where the receding water is stronger than the swash ✓.

2 Compulsory marks ✓\* and any 2 pairs

Max (6)

**EVIDENCE OF EARLY HUMANS (EE)**

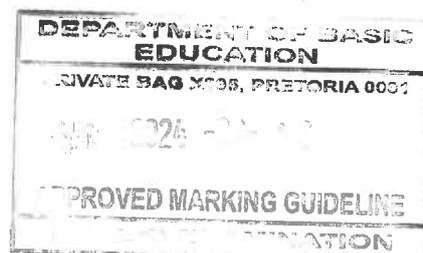
- The middens ✓
- (has up to 24 different) species of mollusc shells ✓ (which include a range of limpets / abalone / *Bullia* / fish bones)
- this provides evidence that protein and omega oil-rich foods was consumed ✓
- illustrating the abundant use of resources ✓ from the adjacent sea shore.
- Mollusc shells found at this midden are False Bay shells ✓
- One kilometre south of the cave is a tidal rock fish trap ✓
- which would have been where the fish were caught ✓
- Fish remains found include, the Poenskop ✓ / White Stumpnose / Blacktail / Galjoen / White Steenbras with the most common fish species being the Hottentot.
- Stone tools ✓
- (and worked) bone rib tools ✓
- show evidence of on-site manufacturing ✓
- Evidence of pottery ✓ were also uncovered.
- (In the surrounding area) jewellery ✓,
- engraved ochre ✓ and
- Fire hearths ✓ were also found.

minimum 2

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA)**

- Allows a specialist to determine the impact it will pose to the environment ✓
- and sensitive archaeological site ✓.
- Recommendations can be done to minimise the impact ✓ of the type of engineering approach to be used

Copyright reserved



Please turn over

A handwritten signature in black ink, appearing to be "S. M." followed by a flourish.

- while still being able to meet the requirement of being able to withstand the erosive forces ✓ / strong wave action
- The EIA will identify potential mitigation measures that can reduce coastal risk / loss to the company responsible for housing development ✓
- by maintaining the integrity of the archaeological site ✓.
- Natural coastal formations / wave-cut platform / archaeological sensitive ecological landscapes / ecosystems / processes have to be protected / restored / enhanced ✓
- for their historical ✓ / economic / social / environmental values)
- or to identify historical evidence / tools that needs to be preserved at museums

(Any logical relevant substantiating answer)

minimum 2

Max

(6)

**OPINION (J)**

1 mark if opinion and motivation correlates

1 mark for motivation

If learner answers 'that these sites ARE relevant'

- Can leave behind middens / remnants of debris that can provide a historical background for better understanding of modern-day issues being faced ✓.
- Archaeological sites can lead to a better understanding of past ways that humans lived ✓
- Tools / traps used can provide a basis / blueprint for many modern designs ✓.
- By studying the history, humans are able to make better decisions in modern day ✓.

If learner answers 'they are NOT relevant'

- Technological advances have made it more efficient to overcome the challenges of dally living ✓.
- Sites have incomplete artefacts / missing links which makes information unreliable ✓.
- Modern day issues are different to that being faced in the past making archaeological information irrelevant ✓.

(Any logical relevant substantiating answer)

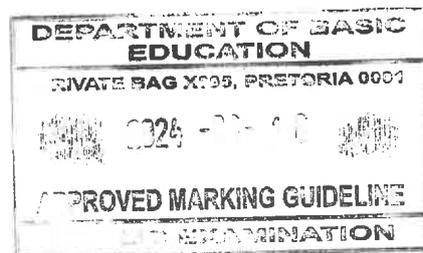
Max

(2)

**CONCLUDING PARAGRAPH**

- Must link wave-cut platform, hard engineering, early human indigenous content and Environmental Impact Assessment.
- Must NOT include the wording of the question.

Content: (25)  
 Synthesis (10)  
 (35)



Copyright reserved

Please turn over

*[Handwritten signatures]*

**QUESTION 5**

**INTRODUCTION GUIDELINE**

- Incorporates the formation of dunes, engineering approaches and Environmental Impact Assessment
- Does not repeat / reproduce wording of the question

**FORMATION OF DUNES (FD)**

- Sediment on the coast is brought to the coast from inland rivers ✓
- by longshore drift which transports the sediment ✓
- from the river mouth to where dunes are formed ✓
- An onshore wind moves the sediment inland ✓
- Aeolian movement also results in the movement of sediment inland ✓
- When sediment reaches an ✓ obstacle such as a stone / shell / carcass
- the air movement carrying the sediment slows down ✓
- The sediment then falls due to gravity ✓ and is deposited
- The first ridge that is formed is referred to as the embryo dune ✓
- Over time, the embryo dune acts as the barrier ✓
- slowing down the air movement and gravity which causes higher volumes of sediment to be deposited ✓
- As a result, dune fields develop inland beyond the embryo dune ✓

minimum 3

**ROLE OF VEGETATION (RV)**

- Pioneer plants' / first plants' root system stabilise the dunes ✓ / sediment
- allowing other plants to grow ✓ (on more stable dune) / plants with deeper root system
- and more animals and secondary plants to move / inhibit this ecosystem for protection ✓
- greater biomass of animals and plants cause an increase in decaying organic material ✓
- which darkens the soil ✓ / increase the loam nature of sediment
- making the soil more fertile ✓
- thus changing from sand to more fertile soil ✓

minimum 2

Max (9)

**ENGINEERING APPROACHES**

**HARD ENGINEERING (HE)**

- Hard engineering structures include sea walls ✓ / groynes / breakwaters / revetments / rock armour / dolosse
- which prevents erosion ✓ by
- reducing the flow of sediment along the coast ✓.
- Hard engineering structures often increase erosion in nearby sections of the coast ✓

minimum 2

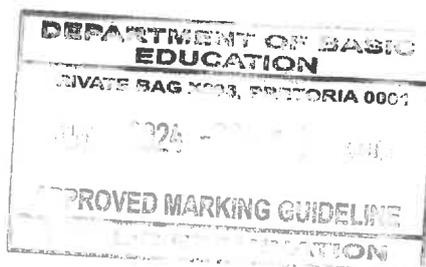
**SOFT ENGINEERING (SE)**

- Soft engineering includes a row of underwater tyres ✓ (below the low-tide mark) / geotextile structures / geotextile tubes
- Soft engineering structures reduce the erosive power of waves ✓ and
- break up the energy of the wave action ✓.

minimum 2

Please turn over

Copyright reserved



*[Handwritten signatures]*

**COMPARING EFFECTIVENESS OF HARD AND SOFT ENGINEERING (CE)**

- Soft engineering tends to be less noticeable ✓ / made of more natural material / more attractive
- whereas hard engineering is more noticeable ✓ / artificial structures / not attractive / not aesthetically pleasing
- Soft engineering requires more frequent maintenance (more temporary structures) ✓
- whereas hard engineering requires less maintenance (more permanent structures) ✓.
- Soft engineering applications are more affordable regarding material needed ✓
- whereas hard engineering structures are usually expensive to build ✓.
- Soft engineering needs to be replaced regularly ✓ / do not last as long
- whereas hard engineering tends to last longer ✓ against wave action.

(Mark a minimum of any 2 pairs)

minimum 4

Max

(10)

**IMPORTANCE OF AN ENVIRONMENTAL IMPACT ASSESSMENT (IE)**

- Allows specialists to determine the impact the structure will pose to the dune ✓ / environment.
- Which would allow the specialists to make informed and research-based recommendations to minimise the impact ✓ of the type of engineering approach used
- while still meeting requirements for the structure, as it is designed to be able to stabilise and significantly reduce the movement of the sediment ✓.
- Recommendations made will reduce the loss of income generated by the tourism industry ✓ / decreased tourism
- by maintaining the integrity of the dunes ✓
- and the economic / social and value of the coast will be optimised ✓.
- Dunes / dune ecosystems and processes need to be protected / restored / enhanced ✓.

Max

(4)

**Justification (J)**

**1 mark if Opinion and motivation correlates**

**1 mark for motivation**

**If learner says 'YES'**

- Having to construct the chosen engineering approach would create job opportunities for locals ✓.
- More tourists would most likely visit the area that would result in
- economic gain ✓ / tourist revenue.

**If learner says 'NO'**

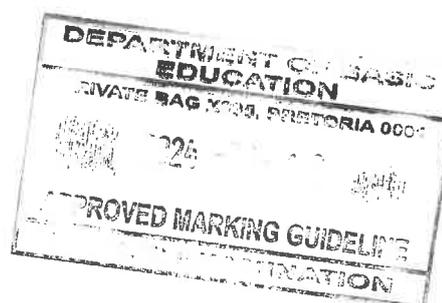
- Corruption might occur during the process of constructing the chosen engineering approach ✓.
- Environmental degradation ✓.
- Due to the area being more accessible once an engineering structure is built, this could possibly lead to over-tourism which might result in an increase of pollution / crime in and around the local areas ✓.

(Any logical relevant substantiating answer)

Max

(2)

Copyright reserved



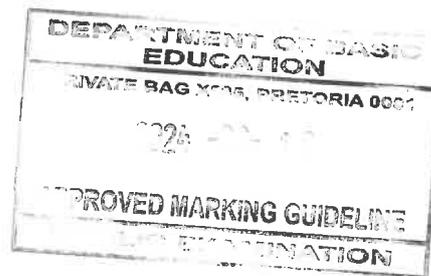
Please turn over

**CONCLUDING PARAGRAPH**

- Must Incorporates the formation of dunes, engineering approaches and Environmental Impact Assessment.
- Must NOT include the wording of the question.

Content: (25)  
Synthesis (10)  
[35]

**TOTAL SECTION C: 35**  
**GRAND TOTAL: 150**



Copyright reserved

Handwritten signature or initials in black ink, consisting of a large stylized 'D' and a smaller 'M'.

