NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

DEPARTMENT OF NATURAL AND APPLIED SCIENCES

QUALIFICATION: BACHELOR OF SCIENCE	
QUALIFICATION CODE: 07BOSC	**LEVEL:** 7
COURSE CODE: MAB702S	**COURSE NAME:** MARINE BIOLOGY 3B
SESSION: NOVEMBER 2022	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER (S):	**Dr. Edosa Omoregie**
MODERATOR:	**Dr. Johannes Iitembu**

INSTRUCTIONS
1. Answer all questions in Sections A, B and C 2. Write clearly and neatly. 3. Number your answers clearly. 4. Draw diagrams wherever necessary

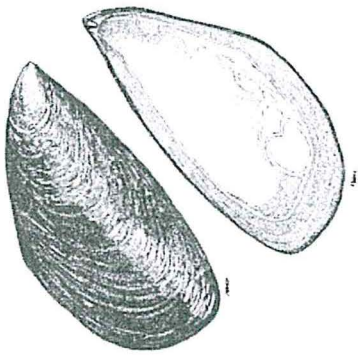
Material/s allowed
Scientific Calculator

THIS QUESTION PAPER CONSISTS OF 5 PAGES
(Including this front page)

ANSWER ALL QUESTIONS

Section A: **[20]**

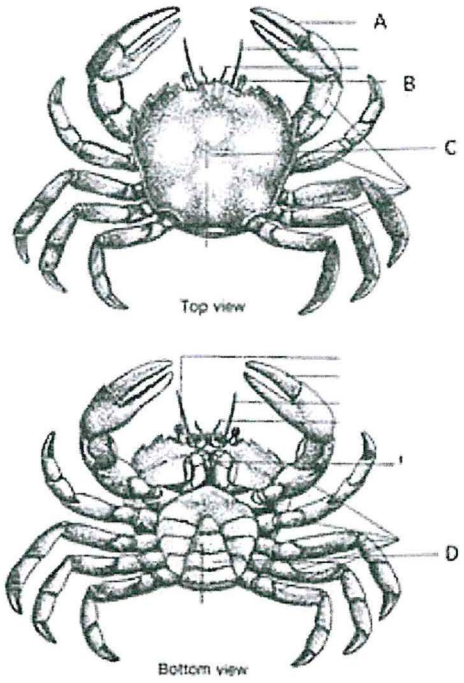
1. a). The diagram below is an illustration of a common intertidal one organism encountered during the class practical field survey.



i. State the Genus, Class and Phylum the organism belongs to? (2)

ii. Explain the main reason for placing the organism under its Class? (1)

b). The diagrams below are ventral and dorsal views of a marine invertebrate encountered during the class field practical exercise at an intertidal zone.

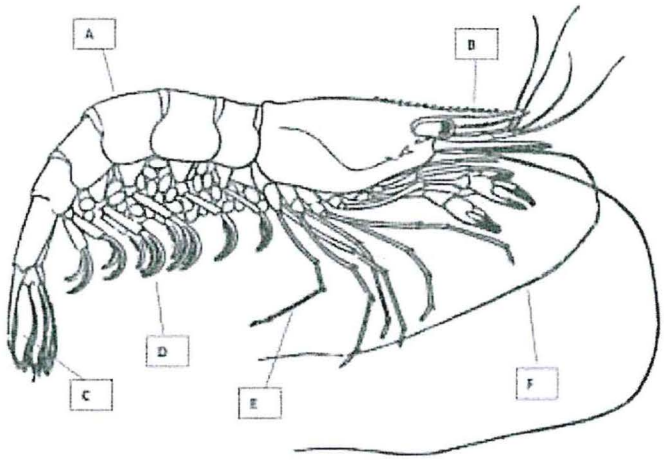


Name the parts labelled as A, B, C and D. (2)

What is the common name of this invertebrate? (1)

What Phylum does this invertebrate belong to? (1)

c). Name the parts labelled in the diagram below. Briefly explain the functions of the part labelled as D, E and F. (3)



2. The sea anemones belong to which of the following classes of marine animals? (1)
   a. Hydrozoa
   b. Scyphozoa
   c. Anthozoa
   d. Calcarea
   e. Hexactinellida

3. Which of the following pigments is predominate in the seaweed Phylum, Phaeophyta? (1)
   a. Chlorophyl
   b. Phycobilin
   c. Fucoxanthin
   d. Carotenes
   e. Flavoxanthin

4. Which of the following phyla do the barnacles belong to? (1)
   a. Annelida
   b. Echinodermata
   c. Mollusca
   d. Arthropoda
   e. Cnidaria

5. Which of these groups of marine molluscs belong to the Class Bivalvia? (1)
   a. Octopuses, Squids, Nautilus
   b. Clams, Mussels, Oysters
   c. Snails, Abalone
   d. Slugs, Periwinkles

6. Which of the following options is <u>not</u> a factor determining benthos survival in rocky intertidal zones? (1)
   a. Susceptibility to predation
   b. Wave action
   c. Boring mechanism
   d. Light and temperature

e. Salinity

7. Which of the following statements is true regarding marine productivity resulting from upwelling? (1)
   a. Water that rises to the surface from the bottom of the sea because of upwelling is typically colder and is rich in microalgae.
   b. Water that rises to the surface from the bottom of the sea because of upwelling is typically colder and is rich in nutrients.
   c. Water that rises to the surface from the bottom of the sea because of upwelling is typically warmer and is poor in microalgae.
   d. Water that rises to the surface from the bottom of the sea because of upwelling is typically colder and is poor in nutrients.
   e. Water that rises to the surface from the bottom of the sea because of upwelling is typically warmer and is rich in nutrients.

8. The solubility of oxygen in seawater is affected non-linearly by temperature. Is this statement true or false? (1)
   a. True
   b. False

9. Under which of the following percentages of dissolved oxygen saturation level in seawater will oxygen diffuse out of the seawater to the atmosphere? (1)
   a. 110%
   b. 48%
   c. 100%
   d. 25%

10. Which of the following options best describe morphologically structure of the horse mackerel caudal fin? (1)
   a. Heterocercal
   b. Truncated
   c. Lunate
   d. Rounded
   e. Forked

11. Crustaceans are distinguished from other arthropods by their possession of a pair of _____ (two-parted limbs). (1)

Section B: **[20]**

12. a). Briefly discuss the main factors affecting feeding behaviour in marine copepods. (4)

   b). Explain the following terms as applied in Marine Biology. (6)
   i. LD_{50}
   ii. Euryhaline
   iii. Anadromous

c). Discuss the unique characteristics of the various groups of benthos based on size, type and location, naming at least one marine benthic organism for each group. (6)

d). With suitable named example for each group, differentiate benthic scavengers from their detritivorous counterparts. (4)

Section C: **[60]**

13. a). With graphical illustrations, explain the major differences in seasonal variation patterns in plankton abundance in Artic, Temperate and Tropical waters. (14)

b). Briefly discuss the various hypothesis for the diurnal vertical migration of zooplankton in the marine environment. (6)

14. a). With reference to survival strategies, discuss how estuarine animals have adapted to coping with salinity variations within the estuarine environment. (5)

b). With suitable examples, discuss the various environmental challenges faced by intertidal organisms. For each of the challenges discussed, briefly explain the strategies employed by these organisms for their survival. (15)

15. a). With suitable graphical illustration, briefly explain the concept of MSY in fisheries management. (6)

b). Explain the major impacts of global warming on the ocean physicochemical parameters and discuss how these impacts will affect the biology, habitat and behaviour of major fish stock. (14)