

Confidential



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

MARITIME ECONOMICS

MAY/JUNE 2024

MARKS: 300

TIME: 3 hours

**This question paper consists of 16 pages and
An Answer Sheet of 2 pages (i–ii).**



INSTRUCTIONS AND INFORMATION

1. Please check that your question paper is complete.
2. Answer Question 1 on the Answer Sheet provided and hand it in at the end of the examination. Remember to write your examination number in the space provided.
3. Read the questions carefully before answering.
4. Answer all the questions.
5. Answer the questions in the same order that they appear on the question paper.
6. Show all working where calculations are involved.
7. It is in your own interest to write legibly and to present your work neatly.



QUESTION 1 MULTIPLE CHOICE QUESTIONS

Answer these questions on the answer sheet provided. Place an X in the block on the letter that is the correct answer to the question. **You must answer the questions in the same order in which they appear on this question paper.**

- 1.1 ... is/are fitted to reduce the amount of sulphur oxide escaping through the ships' funnels into the atmosphere.
- A Solar power
 - B Generators
 - C Scrubbers
 - D A steam engine
- (2)
- 1.2 The latest IMO's MARPOL policies limit the sulphur content in the fuel oil used on board ships operating outside designated emission control areas to ...
- A 5%.
 - B 0.5%.
 - C 50%.
 - D 0.05%.
- (2)
- 1.3 An electric-diesel propulsion system fitted below the hull of the ship, consisting of a propeller on a mounting that can turn 360 degrees around the vertical axis.
- A Multi-directional system
 - B Azipods
 - C Dynamic positioning system
 - D Conventional propulsion system
- (2)
- 1.4 A person **in command** of a containership during pilotage while entering East London port is called ...
- A Pilot.
 - B Officer of the Watch (OOW).
 - C Master.
 - D Commander.
- (2)
- 1.5 Which one of the following is an IMO convention that deals with the training and certification of seafarers?
- A STCW
 - B MARPOL
 - C IMDG
 - D SOLAS
- (2)
- 1.6 When in port, a ship flies at her stern a flag of the country where ...
- A she currently is.
 - B she is registered.
 - C the majority of her crew come from.
 - D she is going next.
- (2)



- 1.7 One of the important roles of a ship's classification society is to ...
- A register a ship in a country of the owner's choice.
 - B carry out special surveys every ten years.
 - C declare a ship seaworthy after repairs following an accident.
 - D moderate examination papers written by navigation students. (2)
- 1.8 What type of insurance would cover damage and/or loss of a shipping container?
- A TT Club
 - B P&I Club
 - C Hull and Machinery
 - D Reinsurance (2)
- 1.9 What do we call a system of insurance taken by insurance companies to cover huge maritime claims, like a loss of a cruise ship?
- A Reinsure
 - B P&I Club
 - C Hull and Machinery
 - D Reinsurance (2)
- 1.10 *MV Marble*, on her voyage from Ngqura to Durban hits a drifting container that fell off from a containership *MKU Vase*, causing a small hole through number one hold. Which insurance will ultimately cover the repair costs of *MV Marble*?
- A *MV Marble's* P&I Club
 - B *MKU Vase's* P&I Club
 - C *MV Marble's* Hull and Machinery
 - D *MV Vase's* Hull and Machinery (2)
- 1.11 Who declares general average on a ship under time charter?
- A Charterer
 - B Ship Agent
 - C Shipowner
 - D Ship Captain (2)
- 1.12 The abbreviation of a salvage clause, SCOPIC stands for...
- A Special Clause Of Parliament and Identity Club.
 - B Special Compensation Of Pollution and Indemnity Club.
 - C Special Clause Of Pollution and Indication Club.
 - D Special Compensation Of Protection and Indemnity Club. (2)
- 1.13 A notice of readiness is sent by the ... to the ... indicating that the ship has arrived at the agreed port and ready to load.
- A Shipowner; Charterer
 - B Master; Shipowner
 - C Master; Charterer
 - D Charterer; Master (2)



- 1.14 The term for an area in a harbour where minerals wait to be loaded is a ...
- A terminal.
 - B wharf.
 - C stacking area.
 - D stockpile. (2)
- 1.15 Which IMO convention or code stipulates that dangerous cargoes must be properly marked, labelled, packaged and stowed on board ships?
- A SOLAS
 - B IMDG
 - C ISM
 - D STCW (2)
- 1.16 A sea is where a littoral state has full rights of fishing and mining is known as ...
- A territorial waters.
 - B contiguous zone.
 - C exclusive economic zone.
 - D continental shelf. (2)
- 1.17 An Incoterm that indicates that the costs of carrying the cargo from the shipper's premises to the consignee's premises will be borne by the Shipper.
- A DDP
 - B EXW
 - C CIF
 - D FOB (2)
- 1.18 When using the Incoterm FOB, the ... is responsible until cargo is loaded onboard the ship, and thereafter, the ... will be responsible.
- A Carrier; Consignee
 - B Consignee; Shipper
 - C Shipper; Consignee
 - D Master; Carrier (2)
- 1.19 An Incoterm that clearly identifies that the cost of insurance will be paid by the Shipper.
- A CFR
 - B CIF
 - C DPU
 - D EXW (2)
- 1.20 A maritime convergence zone that is highly important for the Far East region industrialisation is the ...
- A Strait of Dover.
 - B Strait of Hormuz.
 - C Strait of Malacca.
 - D Strait of Gibraltar. (2)



- 1.21 The type of bill of lading issued when a carrier is responsible for only the ocean leg of cargo shipment.
- A Combined bill of lading
 - B Through bill of lading
 - C Negotiable bill of lading
 - D Straight bill of lading
- (2)
- 1.22 Which of these three main commodities are produced in Russia?
- A Wheat, natural gas & electronics
 - B Natural gas, wheat & sunflower oil
 - C Sunflower oil, iron ore & manganese
 - D Rubber, electronics & grain
- (2)
- 1.23 A ship crossing the North Atlantic Ocean from New York to Gibraltar in June could encounter a ...
- A mid-latitude cyclone.
 - B hurricane.
 - C monsoon.
 - D typhoon.
- (2)
- 1.24 Which one of the following is the correct marine food chain?
- A Sharks → phytoplankton → small fish → zooplankton
 - B Zooplankton → phytoplankton → small fish → sharks
 - C Phytoplankton → zooplankton → small fish → sharks
 - D Phytoplankton → small fish → sharks → zooplankton
- (2)
- 1.25 IMO convention that deals with ballast water exchange and treatment is ...
- A Ballast Water Management Convention.
 - B Ballast Water Treatment Convention.
 - C Ballast Water Exchange Convention.
 - D Ballast Water Safety Convention.
- (2)

[50]

QUESTION 2 THE MARITIME WORLD

- 2.1 The use of the internal combustion engine in ships was introduced in the early 1900s, and the Royal Dutch Shell tanker *Vulcanus* (built 1910) was probably the first motorship.
- 2.1.1 Before the development of internal combustion engines, what was the name of the engines that were famously used by ships? (2)
- 2.1.2 Which fossil fuel did these ships use to fuel their engines? (2)
- 2.1.3 Give a brief explanation of the effects on shipping of the change in ship propulsion from the one indicated in Question 2.1.1 to motorships. (8)
- 2.1.4 Give THREE ways in which shipowners are currently ensuring that their ships operate efficiently with regards to fuel consumption and contribute less greenhouse gas emissions. (6)
- 2.1.5 What does the IMO convention 'MARPOL' stand for? WRITE IN FULL. (2)
- 2.2 Study the following table that shows the number of different types of ships that called into the Port of Utukufu during the years indicated. Figures for 2024 are estimates.

TYPE OF SHIP/YEAR	2018	2019	2020	2021	2022	2023	2024	TOTAL
CAPE SIZE	123	124	127	119	182	161	174	
HANDY SIZE	134	131	145	110	161	174	181	
CONTAINERSHIP	301	307	317	305	341	397	409	
VLCC	134	131	140	117	128	132	139	
PRODUCT TANKER	101	112	125	83	91	109	119	
RO-RO	37	39	43	29	35	39	41	
GENERAL CARGO	145	137	123	91	89	83	69	

- 2.2.1 Which type of ship was seen more frequently in the Port of Utukufu? (2)
- 2.2.2 What is the average number of product tankers that called into the port from 2018 to 2023? (4)
- 2.2.3 Give ONE example of cargoes that are carried by ro-ro ships. (2)
- 2.2.4 Which type of ship will be used for the shipment of about 140 000 tons of iron ore? (2)
- 2.2.5 Which year saw the least number of ships berthing in the Port of Utukufu? (4)
- 2.2.6 Give the reason for the year answered in Question 2.2.5 to have the least number of ships coming into the port. THINK CAREFULLY. (2)



2.2.7 A steel mill that makes use of the Port of Utukufu for imports and exports was expanded. Giving a reason for your answer, which year was the steel mill expansion completed? (4)

2.3 Read the following extract from an article by SAIMI and answer the questions set:

*The International Maritime Employers Council (IMEC) and the South African International Maritime Institute (SAIMI) are pleased to announce the commencement of an IMEC South African Cadet Training Program in 2023. It is envisaged that the recruitment of the first cohort of Cadets will commence in September 2023 and the first seagoing appointments are planned for January 2024. The pilot group of 50 male and female Cadets will join foreign going trading vessels to complete their onboard seagoing experience with an IMEC Member. Cadets who have passed their competency examinations and performed satisfactorily will have access to gainful onboard employment opportunities as 'Officer of the Watch'. **There is an unprecedented demand for South African Officers and Cadets at present, which follows onto years of advocacy and positioning via the SA National Seafarer Development Program (SAIMI, 2023).***

2.3.1 Give a suitable heading of your choice for this article. (2)

2.3.2 What do these news mean for South African seafaring and economy? (4)

2.3.3 Name FOUR countries that have been the major suppliers of seafarers over the past few years. (4)
[50]



QUESTION 3 SHIPPING OPERATIONS

- 3.1 South Africa experienced a shortage of raw sugar resulting from various challenges that made it difficult for farmers to efficiently grow sugar cane. Consequently, four bulk carriers of about 38 000 tons deadweight were chartered to ship a total of 720 000 tons of sugar (valued at \$400/ton) from Port of Santos, in Brazil, via Durban harbour.

Following are the details of one of the bulk carriers, *MV Petra*, chartered to move the cargo of sugar:

Length Overall	170 metres
Beam	27 metres
Loaded draft	9,7 metres
Depth	13 metres
Built	2007
Owners	Heiwa Marine Holdings, Inc - Japan
Managers	Heiwa Marine Holdings, Inc - Japan
Port of Registry	Monrovia – Liberia
Classification Society	Det Norske Veritas
Tonnage:	Deadweight: 38500t; GT: 17000; NT: 10300
Service speed	13,5 knots
HFO Consumption	55 tons per day
Cargo Equipment	5 cranes
Insurers	Lloyds (H&M) North of England P&I Insurance
Cargo seller	A K Food & Beverage Limited, Santos
Cargo buyer	Foodcom CC, Durban

- 3.1.1 30 000 tons of total cargo of raw sugar was shipped at a time. How many shipments were done to move all the cargo? (6)
- 3.1.2 Four bulk carriers were chartered to move this consignment. How many **loaded voyages** will each bulker make to move all the cargo? (6)
- 3.1.3 What would have been the benefits of chartering bigger bulk carriers? (4)
- 3.1.4 Which insurance will cover the cargo of sugar when enroute to Durban? (2)
- 3.2 Look at the given details for *MV Petra*.
- 3.2.1 What type of bulk carrier is she? TWO PARTS TO YOUR ANSWER. (4)
- 3.2.2 How old is she now? (2)
- 3.2.3 Will the freight rates of a newer ship with same dimensions be **more** or **less** than that of *MV Petra*? (2)
- 3.2.4 Giving a reason for your answer, would you call her a 'flag of convenience' ship? (4)
- 3.2.5 Why do shipowners choose to fly flags of convenience? (6)



- 3.2.6 Name FOUR countries with a big register of ships. (4)
- 3.2.7 How would the addition of more commercial ships on the nation's ship register benefit South Africa? Mention THREE points. (6)
- 3.3 On 14 September, the following message was received by LMK Shipping, the port agents at Santos for *MV Petra*:

ETA PILOT STATION SANTOS 06:00 01 OCTOBER. PREVIOUS PORTS BUENOS AIRES; ROTTERDAM; MONTREAL; OSLO; NEW ORLEANS; ROTTERDAM; HAMILTON BERMUDA; HAMBURG; MONTREAL; DRAUGHT FORWARD 4.5 METRES AFT 5.5 METRES. REMINDER OF OUR REQUIRED BUNKERS: 900 TONS HFO AND 120 TONS MDO AND 70 TONS FRESH WATER. REQUIRE STORES AS PER LIST EMAILED TO YOU 06/9. PLEASE FORWARD VOYAGE INSTRUCTIONS PORT OF SANTOS TO DURBAN BEFORE ARRIVAL YOUR PORT.

CARGO STOWAGE PLAN AS FOLLOWS:

1 HATCH:	3 500 TONS
2 HATCH:	7 500 TONS
3 HATCH:	5 500 TONS
4 HATCH:	7 000 TONS
5 HATCH:	6 500 TONS

HOLDS SWEEPED, CLEAN AND DRY AS PER INSTRUCTIONS. PLEASE ENSURE THAT THE VARIOUS SURVEYORS MEET THE SHIP ON ARRIVAL. ANTICIPATE CARGOWORK TO START ABOUT 09:00 01/10 AND WILL USE OWN CRANES SIMULTANEOUSLY AT 85 TONS PER HOUR PER CRANE.

SECOND ENGINEER BARNES SIGNING OFF LEAVE TO FLY TO LONDON. REPLACEMENT STEVENS ALREADY ON BOARD.

GUMEDE, MASTER MV PETRA

- 3.3.1 Why must the holds be swept and dry before arrival in port? (4)
- 3.3.2 The master requested 'voyage instructions'. What are voyage instructions? (4)
- 3.3.3 According to which IMO convention/code did the master provide the last ten ports of call? (2)
- 3.3.4 What arrangement did the agent have to make before the ship arrived? (8)
- 3.3.5 Which government organisation would the agent have had to contact with regards to the second engineer Barnes who had to sign off? (2)



- 3.4 *MV Petra* arrived in Port of Santos at 06:00, 01st October. She berthed an hour later and commenced cargo work at 09:00 on the same day.
- 3.4.1 How many hours did it take to load all the cargo, including 6 hours of break? ROUND OFF TO THE NEXT HOUR. (6)
- 3.4.2 When was the loading of raw sugar completed? (6)
- 3.4.3 Assume that outwards clearance took four hours. What was her ETD from Port of Santos? (4)
- 3.4.4 90 hours was the agreed loading time.
- (a) What is the proper name for these 90 hours? (2)
- (b) From which document will this loading period be stipulated? (2)
- (c) Did *MV Petra* take more or less than agreed time to load? (2)
- (d) Was demurrage or dispatch payable? (2)
- 3.5 On her voyage from Port of Santos to Durban, *MV Petra* collided with a containership within the South African EEZ. As a result of a collision, 250 tons of HFO was spilled from the containership. There was no danger of oil pollution from *MV Petra*. Two salvage tugs attended to the scene. The owners of *MV Petra* (through the master) appointed one of the tugs to escort her to Cape Town harbour for repairs, while the other tug was employed to assist the containership with minimising the oil spill. Repair and tug costs for *MV Petra* amounted to \$2,6 million.
- 3.5.1 Did the master of *MV Petra* employ the salvage tug on a Lloyd's Open Form agreement? Answer YES or NO. (2)
- 3.5.2 Give a reason for your answer in Question 3.5.1. (2)
- 3.5.3 Besides her flag state, what is the **name** of the other organisation that declared her seaworthy after her repairs in Cape Town? (2)
- 3.5.4 Could the owners of *MV Petra* declare general average following this incident? (2)
- 3.5.5 What do we call a place where ship undergo hull repairs, out of the water? (2)

[100]

QUESTION 4

- 4.1 With regards to the cargo of raw sugar carried by *MV Petra*, which company was the ...
- 4.1.1 Carrier? (2)
 - 4.1.2 Shipper? (2)
 - 4.1.3 Consignee? (2)
- 4.2 Assume that the shipment was done with INCOTERM DDP. Choosing between SHIPPER; CARRIER; CONSIGNEE; or AGENT; who will be responsible for ...
- 4.2.1 loading costs? (2)
 - 4.2.2 ocean freight? (2)
 - 4.2.3 discharging costs? (2)
- 4.3 How many bills of lading will be issued for the cargo of sugar carried by *MV Petra* per voyage? (2)
- 4.4 The sea distance from Port of Santos to Durban is 4 838 nautical miles. Assume that *MV Petra* spent four days in Santos, and six days in Durban per voyage. Also assume that she allowed three days for anchorage per round voyage.
- 4.4.1 What is the total number of days for one **round voyage**? BE CAREFUL. (6)
 - 4.4.2 How much HFO will *MV Petra* consume per **round voyage**? (6)
 - 4.4.3 Master requested 900 tons of HFO in Santos. What would have been the minimum amount of HFO already onboard in order to cover one round voyage? (4)
 - 4.4.4 In addition to the minimum required HFO for one round voyage, the chief engineer insisted that they take 10% more as emergency bunkers. Why must ships carry additional or emergency bunkers? (2)



4.5 Read the following article and answer the questions set:

SOUTH Africa is facing a shortage of sugar, the new 'white gold', with local mills unable to meet the local demand, Chris Engelbrecht, the chairperson of the Association of Southern Africa Sugar Importers (Asasi), warned yesterday.

This is a further blow to South Africans, who are facing soaring food prices, exacerbated by supply chain woes due to the war in Ukraine, which has seen countries banning the export of key crops such as palm oil in the face of rampant inflation. Engelbrecht said sugar was like white gold. 'White sugar is now selling at R16 500 per ton (excluding VAT). The usual price is R11 500 per ton (excluding VAT).'

He said the current sugar import duty was R4 148 per ton, which was adjusted on March 5, 2021 (the trigger date was November 30, 2020). Since then, there had been three duty triggers to reduce the import duty on sugar, which, however, had not been implemented. Trigger 1 of February 11, 2021 was R3 354 per ton. Trigger 2 of September 28, 2021 was R2 983 per ton and Trigger 3 of April 14, 2022 was R1 946 per ton.

Asasi said the duty should, therefore, be R1 946 and not R4 148 per ton.

Engelbrecht said the world sugar price was now R8 280 with a ridiculous shipping cost of R2 884 per ton (a 500 percent increase), which left the current landed price for import sugar at a cost of R15 712 per ton, on current duty, instead of R13 510 per ton (on duty trigger 3). He said that even at the lower import duty, the sugar price was still higher than the local market.

Engelbrecht said the minister's office had been notified three times in the past 10 months that there would be a shortage in the local sugar market. 'Firstly, in July 2021 when news was received that 300 000 tons of sugar cane was burnt in the protest actions. Secondly, in December 2021 when news was received in September that 1 million hectares of cane would not be crushed this season. Thirdly, in April 2022 when there was literally no sugar.'

He said there was no confirmation yet on the impact that the current floods would have on the new crop of sugar, but it would be high and the local mills would not be able to supply the current demand. 'Imports were stopped and the local industry was supported. Now there is no sugar,' he said.

South African Farmers Development Association (SAFDA) executive chairperson, Dr Siyabonga Madlala, confirmed that there was a shortage of sugar supply on the local market. 'The industry management has been working closely with the milling companies to assess the situation and to devise strategies to ensure that local market customers' needs are met,' Madlala said.

SAFDA said last season (2021/22) the industry was unable to crush all the sugar cane allocated for the season due the rioting and unrest, which resulted in the loss of thousands of tons of cane that was burnt in arson attacks.



During the unrest, milling companies were not operating for a couple of weeks. When the unrest started there was already harvested cane on the loading zones waiting to be transported to the respective mills, but this cane was later rejected by the milling companies due to damage, SAFDA said.

In the beginning of the season (2022/23), KwaZulu-Natal experienced massive floods, which disrupted sugar-cane production and resulted in infrastructure damage at one of the milling companies. Madlala said millers, which were unable to meet the sugar needs of their local customers, should engage with the South African Sugar Association (SASA) and other millers, which had surplus sugar available, and request their assistance. SAFDA said the local market could not be supplied by local producers, which would lead to sugar imports and the decline in local market revenue.

'Due to the devastating impact of the recent heavy downpours and flooding, supply chain disruptions may be experienced in the short term (a few weeks), but more broadly we continue to anticipate sugar supply in surplus to local South African Customs Union (SACU) demand. Therefore, SASA does not anticipate the necessity of imports from outside of SACU,' Trikam said.

Majola, 2022

- 4.5.1 According to the article, what were the TWO causes of sugar shortage in South Africa? (4)
- 4.5.2 The shortage of sugar caused an increase in the price of sugar. By how much did the price of a ton of sugar increase? (4)
- 4.5.3 If the shortage of sugar prevails, how will the bulk carriers' freight rates be affected? CHOOSE: Increase; OR stay the same; OR decrease. (2)
- 4.5.4 Give a reason for your answer in Question 4.5.3. (2)
- 4.5.5 A continuous shortage of sugar would call for more sugar to be imported into South Africa. How can the government support sugar imports by the sugar industries? (2)
- 4.6 *MV Petra* will steam via the route past Cape Agulhas. Write a note on the importance of Cape Agulhas in world shipping. (10)



4.7 Study the sailing schedule of Seahorse Container Line ships and answer the questions set:

SEAHORSE CONTAINER LINE: SERVICE SCHEDULE

	SEAHORSE FLOWER		SEAHORSE PLANT		SEAHORSE ROSE	
	ETA	ETS	ETA	ETS	ETA	ETS
DURBAN	06/09	08/09	13/09	15/09	20/09	22/09
CAPE TOWN	10/09	10/09	17/09	17/09	24/09	24/09
ALGECIRAS	25/09	26/09	01/10	02/10	08/10	09/10
TILBURY	28/09	29/09	04/10	05/10	11/10	12/10
ROTTERDAM	30/09	01/10	06/10	07/10	13/10	14/10
BREMERHAVEN	04/10	05/10	11/10	12/10	18/10	19/10
CAPE TOWN	19/10	20/10	26/10	27/10	02/11	03/11
DURBAN	22/10	24/10	29/10	30/10	05/11	07/11

PJJ Sugar Co. in Johannesburg ordered six containers worth of packaged white and brown sugar from a sister company in Spain, Algeciras. To keep their supply chain uninterrupted, they want the containers to arrive in the factory on or before 2nd November. They will use the port of Cape Town to land the containers.

Please note that it will take one full day to clear the containers in Algeciras. It will take two days to clear the containers in Cape Town, and one day to move the containers from Cape Town to Johannesburg.

- 4.7.1 Which is the latest ship on which these containers can be shipped from Algeciras? (4)
 - 4.7.2 When will the containers arrive at the PJJ Sugar factory in Johannesburg? (4)
 - 4.7.3 How many days will it take to move these containers from Algeciras to Cape Town harbour? (4)
 - 4.7.4 Which organisation will clear the cargo on arrival in Cape Town? (2)
- [70]**



QUESTION 5

- 5.1 What was the possible effect of the HFO spill by the containership within South Africa's EEZ? (8)
- 5.2 During the clean-up operations of this HFO spill, a mid-latitude cyclone moved through the area of the oil spill.
- 5.2.1 What is another name for a mid-latitude cyclone? (2)
- 5.2.2 Approximately how long did it take the cyclone to pass over the area? Choose your answer from: 12 HOURS or 36 HOURS or 48 HOURS or 3 DAYS. (2)
- 5.2.3 How did the weather change during the passage of the cyclone? (Refer to temperature changes, changes in wind strength and direction, and any rain that might go with such a weather system.) (8)
- 5.2.4 How did the storm disrupt the clean-up operations? (4)
- 5.3 In June 2022, a local businessman was killed by a shark at Sanctuary Beach. Since then, the community has been on a mission to hunt and kill all the sharks in their local waters and surroundings. Explain how this practice of killing sharks can have a negative effect on the ecosystem. (6)

[30]**Total: 300 marks**

