



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2022

MARITIME ECONOMICS

Time: 3 hours

300 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 14 pages and an Answer Sheet of 1 page. 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.
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QUESTION 1 MULTIPLE CHOICE

Answer these on the **Answer Sheet** that is provided. Place an X in the block on the letter that is the correct answer to the question, or is the term described. Ensure that the Answer Sheet is handed in with your Answer Book.

- 1.1 Some modern ships are being fitted scrubbers to ...
- A help to clean holds after cargo has been discharged.
 - B help to remove impurities and exotic organisms from ballast water.
 - C help to remove particles from exhaust gases.
 - D help to remove marine growth from the ship's hull. (2)
- 1.2 The figure that most closely represents the number of deck ratings aboard a large containership is ...
- A 6.
 - B 16.
 - C 26.
 - D 126. (2)
- 1.3 From the list below, the African country with most merchant ships on its register is ...
- A Liberia.
 - B Nigeria.
 - C Egypt.
 - D South Africa. (2)
- 1.4 A ship is registered in Singapore but is owned by a German company. In this case, Singapore is known as a ...
- A national flag.
 - B flag of convenience.
 - C foreign ship's register.
 - D flag of arbitration. (2)
- 1.5 The organisation that will cover a ship for salvage costs after refloating from a reef is the ship's ...
- A P&I Club.
 - B H&M Insurer.
 - C TT Club.
 - D Classification Society. (2)
- 1.6 A containership sails from Japan to San Francisco and then to Shanghai. Through which of the following will she pass?
- A Suez Canal
 - B Panama Canal
 - C Kiel Canal
 - D None of the above canals (2)

- 1.7 The type of insurance that would cover an injury to a crewmember while he was painting the foredeck is ...
- A TT Club.
 - B FFO.
 - C P&I Club.
 - D Hull & Machinery. (2)
- 1.8 The type of insurance that would cover damage to a wheat cargo resulting from a leaking railway truck is ...
- A TT Club.
 - B FFO.
 - C P&I Club.
 - D Cargo Insurance. (2)
- 1.9 A ship has suffered a serious engine room fire. The type of insurance that covers the costs of chartering a tug to tow her into port is ...
- A salvage claim.
 - B FFO.
 - C P&I Club.
 - D Hull & Machinery. (2)
- 1.10 The type of insurance that covers damage to a fragile cargo inside a container that fell when the wire on the ship's crane parted is ...
- A cargo insurance.
 - B TT Club.
 - C P&I Club.
 - D Hull & Machinery. (2)
- 1.11 Among the aspects of shipping operations that the STCW95-2010 Convention covers is ...
- A the items to be in a ship's lifeboat.
 - B the content of the course to be completed by someone wanting to be a ship's cook.
 - C the procedure to be followed after a ship has had an accident.
 - D the regulations for the trans-shipment of an oil cargo from one tanker to another. (2)
- 1.12 A north-easterly wind of constant speed and blowing in the north-western part of the Indian Ocean in December is known as ...
- A Cyclone.
 - B Monsoon.
 - C Mid-latitude cyclone.
 - D Indian Doctor. (2)

- 1.13 Between the South China Sea and the Indian Ocean lies the ...
- A Straits of Gibraltar.
 - B Strait of Dover.
 - C Turkish Straits.
 - D Malacca Straits.
- (2)
- 1.14 The Incoterm that indicates that the shipper will pay the costs of moving the cargo from the shipper's (consignor's) premises until the cargo is aboard the ship is ...
- A FOB.
 - B EXW.
 - C CIF.
 - D DDP.
- (2)
- 1.15 The Incoterm that indicates that the costs of moving cargo from the shipper's (consignor's) premises until it is at the premises of the consignee – excluding customs duty – will be paid by the shipper.
- A CIF
 - B FAS
 - C EXW
 - D DDU
- (2)
- 1.16 A major reason for doing away with coal as a fuel in cargo ships is ...
- A it is a renewable resource.
 - B it is a constant energy source.
 - C it is not a clean energy source.
 - D it is an expensive fuel for marine propulsion.
- (2)
- 1.17 The document that sets out the conditions for the carriage of goods by sea is called the ...
- A Charter Party.
 - B Bill of Lading.
 - C Cargo Manifest.
 - D The APL.
- (2)
- 1.18 A ship is carrying a cargo of steel in five hatches and has a deadweight of 31 248 tons. She is a ...
- A Suezmax.
 - B Panamax.
 - C Handymax.
 - D Supramax.
- (2)

- 1.19 A South African port that is a major export port for vehicles is ...
- A East London.
 - B Richards Bay.
 - C Ngqura.
 - D Saldanha Bay.
- (2)
- 1.20 The organisms that form the basic key to life in the marine food chain are ...
- A Orcas.
 - B Phytoplankton.
 - C Anchovies.
 - D Sea birds.
- (2)
- 1.21 Trawling along the South African coast is controlled by the introduction of ...
- A larger trawlers.
 - B trawlers with nets with a larger mesh.
 - C quotas.
 - D seasonal fishing.
- (2)
- 1.22 An international code in terms of which ships must have lifeboats of a particular capacity is ...
- A SOLAS.
 - B STCW 95/2010.
 - C ISM.
 - D ISPS.
- (2)
- 1.23 The load line to which a ship can load when on a passage from Brazil to Nigeria in July is ...
- A WNA.
 - B W.
 - C S.
 - D T.
- (2)
- 1.24 The term for the period during which a chartered ship should arrive at the loading port and be ready to load is ...
- A Laytime.
 - B Laycan.
 - C Layload.
 - D Laylan.
- (2)
- 1.25 The distance to which a country's territorial waters extends seaward from the main points along the coast is ...
- A 120 nautical miles.
 - B 120 kilometres.
 - C 12 nautical miles.
 - D 12 kilometres.
- (2)

1.26 Conditions associated with a mid-latitude cyclone may affect shipping near ...

- A Maputo (Mozambique) and Sydney (Australia).
- B Rio de Janeiro (Brazil) and Sydney (Australia).
- C Fremantle (Western Australia) and Cape Town.
- D Fremantle (Western Australia) and Durban.

(2)

1.27 A containership has 1200 plug points for reefer containers, and a total cargo capacity of 6400 TEU. At Cape Town, she arrives with 2420 40-foot dry cargo containers aboard and 410 40-foot reefer containers. She can load the following number of reefer containers at Cape Town ...

- A 790 40-foot reefer containers.
- B 1140 40-foot reefer containers.
- C 740 40-foot reefer containers.
- D 940 40-foot reefer containers.

(6)

1.28 A ship has a bunker capacity of 1 230 tons. She takes a full stem of bunkers in Port A and, at an average speed of 14 knots, steams 8 736 nautical miles to Port B, using 35 tons of fuel a day. She will have the following amount of bunkers left on arrival at Port B ...

- A 420 tons.
- B 320 tons.
- C 520 tons.
- D 620 tons.

(6)

1.29 In Port X, the loading rate of a cargo of 28 000 tons of wheat is 400 tons per hour per chute. A ship will use two chutes and will start loading at 08:00 on 4 July. Breaks will total 8 hours and the ship will sail 5 hours after completion of loading. Her ETD from Port X is ...

- A 10:00 on 10 July.
- B 08:00 on 6 July.
- C 08:00 on 10 July.
- D 10:00 on 6 July.

(6)

[70]

QUESTION 2 THE MARITIME WORLD

- 2.1 Tons of fish landed at Port Z. Three years are shown below. The fishing fleet is not allowed to catch a special type of fish for several months in the year but can catch that special type of fish during the other months. Fish catches show an increase in the months when catching that type of fish is allowed.

	Year One	Year Two	Year Three
Jan	1 350	2 410	2 050
February	1 411	3 650	2 650
March	1 520	3 800	3 210
April	1 430	4 400	3 510
May	4 110	11 500	7 430
June	4 340	12 600	8 120
July	5 450	14 800	9 230
August	5 340	14 100	9 650
September	5 121	13 060	7 840
October	1 344	5 560	4 300
November	1 230	4 540	3 120
December	1 010	2 140	1 210

- 2.1.1 What is the monthly average tonnage of fish caught in Year One? (4)
- 2.1.2 During which months of the year can that special type of fish be caught? (2)
- 2.1.3 Explain your answer to Question 2.1.2. (4)
- 2.1.4 The fishing fleet does not go to sea over Christmas and New Year. How does this affect the fishing industry in Port Z? (4)
- 2.1.5 Six of a new class of trawler was introduced by a fishing company at Port Z. They could stay at sea longer than the older trawlers, they had better equipment on board to find the fish shoals and they could catch and freeze more fish on board than the older trawlers.
- (a) In which year were the new trawlers introduced? (2)
- (b) Explain your answer to Question 2.1.5 (a). (4)
- (c) Why do the new trawlers have an advantage in that they can stay at sea for longer than the older trawlers? (4)
- (d) What was the effect on the fishing industry in Port Z (in Year Three) of having the larger trawlers operating? (6)
- 2.2 List four measures that shipowners are taking to ensure that their ships operate more efficiently in terms of fuel consumption and contribute less to greenhouse gas emissions. (8)
- 2.3 Does a ship with a headwind use more fuel if she is to maintain a designated speed? (2)

Answer YES or NO.

(2)
[40]

QUESTION 3 SHIPPING OPERATIONS

- 3.1 Here are details about the bulk carrier *Capetan Gregorias* and her charter, as it was fixed:

Port of Registry	Limassol, Cyprus
Owner	Gregorias Shipping, Piraeus, Greece
Managers	Aegean Ship Management, Piraeus, Greece
Charter details	She is on a voyage charter . Her charter begins on arrival at Odessa, Ukraine, at 00:01 on 23 February and she is expected to start loading at 08:00 on that day. Her charter is expected to end at midnight on the day that she finishes hold cleaning in Port Louis.
Insurers	H&M P&I FFO
Cargo Insurers	Luxe Insurance Company, Luxemburg Wheat: Portal Insurers, London Animal Feed: Argosy Insurers, London
Origin of all Cargo	Ukraine Grain Exporters, Odessa, Ukraine
Cargo to be loaded in Odessa	No 1 Hold 3 200 tons wheat No 2 Hold 5 600 tons animal feed No 3 Hold 6 400 tons wheat No 4 Hold 5 600 tons animal feed No 5 Hold 4 800 tons wheat
Time in Odessa	Expected to be in port for three days
Port rotation	Mombasa, Kenya, then Port Louis, Mauritius
Discharge ports	All animal feed: Mombasa, Kenya, to be discharged via grabs, and railed to Nairobi Fodder Distributors, Nairobi. All wheat: Port Louis, Mauritius, to be discharged via grabs, and trucked to the grain silos of Mauritian Grain Company near the harbour.
Discharge at Mombasa	Expected to take 10 days.
Discharge at Port Louis	Expected to take 8 days.
Time at sea	Hold cleaning expected to take one day. Odessa to Mombasa 15 days Mombasa to Port Louis 06 days
Time at anchor off Port Louis	Expected to be 2 days (regarded as time at sea)
Daily hire cost	\$12 500
Fuel	HFO Consumption 31 tons per day at sea Price \$450 per ton MDO Consumption 3 tons per day Price \$593 per ton
Port costs	Odessa \$38 200 total Mombasa \$73 400 total Port Louis \$52 400 total
Sundry costs for the voyage	\$310 000

3.1.1 Study the details given on page 8.

- (a) In which sea or ocean or bay of gulf is Cyprus? (2)
- (b) What is the term for the list of cargo on board a ship? (2)
- (c) On *Capetan Gregorias's* expected voyage from Odessa on the Black Sea to Mombasa in Kenya, will she pass through the Straits of Gibraltar? Answer YES or NO. (2)
- (d) On her voyage from Odessa to Mombasa, will she pass through the Suez Canal? Answer YES or NO. (2)
- (e) On her voyage from Mombasa to Port Louis, in which ocean will she be sailing? (2)
- (f) Is the ship flying a flag of convenience? Answer YES or NO. (2)
- (g) What does the term **flag of convenience** mean? (4)

3.1.2 The ship is covered by various types of insurance. What does H&M stand for? (2)

3.1.3 What is the document that contains the agreed terms of a charter? (2)

3.1.4 What term is given to the agreed time it will take to load the cargo? (2)

3.1.5 What term applies if it had been agreed that the time taken to load the cargo would be 28 hours but it took 32 hours? (2)

3.2 Look at the various details given on page 8 regarding the vessel's charter and movements.

3.2.1 How many days was she expected to be on charter? (6)

3.2.2 What was the expected cost of the daily hire for the duration of the charter? (6)

3.2.3 What was the expected fuel cost for the duration of the charter? (6)

3.2.4 What were the expected port costs for the duration of the charter? (6)

3.2.5 What were the expected total costs for the duration of the charter? (6)

3.2.6 She has a bunker capacity of 1 845 tons of HFO (heavy fuel oil) and was expected to take a full stem of bunkers in Odessa before sailing to Mombasa and Port Louis. For her next voyage, she was expected to carry 34 000 tons of bagged sugar from Port Louis to Shanghai, a voyage that would take 20 days. Will she have enough HFO on board to reach Shanghai without bunkering or will she need to bunker before she arrives in Shanghai? Show your calculations. (6)

3.3 Russian forces invaded Ukraine at about 00:01 on 24 February 2022.

3.3.1 How long had *Capetan Gregorias* been in port at that time? (6)

3.3.2 Her Master decided to sail immediately after he heard that the Russian invasion had begun. He asked Port Control for tugs and a pilot and the ship cleared the port limits at 05:00 on 24 February.

(a) Why did her Master decide to sail from Odessa immediately? (Give two reasons.) (4)

(b) How long did it take from the time of the invasion for *Capetan Georgias* to clear the port limits? (4)

3.3.3 Romania is Ukraine's southerly neighbouring state. As he knew that Russian warships were patrolling Ukrainian waters off Odessa, and as there was a possibility that one of those warships might detain his ship as she was carrying Ukrainian cargo, the Master of *Capetan Gregorias* decided to head for Romanian territorial waters.

(a) Look at the number of days she was expected to spend in Odessa. Do you think that she completed loading the wheat and animal feed by the time she sailed? Answer YES or NO. (2)

(b) Explain your answer to Question 3.3.3 (a). (4)

(c) Why would his ship be safe in Romanian territorial waters? (4)

3.4 A marine hull insurance policy covers physical damage to a vessel, which can include damage caused in incidents such as groundings, collisions, bad weather or fires. However, hull insurance policies do not cover acts of war, piracy or the seizure (including hijacking) of vessels. These risks require a separate war coverage policy to be taken out.

Similarly special war risk P&I insurance cover would have to be taken out if the ship is in an area where there is a risk of war, piracy or seizure of the ship.

Cargo insurance provides cover for all risks of physical loss or damage to goods while in transit. Unlike marine hull insurance, cargo war risk insurance is usually included within cargo insurance.

3.4.1 What type of insurance would the shipowner have for *Capetan Georgias* if ...

(a) she was damaged during an air raid on Odessa? (2)

(b) cargo **already onboard** was damaged during an air raid on Odessa? **Be careful ...** (2)

- 3.4.2 What type of insurance would a cargo owner arrange to insure his animal feed cargo in case it was damaged during an air raid while the cargo was still in storage in a silo in Odessa? (2)
- 3.5 Shortly after *Capetan Georgias* entered Romanian waters, the crankshaft in her main engine breaks, and she is totally disabled. She is four nautical miles off a reef on the Romanian coast and an onshore gale is blowing. The Romanian tug *Donau* responds to her mayday call, arrives at the scene, and, after much difficulty in the heavy seas, connects a towing wire. *Donau* tows the disabled bulk carrier to the Romanian port of Constanta. For this operation, *Donau* was operating under an L.O.F. What is an L.O.F.? (8)
- 3.6 If a ship cannot be refloated immediately after her grounding, the salvor may change the salvage conditions from L.O.F to another set of conditions. What is that set of conditions known as? (2)
- [100]**

QUESTION 4 INTERNATIONAL TRADE

- 4.1 Study the cargo details given in Question 3.1. Who is ...
- 4.1.1 the carrier for the animal feed cargo? (2)
 - 4.1.2 the consignee for the wheat cargo? (2)
- 4.2 How many original bills of lading will be issued in Odessa for these cargoes? (2)
- 4.3 The animal feed cargo was to be carried FOB (the INCOTERM for *Free on Board*). Choosing your answers from either SHIPPER or CARRIER OR CONSIGNEE, who was expected to pay for each of the following?
- 4.3.1 the costs of loading the animal feed in Odessa. (2)
 - 4.3.2 the costs of railing the animal feed from Mombasa to the premises of Nairobi Fodder Distributors. (2)
 - 4.3.3 the costs of insurance on the animal feed cargo. **(Be careful and remember that the shipment will be made in terms of the Incoterm FOB.)** (4)
- 4.4 From Port Louis, she is expected to head for Shanghai, China, via Singapore. Her course from Port Louis usually takes her in a north-easterly direction.
- 4.4.1 Name the strait through which she is expected to pass before arriving off Singapore. (2)
 - 4.4.2 Explain why that strait is one of the most important convergence zones. ***Apart from other information that you give in your answer, refer to at least two major trading regions countries for which the strait is important.*** (10)
- 4.5 *Capetan Gregorias* is registered in Cyprus.
- 4.5.1 Where on the ship will the port of registry be shown? (2)
 - 4.5.2 This ship was built in 2021. What role will the maritime authorities in Cyprus have played before construction work begins, during her construction and before she is handed over to her owners? (10)
 - 4.5.3 Give two examples of problems that will cause a maritime authority to detain a ship. (4)

- 4.6 A South African seafarer joined *Capetan Georgias* on 1 January 2022 and was earning his salary in US dollars (US\$3 500 a month). He served in the ship for four months (January, February, March and April 2022), and finished his contract on 30 April 2022.

While in various ports, he spent the following amounts between 1 January and 30 April 2022:

New computer	US\$460
Car hire	US\$138
Meals	US\$268
Family presents	US\$320

- 4.6.1 How much did he **earn** during his time at sea? (6)
- 4.6.2 On 31 December 2021, he had US\$25 569 in his bank account. The average exchange rate for that period was US\$1 = R15,12. How much, in South African Rands, did he have in his bank account on 30 April 2022? (6)
- 4.6.3 Which country provides most seafarers to the world's fleets? (2)
- 4.6.4 What type of ship will be used to bring vehicle parts from Japan to Durban? (2)
- 4.6.5 What type of bulk carrier is *Capetan Georgias*? (Ignore the fact that she has cranes.) (2)

[60]

QUESTION 5 MARINE ENVIRONMENTAL CHALLENGES

- 5.1 Before his ship arrived in Odessa from Brazil in ballast, the Master of *Capetan Georgias* indicated that ballast water had been exchanged as required. Explain the term ballast water exchange and explain why this process is necessary *in terms of where this ship has come from.* (8)
- 5.2 Fully laden with a cargo of 275 000 tons of crude oil, the tanker *Arabian Pilot* is off Robben Island en route to Saldanha Bay. Visibility has been reduced to less than 200 metres because thick fog has covered the entire area from Cape Columbine to Cape Point.
- 5.2.1 Explain the cause of this fogbank. (6)
- 5.2.2 How will this affect the tanker's ETA at Saldanha Bay? (2)
- 5.2.3 When *Arabian Pilot* arrives off Saldanha Bay, Port Control informs the Master that the tanker will need to wait for the fog to clear before she can enter the port. Although the tanker has very modern navigation equipment, the pilot has taken this decision for safety reasons. What "safety reasons" caused the pilot made this decision? (4)
- 5.2.4 What type of tanker is *Arabian Pilot*? (2)
- 5.3 In meteorology, the term **depression** applies to a particular type of weather system. What is another term for a **depression** as used in meteorology? (2)
- 5.4 Why is plastic regarded as a serious pollution hazard in the oceans? (6)
- [30]**

Total: 300 marks