



NATIONAL SENIOR CERTIFICATE EXAMINATION  
NOVEMBER 2020

**MARITIME ECONOMICS**

Time: 3 hours

300 marks

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**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.
  3. Read the questions carefully before answering.
  4. Answer all 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 interests to write legibly and to present your work neatly.
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**QUESTION 1      MULTIPLE CHOICE QUESTIONS**

Answer these questions on the Answer Sheet provided. Place an X in the block next to the letter that is the answer to the question, or is the term described.

1.1      Scrubbers are being fitted to the exhaust systems of ships to eliminate the ... from exhaust gases.

- A      nitrogen
- B      oxygen
- C      helium
- D      carbon

1.2      How many engineering officers are usually assigned to a large tanker with an engine of about 45 000 brake horsepower?

- A      Two
- B      Three
- C      Four
- D      Five

1.3      A method used by several countries to attract ships to their registration is ...

- A      marine taxation.
- B      tonnage taxation.
- C      ships' taxation.
- D      port taxation.

1.4      A ship is registered in Liberia but is owned by an American company. The term for this practice is ...

- A      cross-registering.
- B      trans-registering.
- C      flagging away.
- D      flagging out.

1.5      The organisation that will declare a ship seaworthy after an accident is ...

- A      Classification Society.
- B      Shipping Society.
- C      Lloyd's Association.
- D      Lloyd's Convention.

1.6      A handysize bulk carrier sails from Buenos Aires (Argentina) to Durban. Through which of the following seas or oceans will she pass?

- A      North Atlantic Ocean
- B      South Atlantic Ocean
- C      North Sea
- D      South China Sea

1.7      What type of insurance would cover damage to a wharf that was hit by a ship?

- A TT Club
- B FFO
- C P&I Club
- D Hull & Machinery

1.8 What type of insurance would ultimately cover damage to Ship X resulting from a collision with Ship Y when Ship Y was at fault?

- A Ship X's Hull & Machinery
- B Ship Y's P&I Club
- C Ship X's P&I Club
- D Ship Y's Hull & Machinery

1.9 What type of insurance would cover the costs of a helicopter that was used to airlift an injured crewmember to a hospital?

- A TT Club
- B FFO
- C P&I Club
- D Hull & Machinery

1.10 What type of insurance would cover injury to a stevedore who was injured when the ship's gangway collapsed while he was disembarking?

- A TT Club
- B FFO
- C P&I Club
- D Hull & Machinery

1.11 The term that applies to the process of settling a dispute between a charterer and a shipowner is known as ...

- A resolution.
- B charter review.
- C charter Institution.
- D arbitration.

1.12 A severe revolving storm encountered off the coast of Japan where wind speeds reached 245 kmph is known as a ...

- A hurricane.
- B typhoon.
- C mid-latitude cyclone.
- D monsoon.

1.13 The Strait of Magellan provides a natural passage between the South Pacific Ocean and the ...

- A Caribbean Sea.
- B Arabian Gulf.
- C Red Sea.
- D South Atlantic Ocean.

1.14 The Incoterm that indicates that the costs of carrying the cargo from before it crosses over the ship's gunwale until it reaches the consignee's premises will be paid by the consignee is called ...

- A FOB.
- B FAS.
- C CIF.
- D DDP.

1.15 The Incoterm that indicates that all the costs of shipping cargo from the shipper's premises to the consignee's premises will be paid by the consignee is called ...

- A FOB.
- B FAS.
- C EXW.
- D DDP.

1.16 Who bears the insurance costs on the ocean leg of the transport chain if cargo is shipped CIF?

- A The shipper
- B The consignee
- C The carrier
- D The forwarding agent

1.17 The document that sets out the conditions of the carriage of goods by sea is called the ...

- A Charter Party.
- B Bill of Lading.
- C Cargo Manifest.
- D Mate's Receipt.

1.18 A ship is registered in Monrovia. The flag of which country will she fly at the stern when in port?

- A Panama
- B Marshall Islands
- C Cyprus
- D Liberia

- 1.19 The primary cause of fog off the west coast of southern Africa is ...
- A mid-latitude cyclone.
  - B mixing of warm moist air over the Benguela Current and cold moist air.
  - C mixing of warm dry air over the Agulhas Current and cold dry air.
  - D mixing of warm moist air and cooler air over the Benguela Current.
- 1.20 The apex predator in the marine food chain is the ...
- A blue whale.
  - B great white shark.
  - C orca.
  - D southern right whale.
- 1.21 The term for an area in a harbour where minerals await to be loaded is a ...
- A terminal.
  - B wharf.
  - C stacking area.
  - D stockpile.
- 1.22 An international code in terms of which ships must have regular man-overboard drills is ...
- A SOLAS.
  - B STCW 95/2010.
  - C ISM.
  - D ISPS.
- 1.23 A ship steams at 20 knots. In two days she will steam ...
- A 820 nautical miles.
  - B 920 nautical miles.
  - C 860 nautical miles.
  - D 960 nautical miles.
- 1.24 A vessel that can carry 210 000 tons of iron ore is called a ...
- A capesize tanker.
  - B capesize bulker.
  - C very large crude carrier.
  - D capesize crude carrier.
- 1.25 The country in which a ship is flagged, is known as the ...
- A Port State.
  - B Flag State.
  - C Ship State.
  - D Ship Register.

- 1.26 The country with the largest ships' register is ...
- A Germany.
  - B Marshall Islands.
  - C Panama.
  - D Cyprus.
- 1.27 If a country has a system of cabotage, it means that the country ...
- A allows ships of any nationality to move cargoes between its ports.
  - B allows only foreign ships to move its export cargoes to foreign ports.
  - C allows only foreign ships to move cargoes between its ports.
  - D allows only ships registered in its ports to move cargoes between its ports.
- 1.28 A ship steaming from Durban to Mauritius in March could encounter ...
- A a monsoon wind.
  - B a strong Benguela Current.
  - C a tropical cyclone.
  - D a mid-latitude cyclone.
- 1.29 A ship sailing on the ... route may experience ice conditions.
- A New York to Cape Town in July
  - B The North-east Passage in July
  - C Sydney (Australia) to San Francisco (West Coast USA) in July
  - D Oslo (Norway) to Hamburg (Germany) in July
- 1.30 Which of the following can be regarded as dangerous cargo?
- A Granite
  - B Calcium hypochlorite
  - C Manganese
  - D Titanium slag

**[60]**

**QUESTION 2 THE MARITIME WORLD**

- 2.1 Give three reasons for coal being replaced by various grades of oil as the main fuel for ships. (6)
- 2.2 List two advantages in using wind to propel ships. (4)
- 2.3 Besides wind power, other new power sources are being considered as possible replacements for fossil fuels.
- 2.3.1 List two of these possible power sources for ships. (4)
- 2.3.2 Choose one of your answers to Question 2.3.1, and explain why you think it is possibly the better option of the two to use as a fuel by ships in the future. (6)
- 2.4 The following are the average charter rates (in US\$ per day) for VLCCs carrying 280 000 tons of cargo on particular routes in three consecutive years:

ROUTE	YEAR 1	YEAR 2	YEAR 3
Arabian Gulf–Europe (via Suez)	38 677	11 205	3 063
Arabian Gulf–Japan	41 455	20 653	8 524
Arabian Gulf–US Gulf via Cape	46 802	23 414	11 355
Arabian Gulf–Korea	42 587	22 351	9 499

- 2.4.1 Which route has shown the greatest drop in charter rates over the three years? (6)
- 2.4.2 Why are the charter rates on the route to US Gulf higher than other routes? (4)
- 2.4.3 What is a VLCC? (4)
- 2.4.4 Through which two important maritime convergence zones will vessels steaming from Arabian Gulf to Japan pass? (4)
- 2.4.5 Ships on all of the given routes pass through several maritime convergence zones, but through which convergence zone will all of the ships pass? (2)

**[40]**

**QUESTION 3      SHIPPING OPERATIONS**

Here are some details about the bulk carrier *Sofia K*.

She has five holds, a bulbous bow, and her accommodation and engine room are aft.

Length	180 metres
Loaded Draught	10,1 metres (Fully laden to summer marks)
Freeboard when loaded	4,5 metres
Owner	Sofia Shipping, Limassol, Cyprus
Managers	Eastmed Ship Management, Limassol, Cyprus
Charterer	World Food Aid, Geneva, Switzerland
She is on a <b>time charter</b> for 12 months during which she is expected to make <b>six loaded voyages</b> carrying grain from New Orleans (US Gulf) to Beira (Mozambique, on the east coast of Africa). She will steam from New Orleans via the Cape to Beira. She is on her first voyage, and the time on charter can be extended if delays are encountered.	
Insurers	H&M Lloyd's
	P&I North of England P&I Club
Port of Registry	Limassol, Cyprus
Classification Society	American Bureau of Shipping
Cargo	30 000 tons of bagged grain on pallets
Cargo distribution	No 1 Hold 4 000 tons
	No 2 Hold 6 000 tons
	No 3 Hold 6 400 tons
	No 4 Hold 6 400 tons
	No 5 Hold 7 200 tons
She has one crane per hold.	
Origin of Cargo	Louisiana Grain Corporation, New Orleans.
Loading Port	New Orleans
Discharge Port	Beira, Mozambique
Destination of Cargo	Southern Food Aid Distributors, Tete, Mozambique.
The grain will be railed from Beira to Tete for distribution to flood victims.	

- 3.1 Referring to the details given, draw a diagram of this ship from bow to stern. She should be viewed **from the port side**. Use labels to show all available information about the vessel and her cargo. (10)
- 3.2 When this ship was chartered for the movement of grain from New Orleans to Beira, what **specifications** of the ship would have been studied carefully to ensure that she is suitable for the charter? (8)



3.3 Assume the following when the cargo was loaded in New Orleans:

- Loading was done by the ship's own cranes.
- Loading began at 14:00 on 24 June, and, apart from breaks, continues on a 24-hour basis.
- The holds will be loaded simultaneously (i.e. at the same time).
- Loading rate is expected to be 100 tons per hour per crane.
- Breaks (tea breaks, change of shift, etc.) total 12 hours for the duration of the loading process.
- Before she can sail, various procedures will take five hours **once cargowork has been completed**.

3.3.1 How many hours will it take to complete the loading of the cargo, **including breaks**? Round off to the NEXT hour e.g. 22,2 becomes 23 hours. Be very careful and ensure you read carefully all the details about the loading process. (6)

3.3.2 When will the loading of the cargo be finished? (6)

3.3.3 When will she sail from New Orleans? (6)

3.3.4 Assume that the agreed laytime is 66 hours, including breaks. Did the loading process take longer than the agreed time? Answer YES or NO. (2)

3.3.5 Which will be payable: demurrage or dispatch? (2)

3.3.6 Who would be liable for payment? Choose your answer from:

SHIPOWNER or CHARTERER or SHIP'S AGENT or PORT AUTHORITY (2)

3.3.7 Grain cannot be loaded during rain.

(a) What term is applied to a cargo that cannot be worked during rain? (2)

(b) Will a rain interruption be taken into account when calculating demurrage or dispatch? Answer YES or NO. (2)

3.4 Assume that the cargo was carried FOB (the INCOTERM for FREE ON BOARD).

Choosing your answers from SHIPPER or CONSIGNEE or SHIP'S AGENT, who pays for the following:

3.4.1 The costs of loading the cargo of grain in New Orleans (2)

3.4.2 The ocean freight costs between New Orleans and Beira (2)

3.4.3 The costs of discharging the cargo in Beira (2)

- 3.5 What type of bulk carrier is *Sofia K*? (Two parts to your answer.) (4)
- 3.6 What role does a ship management company play in the ship's operation? (6)
- 3.7 Read the following and answer the questions that follow:

At 14:00 on 28 June on the ship's first voyage to Beira, the ship's Master notes a weather warning of a hurricane beginning to develop in a position that is three days ahead of *Sofia K*'s present position, but the hurricane is likely to cross the ship's intended course. Hoping to keep clear of the hurricane, he plots a new course to the north-east of the expected course of the hurricane, and the ship alters course. However, over the next 48 hours, the hurricane strengthens, generating wind gusts of over 130 knots and enormous swells. The hurricane also changes its course, forcing the Master to alter his ship's course again. Despite his efforts to avoid the huge storm, *Sofia K* is battered by strong winds and swells of 11 metres.

Huge swells sweep across her foredeck, damaging some of the deck fittings, and an alarm is set off, indicating that water has entered Number 1 Hold.

Fortunately, the storm abates, but because of the damage to deck fittings and the water in the hold, the Master decides (at 16:00 on 1 July) to head for the nearest port, Tampa in the American state of Florida, and sends an email to his agent in Tampa, requesting that surveyors are flown to the ship before arrival so that she can enter port on arrival. He also alerts Port Control at Tampa and the US Coast Guard. At 10:00 on 2 July, a helicopter arrives with Coast Guard officers and three surveyors. *Sofia K* arrives off Tampa at 13:00 that day. Port Control instructs her to anchor until the Coast Guard allows her to enter port. It is found that her hatch cover to Number 1 Hold has been damaged and will need to be repaired.

As there is no danger that she will sink and no danger of pollution, she is allowed to enter the harbour the following day (3 July). The pilot boards at 05:00 and she berths at 07:00.

At 22:00 on 4 July, the discharge of her damaged cargo is completed, and, as it is declared unfit for human or animal consumption, it is sent to a local disposal site. Surveyors check the bulkheads and the other steelwork, and find no further damage. All other hatch covers are undamaged and the cargo in Holds 2 to 5 has not been affected.

Repairs begin at 10:00 on 5 July, and two weeks later, surveyors clear *Sofia K* to resume trading. At 10:00 on 18 July, she begins loading another 4 000 tons of grain in Number 1 hold and at 16:00 on 20 July, she sails for Beira.

- 3.7.1 Compile the message (no longer than 50 words) that the Master of *Sofia K* would have sent to his ship's agent in Tampa once he had decided to divert to Tampa. Ensure that all the relevant information and requests are in that message – as shown in the report above. If any important information is not in the report above, you can compile your own information, based on the facts.

(12)

- 3.7.2 Compile a timeline (from sailing from New Orleans until she sailed from Tampa) showing the events in the order in which they occurred. (12)
- 3.7.3 The surveyors (other than those representing the US Coast Guard) would have represented three organisations. Which organisations are these? (6)
- 3.7.4 What is the South African equivalent of the US Coast Guard? (2)
- 3.7.5 Which insurance company would pay for the damage to the ship? (2)
- 3.7.6 Who would pay for the damage to the cargo in Number 1 Hold? (2)
- 3.7.7 Can General Average be declared in this incident? Answer YES or NO. (2)
- [100]**

**QUESTION 4      INTERNATIONAL TRADE**

- 4.1 The carriage of the cargo from New Orleans to Beira by *Sofia K* is governed by a bill (or bills) of lading.
- 4.1.1 How many bill(s) of lading is/are required for this cargo? Choose your answer from ONE or TWO or FIVE. (2)
- 4.1.2 Would the owner of the grain cargo take out cargo insurance for the voyage from New Orleans to Beira? Answer YES or NO. (2)
- 4.2 4.2.1 Is *Sofia K* flagged out? Answer YES or NO. (2)
- 4.2.2 Explain your answer to Question 4.2.1. (4)
- 4.3 *Sofia K* will steam via the route past Cape Agulhas. Write a note on the importance of Cape Agulhas in world shipping. Among other facts that you provide in your note, mention the following:
- its position on important world trade routes.
  - some important cargoes that are carried past Cape Agulhas.
  - the periods during which the route past Cape Agulhas was of special importance. (10)
- 4.4 Bagged grain can be carried in containers. The total tonnage of grain carried in one voyage is approximately 30 000 tons and, for ease of handling at the loading and discharge ports, the cargo is palletised. Each pallet will carry 24 bags, each bag carrying 50 kg of grain. The shipper (World Aid Corporation) is considering containerising the grain shipments, particularly as the cargo has to be discharged in Beira and railed to Tete.
- 4.4.1 What will the advantages be if this bagged grain cargo is containerised, especially as it will be railed from Beira to Tete in Mozambique? (8)
- 4.4.2 How many tons of bagged grain are carried on one pallet? (6)
- 4.4.3 How many pallets of bagged grain will be required for a cargo of 30 000 tons? (6)
- 4.4.4 If 10 pallets can fit into one 40-foot container, how many containers will be needed to carry this cargo? (6)

4.5 In the planning stage, the following schedule was drawn up.

Loading time in New Orleans	4 days
Time on Passage New Orleans–Beira	26 days
Discharge time in Beira	11 days
Time on passage Beira–New Orleans	26 days
<i>(Because of the important aid cargo she is carrying, Sofia K will be given priority berthing in Beira.)</i>	
She will bunker only in New Orleans.	
For your answers to these questions, disregard the fact that she had to divert to Tampa after suffering damage in the hurricane.	

4.5.1 How many days will a complete round voyage take? (6)

4.5.2 Will she be able to complete six loaded voyages from New Orleans to Beira in a year? Answer YES or NO but you MUST show your calculation that enabled you to find the answer. **Remember that the sixth loaded voyage would end after discharge of cargo has been completed in Beira.** (6)

4.5.3 While at sea, she uses 31 tons of heavy fuel a day and 3 tons of gas oil a day. How many tons of each type of fuel would she use on one voyage from New Orleans to Beira? (6)

4.5.4 Referring to your answer to Question 4.5.3., how will this alter her draught during the voyage? (4)

4.6 The ship is due to arrive off Beira on one of her voyages between 13 and 16 October. The depth of water at high tide during that time is as follows: (Time in *italics*; depth of water in **bold type**.)

13 October	05:16	<b>09,7 m</b>	18:03	<b>10,3 m</b>
14 October	06:25	<b>10,5 m</b>	18:52	<b>10,8 m</b>
15 October	07:35	<b>11,2 m</b>	19:53	<b>10,8 m</b>
16 October	08:32	<b>10,6 m</b>	20:56	<b>10,3 m</b>

4.6.1 *Sofia K* leaves New Orleans with a draught of 10.1 metres and requires at least 0.8 m clearance under her keel when entering Beira. When would be the best time to enter Beira? (4)

4.6.2 The ship has favourable weather and currents en route and when his ship is off the southern Mozambique coast, the Master calculates that *Sofia K* may arrive off Beira early on the morning of 13 October.

(a) Will the ship be able to enter the port at that time? Answer YES or NO. (4)

(b) Look at your answer to Question 4.6.2 (a). The Master has just completed his calculation of the ship's ETA at Beira. Is he likely to increase or decrease the ship's speed? Answer INCREASE or DECREASE. (2)

(c) Give one reason that will support your answer to Question 4.6.2 (b). (2)

**[80]**

**QUESTION 5      MARINE ENVIRONMENTAL CHALLENGES**

- 5.1 Which of the following is the basic part of the marine food chain?  
Crustaceans OR Zooplankton OR Molluscs OR Phytoplankton (2)
- 5.2 What term is applied when too many fish have been caught in one area, depleting the fish stocks in that area? (2)
- 5.3 In which of the following latitudes is a ship most likely to encounter icebergs?  
0° OR 15°N OR 15°S OR 35°S OR 45°S OR 65°S (2)
- 5.4 Which is likely to cause heavier seas: a tropical cyclone or a mid-latitude cyclone? (2)
- 5.5 What crime is committed when people catch fish without permits? (2)
- 5.6 Apart from a permit system, give two measures that the South African government has implemented to conserve fish stocks off the South African coast. (4)
- 5.7 Explain why plastic in the sea is a particularly bad form of marine pollution. (6)
- [20]**

**Total: 300 marks**