



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2023

MARITIME ECONOMICS

Time: 3 hours

300 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 15 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 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 Countries that currently supply large numbers of seafarers to the global fleet are:
- A Brazil, Russia, South Africa, India
 - B Panama, Liberia, Marshal Islands, Singapore
 - C China, Philippines, Indonesia, Russia
 - D Philippines, Panama, China, Liberia
- (2)
- 1.2 How many navigating/deck officers will be allocated for a safe manning of a large modern ro-ro ship?
- A One
 - B Two
 - C Three
 - D Four
- (2)
- 1.3 A trainee engineering officer on board a ship is known as a:
- A Deck Cadet
 - B Deck Trainee
 - C Engine Cadet
 - D Engine Trainee
- (2)
- 1.4 These vessels depend on winds and currents to make their way through the water:
- A Ancient motor vessels
 - B Sailing ships
 - C Steamships
 - D Harbour tugs
- (2)
- 1.5 From the list of ships' fuels listed below, which one is the cleanest?
- A HFO
 - B MDO
 - C MGO
 - D LNG
- (2)
- 1.6 An African country with the most ships on its registry:
- A Panama
 - B Liberia
 - C Singapore
 - D South Africa
- (2)

- 1.7 The important detail concerning the ship's registration that will appear on the ship's stern is the:
- A Port of registry
 - B Port of load/discharge
 - C Classification society
 - D Country of registry
- (2)
- 1.8 A country in which a ship has been flagged out is sometimes known as a:
- A Coastal state
 - B Flag of convenience
 - C Country of registration
 - D Panama State
- (2)
- 1.9 Some shipowners prefer to flag out their ships to countries where they can pay:
- A Income tax
 - B Negative tax
 - C Tonnage tax
 - D Corporate tax
- (2)
- 1.10 An organisation to approve a ship's major structural modifications:
- A Classification Society
 - B Society of Master Mariners
 - C P & I Club
 - D Port State Control
- (2)
- 1.11 The process of settling maritime disputes pertaining to salvage operations is known as:
- A Dispute Settlement
 - B Arbitration
 - C Court Order
 - D Atrabition
- (2)
- 1.12 Ship A, on a coastal passage, collided with a lighthouse. As a result of the collision, Ship A's hull was badly damaged and there was an ingress of water damaging the cargo of wheat in the number one hold. The lighthouse partially collapsed and stopped working. Which insurance will cover the damage of Ship A's hull?
- A Ship A's P&I Club
 - B Ship A's Hull and Machinery
 - C Ship A's FFO
 - D Cargo Insurance
- (2)

- 1.13 Refer to the scenario given in Question 1.12. Which insurance will cover the damage to the lighthouse?
- A Ship A's P&I Club
 - B Ship A's Hull and Machinery
 - C Ship A's FFO
 - D Cargo Insurance
- (2)
- 1.14 Refer to the scenario given in Question 1.12. Which insurance will ultimately cover the damage to the cargo?
- A Ship A's P&I Club
 - B Ship A's Hull and Machinery
 - C Ship A's FFO
 - D Cargo Insurance
- (2)
- 1.15 A seven-holds Panamax bulk carrier is loaded in holds one and two, as well as holds six and seven. Which of the following hull stresses will she experience?
- A Hogging
 - B Sagging
 - C Torsion
 - D Forward and Aft Trim
- (2)
- 1.16 Which of the following is the world's busiest container port?
- A New York
 - B Durban
 - C Singapore
 - D Shanghai
- (2)
- 1.17 A sea area that extends 12 nautical miles from a baseline of a littoral state is known as:
- A Territorial waters
 - B Contiguous zone
 - C Exclusive Economic Zone
 - D Continental shelf
- (2)
- 1.18 A maritime convergence zone that is highly important for the world's supply of crude oil is:
- A Strait of Dover
 - B Strait of Hormuz
 - C Strait of Malacca
 - D Strait of Gibraltar
- (2)

- 1.19 Incoterms clearly define the shipping responsibilities and liabilities between the:
- A Carrier and ship
 - B Shipper and consignee
 - C Shipper and carrier
 - D Shipper, carrier, and consignee (2)
- 1.20 A document that sets out the conditions relating to the ship's charter is called:
- A Bill of Lading
 - B Charterparty
 - C Voyage instructions
 - D Notice of readiness (2)
- 1.21 A South African organisation that is responsible for the control of cargo coming in and out of the country:
- A South African Revenue Services
 - B South African National Ports Authority
 - C South African Department of Home Affairs
 - D South African Maritime Safety Authority (2)
- 1.22 Forming the bases of the aquatic/marine food chain are:
- A Orcas
 - B Seals
 - C Zooplankton
 - D Phytoplankton (2)
- 1.23 A ship steaming off the west coast of Southern Africa from Cape Town to Walvis Bay might encounter thick fog that is caused by:
- A Cold moist air from the tropical regions resting over the cold Benguela current.
 - B Cold moist air from the tropical regions resting over the warm Benguela current.
 - C Warm moist air from the tropical regions resting over the cold Agulhas current.
 - D Warm moist air from the tropical regions resting over the cold Benguela current. (2)
- 1.24 During the Southern Hemisphere's winter, a ship sailing from Port of Santos, in Brazil to Gqeberha could encounter a:
- A Hurricane
 - B Monsoon
 - C Mid-latitude cyclone
 - D Typhoon (2)

1.25 Sailing from the United Kingdom to New York, America, in July, a ship could encounter a:

- A Willy-willies
- B Hurricane
- C Monsoon
- D Typhoon

(2)
[50]

QUESTION 2 THE MARITIME WORLD

2.1 The IMO-Norway GreenVoyage2050 Project is supporting shipping's transition towards a low-carbon future. This global project is supporting the reduction of Greenhouse Gas (GHG) emissions from shipping.

2.1.1 Name TWO gases that are emitted by ships from burning fuel in their main engines. (2)

2.1.2 Why is it important that there is a reduction of greenhouse gas emissions from ships? (4)

2.1.3 What are shipowners currently doing to reduce greenhouse gas emissions from their ships? (4)

2.1.4 Shipowners are also exploring ways to incorporate wind propulsion on their vessels by mounting sails and kites. Give TWO advantages of incorporating wind on ship propulsion. (4)

2.1.5 Which IMO convention or code deals with the prevention of air pollution by ships? (2)

2.2 The following table shows the number of ships that called into the Port of Gothenburg's container terminal in each quarter of the year from 2014 to 2018. Quarter 1 = Jan to Mar, quarter 2 = Apr to Jun, and so on.

Study the table and answer the questions set:

YEAR	QUARTER	SHIPS ARRIVAL	CONTAINERS	TEUs	TOTAL HOURS
2014	1	210	127 801	216 859	3101
2014	2	212	124 097	209 960	3227
2014	3	198	120 797	202 955	3475
2014	4	175	117 605	199 159	2943
2015	1	170	121 512	205 252	3512
2015	2	204	121 510	208 551	4066
2015	3	206	120 683	203 549	3337
2015	4	184	114 001	192 287	3203
2016	1	119	124 066	212 392	3516
2016	2	170	114 217	190 441	3777
2016	3	184	122 225	217 112	3456
2016	4	167	110 373	158 288	3361
2017	1	159	107 362	179 748	3415
2017	2	145	81 354	133 281	3247
2017	3	142	91 245	149 461	3027
2017	4	160	104 677	176 332	3161
2018	1	161	111 090	188 593	3280
2018	2	162	112 824	190 485	3332
2018	3	130	106 673	179 415	2474
2018	4	134	113 252	191 390	2559

- 2.2.1 What type of ships does this data represent? (2)
- 2.2.2 What does TEU stand for? (2)
- 2.2.3 When did the port experience the least number of ships on their berths? (2)
- 2.2.4 What was the highest number of TEUs recorded in one quarter? (2)
- 2.2.5 What was the total number of ships that called on Gothenburg Port in 2018? (4)
- 2.2.6 What is the approximate number of hours that each ship spent in Gothenburg Port in 2018? (6)
- 2.3 Predicting a massive future shortage of seafarers, IMO has launched various campaigns to attract young people to choose careers at sea by highlighting the positive benefits of choosing a career at sea. The campaign will show that seafaring is a viable, attractive, and exciting career option.
- 2.3.1 As a junior staff member on a learnership programme at a maritime company, you have been tasked to design a poster that will be used for the promotion of sea-going careers. Design an eye-catching poster to be used by your company. Amongst other things, your poster MUST have the following: (12)
- At least FOUR positive benefits of choosing a career at sea.
 - An attractive slogan for your campaign.
- 2.3.2 Give TWO reasons why there has been a decrease in the number of West-European seafarers. (4)
- [50]**

QUESTION 3 SHIPPING OPERATIONS

- 3.1 Following are details about the charter of the cargo ship *MV AMANI* (valued at \$81 million) chartered to move cargo from Gothenburg Port in Sweden to Durban (8700 nautical miles away). She is replacing the company's existing ship currently undergoing major repairs.

You may be required to consult these details for questions that follow throughout the paper.

Built	2011 Tsuneishi Holdings Corporation, Japan
IMO Number	9296574
Owners	P T Adamos Shipping Ltd, Greece
Charterers	Jensen-Nielsen Shipping Co.
Port of Registry	Monrovia
Classification Society	Lloyd's Register
Length over all	179.00 metres
Beam	32.00 metres
Summer Draught	10.15 metres
Depth	21.62 metres
DWT	16 886 t
Propulsion	Single shaft; fixed-pitch propeller
Installed power	Mitsubishi diesel engine, 19 140 hp (14 270 kW)
Service speed	19.2 knots
Crew	24
Cargo	1700 cars and 70 construction vehicles
Ramps	Stern ramp and starboard midship ramp
Port of load	Gothenburg Port, Sweden
Origin of cargo	Perdesen Vehicle Traders Ltd
Cargo destination	Agarwal Vehicle Distributors, Isipingo, Durban
Insurers	Northern P&I Club Thames Hull and Machinery TMT Cargo Insurers

- 3.1.1 What type of cargo ship is *MV AMANI*? (2)
- 3.1.2 Give TWO distinguishing factors that would enable you to identify this type of vessel when you see it. (How she is constructed ...) (4)
- 3.1.3 Which country's flag will she fly on her stern when loading in the Port of Gothenburg? (2)
- 3.1.4 Her DWT is 16 886 t. What does this mean? (2)
- 3.1.5 According to which IMO convention or code are the 24 crew members trained and certified? (2)
- 3.1.6 How will her classification society be abbreviated on her Plimsoll line (load line)? (2)

- 3.2 3.2.1 How do we know that *MV AMANI* has been flagged out? (2)
- 3.2.2 Give THREE possible reasons why her owners chose to flag her out. (6)
- 3.2.3 What role has her flag state been playing after she was delivered to her owners? (6)
- 3.2.4 *MV AMANI* has been sold to different owners twice, i.e., she has had three owners. How many times has her IMO number changed? CHOOSE: ZERO, TWICE (TWO TIMES), THREE TIMES. (2)
- 3.3 *MV AMANI* arrived at Gothenburg Port to commence her charter at 00:01 6th May. She began loading at 08:00 on the same day. Following are other details concerning the loading process:
- Cars were loaded first through both ramps at a rate of 35 cars per hour per ramp.
 - After the cars, construction vehicles were loaded using the stern ramp at a rate of 10 vehicles per hour.
 - Total breaks amounted to eight hours.
 - After all cargo was loaded, lashing carried on for another three hours.
 - Upon completion of lashing, attempts to close the stern ramp failed because of a hydraulic winch failure. Repairs took four hours.
 - After loading processes and securing of the ship, she spent three more hours in port before she could sail.
- 3.3.1 How many hours did the loading of cars take, excluding breaks? Round off to the next hour. (6)
- 3.3.2 How many hours did the loading of construction vehicles take, excluding breaks? Round off to the next hour. (6)
- 3.3.3 When was the lashing of cargo completed? (6)
- 3.3.4 What was her ETD Gothenburg Port? (4)
- 3.3.5 Which ship side was against the quay at her berth? (2)
- 3.3.6 What clearances need to take place before a ship can sail? (4)
- 3.3.7 45 hours (breaks included) was the agreed loading time.
- (a) What is the proper term for this agreed loading time? (2)
 - (b) In which document was this agreed loading time stipulated? (2)
 - (c) Which TWO parties agreed and signed the document mentioned above? **Give the actual names of the parties.** (4)
 - (d) Did *MV AMANI* take more or less time to load? (2)
 - (e) Which was payable? Demurrage or dispatch? (2)

- (f) Who was liable to pay? (2)
- (g) What is the appropriate term for the four hours delay spent on fixing the ship's stern ramp winch? (2)

3.4 *MV AMANI* was safely piloted out of Gothenburg Port. Pilot disembarked after taking the ship to her beginning of sea passage position. About two days later, the ship made a slight starboard turn through the straits and entered the English Channel steaming at 12 knots. After entering the channel, speed increased to 15 knots. Later that day, *MV AMANI* made a port turn out of the English Channel into the rough-weathered Bay of Biscay and developed a severe list. The third mate who was the officer on watch (OOW) immediately called the master who gave the order to stop engines and expressed doubts in respect of the stability of the vessel. As the list increased, the ship's propeller and rudder came clear of the water. The ship grounded on a sand bank off the Bay and settled with a list that would eventually reach 52°. The OOW broadcasted a distress call on the command of the master.

The tugs *Svitzer Ferriby* and *Svitzer Surrey* were sent to the assistance of *MV AMANI*. A Severn-class lifeboat from Santander and an Atlantic 85-class lifeboat from Cowes were called out. Coastguard helicopter from RNAS Lee-on-Solent (HMS *Daedalus*) was also called out to assist.

Svitzer Ferriby arrived at the scene. One crew member aboard *MV AMANI* broke an arm and a leg when he fell and slid for about 18 meters in a corridor as the ship listed. A crew member jumped into the water as a lifeboat approached and was rescued. Six crew were winched aboard the helicopter from Lee-on-the-Solent and landed there. RFA Lyme Bay assisted in the coordination of the rescue efforts. A crew member from the Yarmouth Lifeboat was winched onto *MV AMANI* to assist with the evacuation. All crew except captain, chief engineer and chief officer had been rescued by 00:15 the following day. Salvage contract was signed between *MV AMANI* and *Svitzer* who were appointed as Salvors.

The ship was carrying a cargo of 1700 cars and about 70 construction vehicles. All cargo was valued at \$37 million, with \$1 million worth of bunkers (owned by shipowner).

The first attempt to refloat the ship failed and was rescheduled for a later date but cancelled because more water than expected was discovered inside the vessel. About three days later *Svitzer Ferriby* managed to refloat *MV AMANI* assisted by high tide and strong winds. She was then taken in tow and moored approximately two miles east at Alpha Anchorage, in France, to await further salvage operations. Salvors managed to reduce list to 5° and towed her into Nantes – Saint Nazaire Port for repairs. The majority of cars were not damaged. All repairs done in dry dock amounted to **\$1.4 million**.

The investigation found that plans for the loading of the cargo had not been changed despite the change in itinerary. No calculation of the vessel's stability had been made. The weight of cargo on board had been underestimated, being 265 tonnes greater than estimated. The ship's ballast water system was not fully serviceable.

- 3.4.1 What is the keyword used for broadcasting a distress call on VHF radio? (2)
- 3.4.2 What is the name of a salvage contract signed by the Master of *MV AMANI* and Svitzer? (2)
- 3.4.3 If you were the master of the salvage tug, would you rather have invoked the SCOPIC clause? YES/NO. (2)
- 3.4.4 Give a reason for your answer to Question 3.4.3. (2)
- 3.4.5 Which organisation would have inspected and given permission for *MV AMANI* to be towed to Anchorage Alpha? CHOOSE: Flag State, Port State, Classification Society, P&I Club. (2)
- 3.5 *MV AMANI* had to go into dry dock to undergo hull repairs. If three metres on either side of the ship, and six metres ahead and astern were left open, what was the length and breadth of the dry dock? (4)
- 3.6 Which TWO organisations will declare a ship seaworthy after the repairs? (4)
- 3.7 What is the name of the insurance that will cover the medical bill of a crew member who broke his arm and leg? (2)
- 3.8 Calculate the share of general average payable by the ship owner for the repairs that amounted to \$1.4 million. (6)
- [100]**

QUESTION 4 INTERNATIONAL TRADE

- 4.1 With regard to the cargo shipment in Question 3, who is the:
- 4.1.1 Shipper (2)
 - 4.1.2 Carrier (2)
 - 4.1.3 Consignee (2)
- 4.2 It was agreed that the cargo of construction vehicles be shipped with Incoterm FAS (Free Alongside Ship). **Between the Master, Shipper, Carrier, Consignee and Agent**, who was responsible and liable for each of the following:
- 4.2.1 Driving the vehicles into the ship. (2)
 - 4.2.2 Ocean freight for cargo shipment. (2)
 - 4.2.3 Discharging the vehicles in Durban Harbour. (2)
- 4.3 4.3.1 Which important strait did *MV AMANI* sail through before entering the English Channel? (2)
- 4.3.2 Just after sailing through the English Channel, onto which sea or ocean did she enter? (2)
- 4.3.3 Without delays, how many days would *MV AMANI*'s voyage have taken? (6)
- 4.4 Sailing to Durban, *MV AMANI* will pass Cape Agulhas, an important convergence zone in maritime international trade.
- Write a note on the importance of Cape Agulhas as a Maritime convergence zone. Your note must include its strategic importance, cargoes that pass through the zone, and times when the zone was on the news. (10)
- 4.5 A South African agency division issued a statement of concern that in recent years there has been a 28.8% increase in the imports of cars into South Africa. They are concerned that this behaviour may see the country's local automotive industry collapse.
- 4.5.1 Which agency division issued the above statement? CHOOSE: Immigrations; Customs; Port health; or ISPS. (2)
 - 4.5.2 Explain what South Africa should do to ensure that the country's automotive (vehicle) industry continues to grow in size and in profitability. (8)

4.6 Agarwal Vehicle Distributors sold 120 cars to Gari Car Dealership in Kenya. They were exported in 40-foot containers (four cars per container) to Port of Lamu (Kenya). Ongoti Shipping Line (OSL) provided both the land-based transportation of the containers and the ocean leg, i.e., they provided the trucks from the shipper's premises to Durban Harbour, a ship to the Port of Lamu, and trucks from Lamu Port to the consignee's premises.

4.6.1 How many containers were used for this consignment? (4)

4.6.2 With a total freight of \$7800 per container, how much was payable for the shipment of all the containers? (4)

4.6.3 What type of bill of lading was issued by Ongoti Shipping Line, seeing that they were responsible for the land and ocean leg of the shipment? (2)

4.6.4 What is another name for the service provided by OSL from the shipper's premises to the consignee's premises? (2)

4.6.5 What information is found on the back of the bill of lading? (2)

4.7 The following is the schedule for the containerships belonging to Ongoti Shipping Line:

	OSEAAN	LEOATLE	LWANDLE	OCEAN
Cape Town	09–10 MAY	16–17 MAY	23–24 MAY	30–31 MAY
Gqeberha	11–12 MAY	18–19 MAY	25–27 MAY	01–02 JUN
Durban	14–17 MAY	21–24 MAY	28–31 MAY	04–07 JUN
Beira	19 MAY	26 MAY	02 JUN	09 JUN
Dar es Salam	21–22 MAY	28–29 MAY	04–05 JUN	11–12 JUN
Lamu	23–25 MAY	30–01 JUN	06–08 JUN	13–15 JUN
Mogadishu	28–29 MAY	04–05 JUN	11–12 JUN	18–19 JUN
Dar es Salam	04–06 JUN	11–13 JUN	18–20 JUN	25–27 JUN
Durban	10–11 JUN	17–18 JUN	24–25 JUN	01–02 JUL
Cape Town	15–16 JUN	22–23 JUN	29–30 JUN	06–07 JUL

4.7.1 Assume that *MV AMANI* arrived in Durban at 07:40 on 27 May. Which is the earliest ship that was used for the shipment of the containerised cars? (4)

4.7.2 How many days was the voyage, from time of departure to arrival at Lamu? (4)

4.7.3 If it took one day for the containers to reach Gari Car Dealership in Lamu from the port, when did they arrive at their final destination? (4)

4.7.4 How many South African ports does Ongoti Shipping Line serve? (2)

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QUESTION 5 MARINE ENVIRONMENTAL CHALLENGES

- 5.1 *MV AMANI* encountered fog off the Namibian coast towards the South African West Coast. Explain how this fog was formed. (6)
- 5.2 5.2.1 Besides overfishing, which TWO other acts by ships and humans may disrupt the marine ecosystem? (4)
- 5.2.1 Explain why overfishing is such an unwanted act. (6)
- 5.2.2 Give TWO practical actions that can be taken to eradicate overfishing. (4)
- 5.3 Give the correct term for each of the following:
- 5.3.1 A tropical revolving storm when experienced in the Far East region. (2)
- 5.3.2 Cargo that cannot be loaded in rain. (2)
- 5.3.3 The unit of measurement for wind speed at sea. (2)
- 5.3.4 The apex predator in the marine food chain. (2)
- 5.3.5 South African port built on a river mouth. (2)
- [30]**

Total: 300 marks