NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2021

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.

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 interest to write legibly and to present your work neatly.

QUESTION 1

Answer these on ***the special Answer Sheet*** that is provided. Place an X in the block next to 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 with steam turbine propulsion systems that are fuelled by …

A liquefied petroleum gas.
B marine diesel oil.
C kerosene.
D marine gas oil.

1.2 How many navigating officers are usually assigned to a large containership?

A Six
B Four
C Two
D Five

1.3 From the list below, the country with most merchant ships on its register is …

A the United States.
B India.
C the Marshall Islands.
D Panama.

1.4 A ship is registered in Panama but is owned by a Japanese company. In this case, Panama is known as a …

A national flag.
B flag of convenience.
C foreign ship's register.
D flag of arbitration.

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

A P&I Club.
B H&M Insurer.
C Lloyd's Association.
D Classification Society.

1.6 A containership sails from Japan to San Francisco and then to New York. Through which of the following will she pass?

A Suez Canal
B Straits of Malacca
C Kiel Canal
D Panama Canal

1.7 What type of insurance would cover an injury to a stevedore when the ship's gangway broke while he was legitimately boarding the ship?

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

1.8 What type of insurance would cover damage to a grain cargo resulting from a leaking hatchcover?

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

1.9 A ship has suffered a serious breakdown in her main engine. What type of insurance would cover the costs of chartering a tug to tow her into port?

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

1.10 What type of insurance would cover damage to cargo inside a container?

A Cargo Insurance
B TT Club
C P&I Club
D Hull & Machinery

1.11 The 1978 STCW Convention was ratified in 2010 at a conference in …

A Manila.
B London.
C Hong Kong.
D Singapore.

1.12 A south-westerly wind of constant speed and blowing in the north-western part of the Indian Ocean in the northern hemisphere's summer months is known as a/an …

A cyclone.
B monsoon.
C mid-latitude cyclone.
D Indian Doctor.

1.13 Between the North Sea and the English Channel lies the …

A Baltic Sea.
B Strait of Dover.
C Norwegian Sea.
D Kiel Canal.

1.14 The Incoterm that indicates that the costs of carrying the cargo from the shipper's (consignor's) premises to the consignee's premises will be paid by the consignee.

A FOB
B EXW
C CIF
D DDP

1.15 The Incoterm that indicates that the costs of moving cargo from the shipper's (consignor's) premises until it is aboard the ship will be paid by the shipper.

A FOB
B FAS
C EXW
D FAS

1.16 The following was a major reason for doing away with wind propulsion in cargo ships.

A It is a renewable resource.
B It is a constant energy source.
C Some voyages took a long time.
D Ocean currents often flowed against the ship.

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 Mate's Receipt.

1.18 The cruise ship industry has suffered a setback because …

A the airline industry now carries most passengers.
B of Covid-19.
C passenger fares became too high.
D governments refused to vaccinate passenger ship crews against Covid-19.

1.19 The South African port that has been renamed Gqeberha is …

A East London.
B Richards Bay.
C Port Elizabeth.
D Saldanha Bay.

1.20 The apex predator in the marine food chain is the …

A blue whale.
B great white shark.
C orca.
D whale shark.

1.21 The main problem caused by an oil spill in mid-ocean is that …

A it kills dolphins.
B it kills phytoplankton.
C it pollutes river estuaries.
D the oil sinks to the seabed and kills bottom-feeding creatures.

1.22 An international code in terms of which ships must have regular man-overboard drills is …

A SOLAS.
B STCW 78/2010.
C ISM.
D ISPS.

1.23 If a ship loads to her summer load line, she cannot steam …

A from Brazil to Nigeria in July.
B from Japan to San Francisco in winter.
C via Cape Horn in winter.
D via Cape Agulhas in winter.

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.

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.

1.26 The term for the area where containers are kept just before they are to be loaded aboard a ship is the …

A container depot.
B container wharf.
C container store.
D container stack.

1.27 The controlled tonnage of number of fish that may be caught in a given period by a particular fishing company is called a …

A fishing allocation.
B fishing right.
C fishing licence.
D fishing quota.

1.28 A ship steaming from Walvis Bay to Cape Town will …

A steam against the Benguela Current.
B steam against the Agulhas Current.
C steam with the Agulhas Current.
D steam with the Benguela Current.

1.29 A water body that is totally outside the tropical area is the …

A Arabian Sea.
B Caribbean Sea.
C Tasman Sea.
D Red Sea.

1.30 Conditions associated with a mid-latitude cyclone may affect shipping near …

A Maputo (Mozambique).
B Rio de Janeiro (Brazil).
C Fremantle (Western Australia).
D Miami (Florida, USA).

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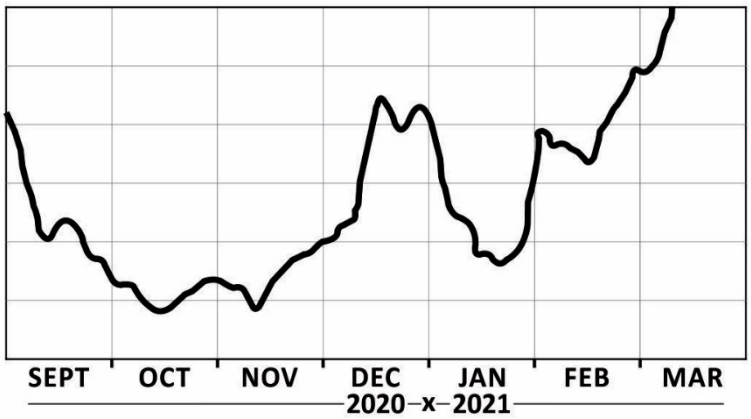
QUESTION 2 THE MARITIME WORLD

2.1 The graph below represents the Baltic Dry Index for the last part of 2020 and the first part of 2021. It shows changes in the freight rates for transporting various bulk cargoes. Study the graph and answer the questions set.



2.1.1 In which month was the lowest index (value) reached? (2)

2.1.2 The rise late in 2020 did not last long. In which month – after that – did the greatest drop in rates occur? (2)

2.1.3 If you were the owner of a handysize bulk carrier in March 2021, would you have been worried about the rates applicable to your ship? Answer YES or NO. (2)

2.1.4 Explain your answer to Question 2.1.3. (4)

2.1.5 Give three factors that might cause the freight rates for steel to be different when you compare freight rates from Port A to Port B with the freight rates from Port A to Port Z. (6)

2.1.6 Here are the numbers of ships calling at Port A. Apart from other cargoes, grain is exported via the port. A steel mill was built to process locally mined iron ore. Among the products of that steel mill are pig iron, steel plating (sheets), rolled steel, railway lines and steel bars (3 metres long and 20 cm high).

	2014	***2015***	***2016***	***2017***	***2018***	***2019***	***2020***
Container ships	350	368	387	750	825	911	1010
Handysize bulk carriers	090	092	102	201	242	260	281

(a) In which year did the steel mill begin production? (2)

(b) Give a reason for your answer to Question 2.1.6 (a). (2)

(c) What term is given to the kind of cargo that this steel mill produces? (Two words) (2)

(d) What type of cargo – produced by the steel mill – would be easiest to containerise? (2)

(e) What was the average number of calls each week by bulk carriers in 2019? (4)

(f) Some of the bulk carriers will call only to load rolled steel in one or two holds because they have loaded other cargoes at other ports, e.g. two holds of manganese at Port C; one hold of bagged grain at Port D; one hold of chrome ore at Port E. We say that the rolled steel is a … cargo. What word is missing here? (2)

2.2 *Ocean Pilot* is a geared handysize bulk carrier with a loaded summer draught of 10 metres and a depth of 14 metres.

2.2.1 What is her freeboard when she is fully loaded to her summer loadline? (4)

2.2.2 *Ocean Pilot* has a main engine that uses heavy fuel oil. Explain why this form of propulsion is better than that of an earlier ship of the same name that had coal-fired boilers and was steam-propelled. (6)

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QUESTION 3 SHIPPING OPERATIONS

3.1 Here are further details about the bulk carrier *Ocean Pilot* and her charter:

Port of Registry		Singapore
Owner		Elbe Shipping, Hamburg, Germany
Managers		Arbeit Ship Management, Hamburg
Charter details		She is on **voyage charter**, fixed by Sanjay Shipbrokers, Mumbai, India. Her charter begins at 00:01 on 20 October.
Insurers	H&M	Saxony Maritime Insurers, Hamburg
	P&I	Northern P&I Club
	FFO	Atlantic Insurance Company, London
Origin of Cargo		No 1 Hold Tweendeck: 1 800 tons rolled steel Lower hold: 2 160 tons steel plating No 2 Hold 4 800 tons rolled steel No 3 Hold 4 900 tons steel plating No 4 Hold 5 400 tons rolled steel No 5 Hold 5 500 tons steel plating
Port rotation		Cochin then Mumbai, India
Discharge ports		All rolled steel: Cochin, India to be trucked to Cochin Steel Company All steel plating: Mumbai, India, to be railed to Tiger Steel Distributors, Tendulabad

3.1.1 Study the details given above.

(a) Give an example of the type of incident that would be covered by Atlantic Insurance Company. (2)

(b) Explain why a shipowner may want to flag his ship out. (8)

(c) Has *Ocean Pilot* been flagged out? Answer YES or NO. (2)

(d) Explain your answer to Question 3.1.1 (c). (4)

(e) Why has the rolled steel been loaded in the tweendeck and the steel plating in the lower hold? (4)

3.1.2 The following relates to the expected arrangements when the cargo is loaded in Japan:

- Loading rates: Steel plating 50 tons per hour
Rolled steel 60 tons per hour.
- Loading is scheduled to begin at 08:00 on 20 October.
- Loading will be on a 24-hour basis apart from the breaks mentioned below.
- Breaks (tea breaks, lunch, change of shift, etc.) are expected to total 10 hours for the duration of the loading process.
- A typhoon is forecast to pass to the east of Osaka but its effects are likely to cause no loading to be done from 19:00 on 21 October to 22:00 on 22 October.
- Lashing of the steel is expected to continue for about nine hours after completion of loading.
- Before she can sail, various clearance procedures are expected to take two hours **once the lashing has been completed**.

(a) How many hours will it take to complete the loading of the cargo, **including breaks and other stoppages**? If necessary, round off to the NEXT hour, e.g. 22.2 becomes 23 hours. ***(Be careful and note that cargowork involves five holds and that the ship is working with her own cranes.)*** (6)

(b) When is the lashing of the cargo expected to be finished? (6)

(c) When is she expected to sail from Osaka? (6)

3.2 The following information relates to *Ocean Pilot's* voyage from Osaka to India.

Note: Irrespective of your answers to the previous calculations, assume that she was in Osaka for six days.

Operating costs		$30 000 per day
Bunker capacity	HFO	1 880 tons
Fuel consumption	HFO (at sea and at anchor)	36 tons per day
	MDO (all days)	3 tons per day
	Note that she took a full stem of bunkers to Osaka.	
Budgeted fuel costs	HFO	$350 per ton
	MDO	$456 per ton
Port costs	Osaka	$249 000 (for entire period)
	Cochin	$209 000 (for entire period)
	Mumbai	$202 000 (for entire period)
Steaming time	Osaka to Cochin	14 Days
	Time at anchor outside Cochin	3 Days
	Cochin to Mumbai	5 Days
	Time at anchor outside Mumbai	2 Days
Time in port	Cochin	7 Days
	Mumbai	8 Days PLUS one day cleaning holds
Sundry Costs		$290 000

3.2.1 How many days will *Ocean Pilot* be on charter? (6)

3.2.2 The charter will end at 23:59 on the day she finishes cleaning holds in Mumbai. When will the charter end? (6)

3.2.3 What will be the operational costs for the voyage from the time the charter begins to the time it ends in Mumbai? (6)

3.2.4 What will be the fuel costs for the voyage from the time the charter begins to the time it ends in Mumbai? (6)

3.2.5 What will be the port costs for the voyage from the time the charter begins to the time it ends in Mumbai? (6)

3.2.6 What will be the total cost for the voyage from the time the charter begins to the time it ends in Mumbai? (6)

3.2.7 Look at the port costs in Osaka. If US$1 = 109 Yen (the Japanese currency) how much money (in Yen) will the agent have to transfer to the bank account of the Port of Osaka? (6)

3.3 How many tons of heavy fuel oil (HFO) are expected to be left when *Ocean Pilot* berths in Mumbai? (6)

3.4 While on passage between Osaka and Cochin, a crewmember falls and breaks his leg. The ship needs to divert to the nearest port in Taiwan to land the injured crewmember. When the ship is in range, a Taiwanese naval launch will come out to the ship to take on the crewmember and to take him ashore where the hospital is preparing to receive him. At 14:30 local time on 2 November, the Master sends the following message to Port Control at the Taiwanese port to relay to the naval authorities:

PRESENT POSITION 72 NAUTICAL MILES EAST NORTH EAST RENDEZVOUS POSITION*. PRESENT SPEED 16 KNOTS. WILL HAVE PATIENT IN STRETCHER READY FOR DISEMBARKATION USING MY SHIP'S CRANE.

*rendezvous position: the position where the launch will meet the ship.

3.4.1 From the time the message was sent, how long will it take the ship to reach the rendezvous position? (6)

3.4.2 What time will the ship reach that position? (6)

3.4.3 The total deviation to rendezvous with the launch is expected to take nine hours. Will the ship be off hire during this time? Answer YES or NO. (2)

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QUESTION 4 INTERNATIONAL TRADE

4.1 Study the cargo details given in Question 3.1. Who is …

4.1.1 the carrier for the rolled steel cargo? (2)

4.1.2 the consignee for the steel plating? (2)

4.2 How many original Bills of Lading will be issued in Osaka for these cargoes? (2)

4.3 Assume that the rolled steel cargo was carried *CIF* (the INCOTERM for *Cost of Insurance and Freight*). Choosing your answers from either SHIPPER or CARRIER OR CONSIGNEE, who pays for each of the following?

4.3.1 the costs of loading the rolled steel in Osaka. (2)

4.3.2 the costs of railing the steel plating from Mumbai to the ultimate destination. (2)

4.3.3 the costs of insurance on the rolled steel cargo (2)

4.4 Between Osaka and Cochin that is on the south-western coast of India, the ship will pass through a major strait to the north-west of Singapore.

4.4.1 Name the strait through which she will pass. (2)

4.4.2 Once the ship has passed through that strait, into which ocean will she steam? (2)

4.4.3 Why is that strait extremely important for countries such as China, Japan and Korea? (There are at least three reasons for this importance.) (6)

4.5 A government wishes to expand the steel industry in that country.

4.5.1 What steps can it take to discourage and reduce the importation of steel products from other countries? (6)

4.5.2 How will these steps – taken by that government – affect shipowners and operators, and shipping in general? (Think widely before attempting to answer this question.) (10)

4.6 At all ports, strict measures are now in place to improve security.

4.6.1 What is the IMO Code that was introduced in 2004 to enforce the tightening of security at ports? (2)

4.6.2 What major incident caused the implementation of that IMO Code? (2)

4.7 *Ocean Pilot* is registered in Singapore.

4.7.1 Where is Singapore? (2)

4.7.2 What role will the Singaporean maritime authorities play regarding the fact that this vessel (and hundreds of others) is registered there? (10)

4.7.3 Can the Singaporean maritime authorities stop a fully seaworthy ship from moving through Singaporean waters on a voyage from Argentina to Japan and on a genuine innocent passage? Answer YES or NO. (2)

4.7.4 Give two incidents that will cause a maritime authority to order a ship to leave that country's territorial waters. (4)

4.8 Why do countries have an economic exclusion zone that in many cases extends to 200 nautical miles off the main points along the coast? (4)

4.9 The Strait of Hormuz is a very important strait in shipping. Explain why it is so important to the world's economy and to the Gulf to its north-west. (10)

4.10 *Ocean Pilot* will berth in the Indian port of Cochin. Prior to her arrival, her agent will contact Port Control at Cochin to arrange a suitable berth for her. List three important pieces of information that the agent will need to tell Port Control to ensure that she can berth safely to discharge her cargo of rolled steel. (6)

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QUESTION 5 MARINE ENVIRONMENTAL CHALLENGES

5.1 Plastic pollution of the oceans has become a significant problem.

5.1.1 What is the source of most of this plastic – WASTE DUMPED FROM SHIPS or WASTE THAT ORGINATES FROM LAND SOURCES? (2)

5.1.2 Why is plastic such a problem in the ocean? (4)

5.2 The loading of *Ocean Pilot* in Osaka was delayed by a typhoon.

5.2.1 Give two regions (other than Asia) where these storms are experienced, and provide the names by which those storms are known in those regions. (8)

5.2.2 Explain why these storms can have a serious effect on ships at sea. (6)
[20]

Total: 300 marks