



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2011

MARITIME ECONOMICS

Time: 3 hours

300 marks

PLEASE READ THESE INSTRUCTIONS CAREFULLY

1. This question paper consists of 10 pages and an Addendum Booklet of 3 pages (i – iii). Please remove the Addendum Booklet from the middle of the question paper. Please check that your paper is complete.
 2. Answer all questions.
 3. Read the questions carefully before answering.
 4. It is in your interest to write neatly.
 5. Where calculations are involved, all working must be shown.
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QUESTION 1 THE MARITIME WORLD

- 1.1 When *Titanic* sank after striking an iceberg during her first trans-Atlantic voyage in April 1912, dozens of officers and ratings in the engineroom died. She needed such a large number of people in the engineroom to ensure that her furnaces received enough fuel for her 29 boilers.
- 1.1.1 What fuel was used in ships of that time? (2)
- 1.1.2 What type of propulsion did she have? (2)
- 1.1.3 *Titanic* was a large passenger ship with over 1 000 passengers on board. What type of engine would a large modern passenger ship have? (2)
- 1.1.4 A large modern passenger ship has fewer engineroom personnel than *Titanic*. Explain why this is possible. (6)
- 1.1.5 She was steaming from Southampton (Britain) to New York (USA). Which ocean did she cross? (2)
- 1.1.6 She hit the iceberg about a day's steaming from New York. It is thought that the iceberg had drifted in the Labrador Current from the waters around Greenland. In which direction did the iceberg drift to be in that area? (2)
- 1.1.7 What other navigational hazard do ships encounter when steaming in an area where cold and warmer waters mix? (2)
- 1.2 Give two ways in which the change to steam propulsion assisted shipping. (4)
- 1.3 Read the extract from *Lloyd's List – Keep Suez Canal Open*, provided as **Addendum One**, and answer the questions set. Bear in mind that it was written early in 2011 at the start of the political crisis in Egypt.
- 1.3.1 Why were shipping people 'watching the broadcasts ... with an anxiety not shared by colleagues in other sectors'? (8)
- 1.3.2 What alternative route is available to ships if the Suez Canal were to close? (2)
- 1.3.3 Why is it important for Egypt that the canal remains open? (4)
- 1.3.4 What steps did the Egyptian government take to ensure that the canal remained open, despite the unrest in the country? (2)

- 1.4 Study the two graphs relating to shipping passing through the Suez Canal, provided as **Addendum Two**, and answer the questions set.
- 1.4.1 To which sector of shipping is the Suez Canal most important? (2)
- 1.4.2 Look at the graphs showing the tonnes of LNG cargo passing through the canal and showing the number of LNG vessels passing through the canal. What does this tell you about the size of the LNG vessels passing through the canal? (2)
- 1.4.3 Explain your answer to Question 1.4.2. (4)
- 1.5 Some of the major sources of the world's seafarers are Philippines, China, India and Eastern Europe. Explain each of the following:
- 1.5.1 The decline in seafaring as a career in previously major seafaring nations such as Britain, Netherlands and Norway. (6)
- 1.5.2 The reasons for countries such as Philippines, China, India and Eastern Europe supplying most of the world's seafarers. (6)
- 1.5.3 Suggest one method of encouraging more South Africans to follow a career at sea. (2)
- [60]**

QUESTION 2 SHIPPING OPERATIONS

2.1 Here are some details about the bulk carrier *North Sea*:

She has five holds, a bulbous bow, and her accommodation and engine room are aft.	
Length	182 metres
Loaded Draught	12 metres
Freeboard when loaded	5 metres
Owner	Northern Shipping, Oslo, Norway
Managers	Eastern Ship Management, Hong Kong
Charterer	Western Charterers, Johannesburg, South Africa
She is on a time charter for six months during which she is expected to make 4 laden voyages carrying rolled steel from Durban to Mumbai. She is on her first voyage, and the time on charter can be extended if delays are encountered.	
Insurers Hull & Machinery	Norway General
P & I	West of England
Port of Registry	Panama
Classification Society	Det Norske Veritas
Cargo	36 120 tons of rolled steel (Each roll of steel is 14 tons)
Cargo distribution	No 1 Hold 5 600 tons No 2 Hold 7 000 tons No 3 Hold 7 840 tons No 4 Hold 8 400 tons No 5 Hold 7 280 tons
Each hold has a crane.	
Origin of Cargo	Vaal Steel, Vereeniging, Gauteng, South Africa
Loading port	Durban
Discharge Port	Mumbai, India, for onward transport by rail
Destination of Cargo	Delhi Steel, Delhi, India
Value of Ship	\$50 million
Value of Cargo	\$30 million
Value of Bunkers on board	\$220 000

- 2.1.1 Who is the consignee of this cargo of rolled steel? (2)
- 2.1.2 What type of bulk carrier is *North Sea*? There are TWO parts to this answer. (4)
- 2.1.3 How many rolls of steel will she carry on this voyage? (6)
- 2.1.4 Assume the following when the cargo is loaded in Durban:
 - Loading will be done by the ship's cranes at an expected rate of 6 rolls of steel an hour **by each crane**.
 - Holds will be loaded at the same time.
 - Loading in all holds will begin at 08:00 on 24 November and continues 24 hours a day, except for the breaks mentioned below.
 - Breaks (tea breaks, change of shift, etc.) are expected to total 16 hours for the duration of the loading process.
 - A planned strike in Durban will mean that no loading will be done from 05:00 on 25 November to 05:00, 27 November.
 - Before she can sail, checking of the cargo lashings and securing of the hatchcovers will take about six hours **once cargowork has been completed**.

- (a) How many hours will it take to **complete the loading** of the cargo, **including breaks but excluding the other stoppages**? Round off to the NEXT hour, e.g. 22.2 becomes 23 hours. *NB: Remember that the holds are loaded at the same time.* (8)
- (b) How many hours will the entire loading process take? **Include breaks and other stoppages.** (6)
- (c) When will the loading of the cargo be finished? (6)
- (d) Assume that the agreed laytime is 120 hours, including breaks, but excluding other stoppages. Will the loading process take longer than the agreed time? Answer YES or NO. (2)
- (e) Which will be payable: demurrage or dispatch? (2)
- (f) Who will be liable for payment? Choose your answer from: SHIPOWNER or CHARTERER or AGENT. (2)
- (g) When will the ship sail from Durban? (6)

2.1.5 Assume that the cargo was carried FOB (the INCOTERM for free on board). **Choosing your answers from either SHIPPER or CONSIGNEE**, who pays for the following?

- (a) The costs of loading of the cargo of rolled steel in Durban (2)
- (b) The ocean freight costs between Durban and Mumbai (2)
- (c) The insurance of the cargo between Durban and Mumbai (2)

2.2 On her voyage from Durban to Mumbai, *North Sea* encounters very heavy weather in the Mozambique Channel as a result of a tropical cyclone in the area. Some of the cargo breaks loose and the ship develops a 15-degree list to starboard. It is apparent that no. 2 hatchcover has been damaged by the heavy seas and, with the ship listing in the heavy weather, no. 2 hold is flooded.

Because of the adverse weather and the serious danger posed to his ship, the master gives a mayday call.

Operating on a Lloyd's Open Form, the salvage tug *Storm Petrel* arrives at the scene, but because of the weather conditions, is unable to put up a towing line immediately. The tug stands by and 24 hours later, the weather moderates so that the towing wire can be connected.

The tug, with *North Sea* in tow, arrives off Durban at 06:30 on 8 December.

Before she is permitted to enter the harbour, several surveyors board by helicopter to assess her condition.

As there is no danger that she will sink and no danger of pollution, she is allowed to enter the harbour. The pilot boards that afternoon and she berths in Durban harbour. The cargo that had shifted is restowed and secured, but as surveyors have condemned the cargo in no. 2 hold, it is discharged and new rolls of steel are loaded. The water in the hold is pumped out.

She sails for Mumbai on 22 December.

- 2.2.1 Draw a diagram in which you show what the term *listing* means in the context of what happened to *North Sea*. (4)
- 2.2.2 Which three organisations would have sent surveyors to inspect the vessel off Durban? (6)
- 2.2.3 Who would pay for the damage to the steel cargo in number two hold? (2)
- 2.2.4 Do you think that General Average would be declared in this case? Answer YES or NO. (2)
- 2.2.5 Explain your answer to Question 2.2.4. (8)
- 2.2.6 What is meant by the term Lloyd's Open Form? (4)
- 2.2.7 Is the tug owner entitled to claim salvage for this operation? Answer YES or NO. (2)
- 2.2.8 Give a reason for your answer to Question 2.2.7. (2)
- 2.2.9 Assume the ship had sunk before the arrival of the tug, and that the crew had abandoned ship, taking to the lifeboats. Assume also that a hatchcover and other debris had been floating in the water. Assume also that a considerable amount of oil pollution had occurred.
- (a) What would the tug's first task have been once she arrived at the scene? (2)
- (b) Why would the tug owner have invoked SCOPIC if the ship had sunk? (4)
- 2.2.10 If a dispute arises about the salvage, it is resolved by a special legal process.
- (a) What is the term for that legal process? (2)
- (b) Where is the court that hears most of these legal disputes over salvage? (2)
- 2.3 The Flag State of this ship is Panama.
- 2.3.1 Where is Panama? (2)
- 2.3.2 Has she been *flagged out*? Answer YES or NO. (2)
- 2.3.3 Explain your answer to Question 2.3.2. (4)
- 2.3.4 What is the role of the flag state of this ship in connection with each of the following aspects?
- (a) Her construction (4)
- (b) From the time she arrives under tow in Durban until she sails (4)

- 2.4 Write a newspaper article (about 150 words) on the salvage of *North Sea*. In your article, include comments about the weather from the master of *North Sea*, and comments from the tugmaster in which he describes the difficulty in taking *North Sea* in tow. (14)
[120]

QUESTION 3 INTERNATIONAL TRADE

- 3.1 Study the map that is provided as **Addendum Three** and answer the questions set.

Notes:

- *SUMED Pipeline runs from the southern end of the Suez Canal to the northern end of the canal. Large tankers with a draught that is too deep for them to pass through the canal can discharge part of their cargoes at the southern end of the pipeline and then move through the canal to re-load the cargo at the northern end of the canal. Some large tankers discharge their entire cargo at the southern end of the canal. It is pumped through the pipeline and loaded by another tanker at the northern end of the pipeline for onward movement to Europe.*
- *b/d = barrels of oil per day.*

- 3.1.1 Of the three maritime choke points shown on the map, which is most important in terms of the amount of crude oil that passes through it? (2)
- 3.1.2 What is the sea through which a tanker will pass from Bab el Mandab to the Suez Canal? (2)
- 3.1.3 What is the gulf into which a tanker will pass when steaming from east to west through the Straits of Hormuz? (2)
- 3.1.4 Assume that 10 barrels of oil = 1 ton of oil (approximately). Assume also that the average cargo capacity of tankers carrying crude oil passing through the Straits of Hormuz is 100 000 tons. How many tankers carrying crude oil will pass through the Straits of Hormuz in one day? (*Round off your answer to the next full figure, e.g. 42,2 = 43.*) (6)
- 3.1.5 Explain why 16 million barrels of oil pass through the Straits of Hormuz each day, but only 2 million barrels of oil pass through the Suez Canal (including some oil that is produced in North Africa or in the Black Sea area and is moved to the east). (8)
- 3.1.6 How would the closure of the Suez Canal affect the tanker industry? (8)
- 3.1.7 With reference to your answer to Question 3.1.6, explain how a closure of the Suez Canal would affect each of the following:
- (a) Global bunker prices (4)
- (b) The price of goods in a supermarket in London (4)
- (c) Port congestion in South Africa (4)
- 3.1.8 Apart from oil and oil products, give two other cargoes that pass through the Suez Canal on a daily basis. (4)

- 3.2 The present limits to the size of ships that can pass through the Panama and Suez Canals are as follows:

	Length	Beam	Draught
Panama Canal	274,3 m	32,3 m	11,28 m
Suez Canal	No restriction	70,0 m	19,50 m

Look at the *Lloyd's Register* extract listing a number of tankers (shown in **Addendum Four**).

- 3.2.1 In terms of a charterparty, the vessel taken on charter needs to pass through both canals during her voyages. The vessel to be chartered must also have a summer deadweight of at least 120 000 (see column 3) and a heavy fuel capacity (hvf) of at least 3 200 tons (see last column). Will any of the tankers fit the requirements of the charterparty? (6)
- 3.2.2 Look at the entry for *British Reliance*.
- (a) What is her length overall? (2)
- (b) What is her loaded draught? (2)
- (c) If she were chartered to move oil from the area to the west of the Straits of Hormuz to Europe, which route would she have to take? (6)
- (d) Give a reason for your answer to Question 3.2.2.(c). (2)
- 3.3 Assume that a Port State Control official inspects a ship and finds that there is non-compliance with the STCW 95 code.
- 3.3.1 What does STCW 95 mean? (2)
- 3.3.2 Give two examples of non-compliance in terms of this code. (4)
- 3.3.3 What steps will be taken against the ship if she does not comply with the requirements of this code? (6)
- 3.3.4 In South Africa, which organisation undertakes Port State Control inspections? (2)
- 3.4 Provide the information required for each of the following:
- 3.4.1 The organisation that controls world shipping. (2)
- 3.4.2 The international code in terms of which the disposal of waste at sea is controlled. (2)
- 3.4.3 The international code in terms of which the number of lifeboats is determined for a new ship. (2)
- 3.4.4 The mark (on the side of a ship) that indicates the depth to which a ship may be loaded. (2)
- 3.4.5 Refer to your answer to Question 3.4.4. What do the letters WNA indicate on that mark on the side of the ship? (2)
- 3.4.6 The international code that governs the movement of cargoes by sea. (2)
- 3.4.7 The major problem affecting ships steaming through the Gulf of Aden. (2)

QUESTION 4 MARINE ENVIRONMENTAL CHALLENGES

4.1 The weather forecast giving details of the tropical cyclone that caused the damage to *North Sea* is as follows:

MOZAMBIQUE CHANNEL

**** GALE WARNING ****

TROPICAL CYCLONE DENISE MOVING IN SOUTH WESTERLY DIRECTION IN MOZAMBIQUE CHANNEL

NE GALE GUSTING 85 KNOTS AT TIMES FROM LATITUDE 14 DEGREES SOUTH TO LATITUDE 22 DEGREES SOUTH

WEATHER OVERCAST WITH RAIN, HEAVY AT TIMES

WIND NE GALE FORCE GUSTING 85 KNOTS AT TIMES, MODERATING LATER BUT REMAINING GALE FORCE

VISIBILITY POOR IN RAIN AND IN AREAS AFFECTED BY TROPICAL CYCLONE DENISE

SEA SWELL UP TO 10 METRES, ESPECIALLY IN THE NORTHERN PART OF MOZAMBIQUE CHANNEL, MODERATING TO 6 METRES LATER

4.1.1 Explain the following terms:

- (a) NE gale gusting 85 knots at times (6)
- (b) Moderating later (2)
- (c) Visibility poor in rain (2)

4.1.2 What causes the heavy swell? Choose your answer from: WIND or RAIN or GRAVITY. (2)

4.1.3 Approximately how long would it take for a tropical cyclone to pass over a point? Choose your answer from: 12 HOURS or 48 HOURS or 4 DAYS. (2)

4.1.4 At the centre of a tropical cyclone, will you find a low pressure or a high pressure cell? (2)

4.2 Emissions from the funnels of ships have caused great controversy recently. Some people say that ships cause a great amount of air pollution, while others say that ships cause less air pollution than aircraft or vehicles or factories. Those who are sympathetic to shipping point out that the shipping industry has helped greatly over the years by introducing a number of measures to reduce air pollution. This includes 'cleaner' fuels, exhaust 'scrubbers' that reduce toxins from the funnel emissions, and shutting down engines while ships are in port, and running on electricity generated ashore.

4.2.1 What is the source of the 'emissions from the funnels of ship'? (2)

4.2.2 Do you think that the change from coal-fired ships to modern engines has helped reduce air pollution? Answer YES or NO. (2)

- 4.2.3 Give a reason for your answer to Question 4.2.2. (2)
- 4.2.4 Write a short letter to the editor of a maritime magazine in which you give your opinion regarding the criticism from those who say that the shipping industry is causing a lot of air pollution. (*NB: You need only give the content of your letter, not the addresses.*) (8)
- [30]**

Total: 300 marks