



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2015

MARITIME ECONOMICS

Time: 3 hours

300 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 9 pages and an Addendum of 2 pages (i – ii). Please check that your question paper is complete.
 2. Answer all the questions.
 3. Read the questions carefully before answering.
 4. It is in your own interest to write legibly and to present your work neatly.
 5. Where calculations are involved, all working must be shown.
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QUESTION 1 THE MARITIME WORLD

- 1.1 Coal-burning steamships were replaced by ships that either had oil-fired boilers that produced steam that turned a turbine, or by ships that were powered by internal combustion engines using heavy fuel oil. How did this change in propulsion affect **the design and operation of ship**? (8)
- 1.2 Later developments surrounding ships' engines have led to several improvements relating to environmental issues. Give three measures that have been taken **by ships' engine manufacturers and fuel companies** in recent years to make ships more environmentally 'friendly'. (6)
- 1.3 Study the graph relating to the growth of cargowork at Port A from 2001 to 2014. (See **Annexure 1** to the Question Paper – figures are in MILLION TONS) – and answer the questions set.
- 1.3.1 In which year was the export of iron ore shipments the greatest? (2)
- 1.3.2 What was the tonnage of iron ore exported in 2009? (2)
- 1.3.3 Between which years was the trend negative? (2)
- 1.3.4 Will the graph be pleasing to owners of Capesize ore carriers? Answer YES or NO. (2)
- 1.3.5 Give a reason for your answer to Question 1.3.4. (2)
- 1.3.6 What was the **percentage** growth (in tons) of iron ore exports from 2011 to 2014? (4)
- 1.4 The table below indicates the ships calling at Port X between the years 2008 and 2014. Answer the questions set. Each of the VLCC's brought about 260 000 tons of crude oil to the port for refining, and the product tankers (each of about 35 000 deadweight) took the oil products from the refinery to other ports.
- | <i>Ship Type</i> | <i>2008</i> | <i>2009</i> | <i>2010</i> | <i>2011</i> | <i>2012</i> | <i>2013</i> | <i>2014</i> |
|------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Product tankers | 105 | 110 | 104 | 155 | 188 | 204 | 212 |
| VLCCs | 65 | 59 | 62 | 104 | 118 | 122 | 131 |
- 1.4.1 How many product tankers berthed per week in 2010? (6)
- 1.4.2 What does the term VLCC mean? (4)
- 1.4.3 Judging from the figures given, when were the extensions to the refinery at the port completed? (2)
- 1.4.4 Give a reason for your answer to Question 1.4.3. (4)
- 1.4.5 Besides the extensions to the refinery, what other extensions would have had to be made at Port X to accommodate the additional ships? (4)
- 1.4.6 Look at the figures for product tankers and compare them to those for the VLCCs. From these figures, how do you know that much of the product from the oil refinery is used locally? (6)
- 1.5 Cabotage is the reservation of sea trade for ships registered in a particular country or group of countries. Explain how this system (cabotage) can help to employ seafarers of a country that has introduced cabotage. (6)

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QUESTION 2 SHIPPING OPERATIONS

2.1 The following are details about the vessel *Pacific Island*:

<i>Owners</i>	Island Shipping, Dublin, Ireland
<i>Charterers</i>	Ghusan-Liou Shipping, Shanghai, China (Voyage Charter)
<i>Port of Registry</i>	Limassol, Cyprus
<i>Classification</i>	Lloyd's Register 100 A1 LMC
<i>Insurance</i>	Hull & Machinery: Lloyds Covered by West Midland P&I Club
<i>Cargo</i>	180 000 tons graded coal
<i>Origin of Cargo</i>	Mpumalanga Coaling Company, Witbank
<i>Cargo Destined to</i>	Lu-shan Coal Company, Dalian, China
<i>Loading Port</i>	Richards Bay
<i>Discharge Port</i>	Dalian, China
<i>Charter begins</i>	00:01 15 January 2015 on arrival in Richards Bay
<i>Charter ends</i>	23:59 on day when holds have been cleaned in Dalian

2.1.1 Draw a sketch of the stern of *Pacific Island* as you would observe it when she is in port in Richards Bay. (8)

2.1.2 Which company is ...

- (a) the Consignee?
- (b) the Carrier?
- (c) the Shipper?
- (d) likely to be held responsible if the ship is delayed by two weeks following an engine breakdown? (8)

2.2 *Pacific Island* sailed from Richards Bay, but when she was three days out and 850 nautical miles from land, in calm conditions, she suffered an engine breakdown. Her master requested the salvage tug, *Powerful*, to come from Durban to tow her back to Richards Bay on a daily hire basis only at US\$24 000 per day. The tug took two days to reach her, and the return voyage to Richards Bay took four days. The bulk carrier was inspected by SAMSAs officials. They and the Port Captain of Richards Bay decided to allow the vessel to enter port. However, because she was fully laden, she could only berth at berths with a suitable depth of water, and had to wait at anchor for 8 days before a vacant berth was available. The tug was commissioned to stand by her in the anchorage for this time at US\$20 000 per day. Once she had berthed, shoreside engineers boarded to undertake repairs that took two weeks.

(Refer also to details provided in Question 2.1.)

2.2.1 What kind of marine insurance covers the costs of the tug's operation? (2)

2.2.2 Which two organisations would have had to declare the ship ready to return to service? (4)

2.2.3 Why is SAMSAs involved in this incident? (4)

2.2.4 List two functions of SAMSA, other than the role they played in this incident. (4)

2.2.5 The tug was hired on a daily hire basis.

(a) Would she have been able to claim for salvage? Answer YES or NO. (2)

(b) How many days was she on hire to tow *Pacific Island* to the **Richards Bay anchorage**? (6)

(c) Why was the tug chartered to stand by *Pacific Island* while she was at anchor? (4)

(d) What was the total cost of the tug's operations? *Be careful when doing these calculations.* (6)

2.2.6 What term is given for the period from the time *Pacific Island* broke down until she continued her voyage to Dalian? (2)

2.3 The following details refer to the **PLANNED voyage** of *Pacific Island* from Richards Bay to Dalian.

Daily charter rate	US\$28 000 (excluding fuel)
Estimated time in Richards Bay	4 days
Port costs in Richards Bay	US\$54 000 including tugs and pilotage
Estimated time in Dalian	9 days plus one day to clean holds.
Port costs in Dalian	US\$76 000 including tugs and pilotage
Days at sea (Richards Bay to Dalian)	28 days
Fuel consumption HFO	40 tons per day at sea
Fuel consumption MDO	03 tons per day in port and at sea
Fuel prices at Richards Bay	HFO: \$US382 per ton MDO: \$US476 per ton
Sundry cost for the voyage	US\$213 000

IN ALL YOUR CALCULATIONS, IGNORE THE FACT THAT SHE HAD TO RETURN TO RICHARDS BAY. I.E. DO YOUR CALCULATIONS FOR THE PLANNED VOYAGE.

2.3.1 Calculate the charter costs for the planned voyage. (Use the daily charter rate.) (6)

2.3.2 Calculate the port costs for the planned voyage. (6)

2.3.3 *Pacific Island* bunkered in Richards Bay. Calculate the fuel costs for the planned voyage. (6)

2.3.4 Calculate the total costs for the planned voyage to Dalian. (6)

2.3.5 If the currency exchange rate in South Africa was US\$1 = R11.55, what was the amount paid in South African rand to Transnet National Port Authority for the port costs covering the vessel's stay in Richards Bay? (6)

2.4 What type of vessel is *Pacific Island*? (Two parts to your answer.) (4)

- 2.5 *Pacific Island* is registered in Cyprus.
- 2.5.1 Where is Cyprus? (2)
- 2.5.2 What is the process called whereby an owner registers his ship in a country other than his own country? (2)
- 2.5.3 To many, the process you have named as your answer to Question 2.5.2 is not good. What are three positive reasons for a ship owner registering his ship in another country? (6)
- 2.6 The shipment of coal carried by *Pacific Island* was shipped CIF (cost of insurance and freight).
- 2.6.1 Who is responsible for payment for the costs of the ocean leg of the shipment process? Choose your answer from CONSIGNOR or CONSIGNEE or CARRIER. (2)
- 2.6.2 Who is responsible for payment for the insurance on the coal consignment from Richards Bay to Dalian? Choose your answer from CONSIGNOR or CONSIGNEE or CARRIER. (2)
- 2.7 In the charter party that was signed for the shipment of the consignment of coal (180 000 tons) from Richards Bay to Dalian, the agreed laytime to load the coal was 36 hours, and demurrage or dispatch of US\$3 000 per hour was agreed.
- 2.7.1 Loading of the coal averaged 4 000 tons per hour. How many hours did the loading take? (6)
- 2.7.2 Was demurrage or dispatch payable? (2)
- 2.7.3 How much was payable? (6)
- 2.7.4 To whom was the amount paid? For your answer, choose from OWNER or AGENT or CHARTERER or CONSIGNOR or CONSIGNEE (2)
- 2.7.5 A strike at Richards Bay delayed the loading process by 8 hours. Does this affect the laytime calculation? Answer YES or NO. (2)
- 2.8 Give the term for each of the following:
- 2.8.1 The process that comes into action if an abnormal expense in the course of a voyage (eg ocean towage) is incurred and each participant in that voyage (the owner, cargo owners and bunker owner) has to pay a proportion of the costs. (2)
- 2.8.2 The form of insurance that covers the loss of a container. (2)

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QUESTION 3 INTERNATIONAL TRADE

- 3.1 South African territorial waters extend 12 nautical miles from the major points along the coast. Although all ships have the right of innocent passage through any country's territorial waters, South Africa can take action against ships that contravene international maritime law in that area. Can South Africa intervene in each of the following incidents? Answer YES or NO to each question.
- 3.1.1 A ship is five nautical miles off Cape Point and known to be carrying illegal weapons. (2)
- 3.1.2 A ship that is carrying nuclear waste in special radiation-proof containers and is passing five miles off Cape Agulhas en route from France to Japan. (2)
- 3.2 In terms of international law, the STCW 95/2011 convention is important in matters to do with crewing. Indicate whether STCW 95/2011 covers each of the following: (Answer YES or NO.)
- 3.2.1 The prescribed minimum number of seafarers on a ship. (2)
- 3.2.2 The examinations set by a training institution for candidates for chief engineers' certificates of competency. (2)
- 3.3 The Panama Canal is being modified by the construction of additional larger locks that will allow commercial ships of up to 336 metres in length to pass through the canal. (The present maximum length for commercial ships is 274 metres and containerships of up to about 13 000 teu will now be able to pass through the enlarged canal.)
- 3.3.1 What term is given to a ship that can pass through the Panama Canal now? (2)
- 3.3.2 How will the opening of the new, larger locks at the Panama Canal change present trade routes for containerships, tankers and bulk carriers? (12)
- 3.3.3 The following 200-metre ships are scheduled to undertake the following voyages:
- SHIP A: Europe to San Francisco on the west coast of the USA
SHIP B: Europe to India
SHIP C: New York to Australia
- (a) Which of these ships will use the Panama Canal route as the shortest route? (4)
- (b) If any of these ships will use another route as the shortest route on her/their voyage(s), give the route (or routes) to be used. (4)

- 3.4 Atlantic Shipping wants to build a ship. A shipyard in country X has calculated that it will cost US\$50 million to build that ship, but the government of country X will provide a 20 per cent subsidy for the shipyard. In country Y, a shipyard has quoted US\$44 million for the ship because of lower labour costs and lower steel prices. The quality of the ships built in the two shipyards is of a high standard, and both shipyards have a reputation for keeping to delivery dates for ships that they have built. No subsidy is given to shipbuilding in country Y.
- 3.4.1 Give three reasons for country X subsidising shipbuilding. (6)
- 3.4.2 What is the actual cost of the ship to the shipowner if she is built in country X? (6)
- 3.4.3 Give three factors, *other than cost*, that a shipowner must consider before he decides where to build a ship? (6)
- 3.4.4 Where will Atlantic Shipping build its ship? Answer X or Y. (2)
- 3.4.5 The shipyard in country Y has also told Atlantic Shipping that if it orders three ships of the same specifications, the total cost will be US\$108 million. Explain why Atlantic Shipping might accept this offer and how they might be able to recover some of the cost of building three ships. (12)
- 3.5 Read the edited extract from an article in the *Cape Times* below and answer the questions set.

Note: *Aden is a port in Yemen, a country whose coastline lies on the Gulf of Aden and Red Sea.*

One of the most important shipping routes passes through the Gulf of Aden and the Red Sea. Yemen lies on the northern side of the Gulf of Aden and Somalia on the southern side.

ISIS is an extremist organisation whose forces have invaded parts of Syria and Iraq and have killed many innocent people in brutal ways. It has associated organisations in several other places.

Aden has a huge, safe natural harbour. It once was a major bunker port for hundreds of ships on Asia-Europe trades and some ships brought the coal for the old steamships; more recently, ships refuel alongside or at buoys with their heavy fuel or gasoil carried in undersea bunker pipes from shoreside tanks.

The 1967 closure of the Suez Canal drew the curtain on that busy trade. Already passenger ship services were dying, strangled by air travel, high fuel costs, the advances of containerisation, and the passing of the colonial era during which voyages to and from the colonies by ex-patriate civil servants gave the passenger ships good clientele.

The canal's reopening eight years later could not revitalise the struggling Aden to its former economic strength. Most of those shipping lines that once called regularly at Aden had been absorbed into large containership consortia that were formed in the 1960s and 1970s, while ship design had incorporated more efficient engines and larger fuel tanks to minimise bunker stops. Thus, fewer ships needed to call to bunker at Aden. Those large containerships, each of which had replaced five of the earlier conventional freighters, steam past Aden at 20 knots, and do not need to bunker there.

Perhaps the downturn in shipping and the consequent decline in Aden's economy engendered the insidious growth of extremism that has brought chaos to Yemen, and that has led to government buildings in Aden, including the power station, falling to forces said to be akin to ISIS. Because of the crisis, most countries have closed their embassies in Yemen and withdrawn their citizens.

Across the Gulf of Aden, many Somali pirate operations have been destroyed by more watchful naval patrols and armed guards aboard ships passing through those waters. The Somali government has also played a role in reducing pirate operations off its coast. However, with the collapse of the Yemeni government, a new and perhaps more sinister threat to shipping has emerged.

Piracy will seem Robin Hood-like in comparison to maritime operations by the vicious ISIS whose aim – if it got a foothold along the Gulf of Aden – would be to disrupt trade by attacking shipping in the Gulf of Aden, possibly forcing at least some ships to divert via the Cape route. Even their radical associates in Egypt would benefit if traffic through Suez was reduced, denying Egypt much of its most important revenue. As the firepower demonstrated by ISIS during its evil rampage through Syria and Iraq was as surprising as it was alarming, more sophisticated attacks on ships – via drones or even rockets – are entirely possible.

The mere threat of an attack can hike insurance surcharges that, with recently increased canal tariffs, could tip the balance in favour of some ships heading for the Cape. Serious attacks could cause many ships to flee the Gulf of Aden route in favour of the Cape.

- 3.5.1 What was the major role of Aden in shipping operations between Europe and Asia? (2)
- 3.5.2 Give two reasons for Aden being successful in that major role you have given in your answer to Question 3.5.1. (4)
- 3.5.3 Does the writer feel that the result of the present instability in Yemen could be worse than the impact of piracy? Answer YES or NO. (2)
- 3.5.4 Quote from the extract to support your answer to Question 3.5.2. (2)
- 3.5.5 According to the writer, what three factors contributed to the decline in piracy in the Gulf of Aden and along the Somali coast? (6)
- 3.5.6 Explain the possible impact of the instability in Yemen on shipping routes between Europe and Asia. (12)

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QUESTION 4 MARITIME ENVIRONMENTAL CHALLENGES

- 4.1 When steaming between the Sunda Strait and Dalian, *Pacific Island* receives the weather forecast shown below: (Look at **Annexure 2** to this question paper.)

WEATHER FORECAST: NORTH WESTERN PACIFIC OCEAN	
++++ TYPHOON WARNING ++++ TYPHOON WARNING ++++	
TYPHOON DEE-HAI (EYE IN POSITION 20.00 NORTH 130.00 EAST) MOVING AT 25 KNOTS NORTH-WESTERLY DIRECTION. ALL SHIPS CAUTIONED TO AVOID TYPHOON AND TO APPROACH NO CLOSER THAN 200 NAUTICAL MILES FROM EYE.	
WINDS	GALE FORCE 79 KNOTS NORTH-EAST, STRENGTHENING TO 85 KNOTS WITH PASSAGE OF TYPHOON. BACKING TO NORTH EAST AND DROPPING TO 60 KNOTS WITH PASSAGE OF TYPHOON.
	CALM IN EYE OF TYPHOON
SWELL	See Questions 4.1.1. and 4.1.2. below
WEATHER	HEAVY RAIN DURING PASSAGE OF TYPHOON.
VISIBILITY	See Questions 4.1.3. and 4.1.4. below.

The vessel's course and the isobaric systems are shown on the synoptic chart shown in Annexure 2 attached to this question paper. The ship's position is marked X.

- 4.1.1 Provide an appropriate description of the swell that would be forecast in the vicinity of the typhoon. (4)
- 4.1.2 What problems does this typhoon present to a ship within 200 nautical miles of the eye of the typhoon? (4)
- 4.1.3 What does the term **VISIBILITY** mean? (4)
- 4.1.4 Provide an appropriate description of the **VISIBILITY** that would be forecast. (4)
- 4.1.5 Look at Annexure 2. What will the ship's master need to do to ensure his vessel's safety? (4)
- 4.2 Explain why oil pollution is to be avoided by ships. (10)
- [30]**

Total: 300 marks