



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2012

MARITIME ECONOMICS

Time: 3 hours

300 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 12 pages. Please check that your paper is complete.
 2. Answer all the questions.
 3. Read the questions carefully before answering.
 4. It is in your own 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 For ships carrying supplies and scientists into polar regions, special attention has to be given to the type of fuel they use, and the emissions from the ships' funnels.
- 1.1.1 Name one gas that is emitted by ships and that might be considered harmful to the polar environment. (2)
- 1.1.2 Most polar supply ships use gas oil, a form of diesel that is very expensive when compared to heavy fuel oil used in other ships.
- (a) How will the information given in this question affect the operating costs of a modern polar supply ship? (4)
- (b) Why don't these ships use heavy fuel oil in their main engines? (2)
- 1.1.3 A polar supply ship needs to be at sea for 72-day voyages, and uses 45 tons of gas oil a day.
- (a) How many tons will she use during her voyage to the polar region? (6)
- (b) If her designers believe that there should be a 40 percent safety margin (i.e. she should be able to carry 40 percent more fuel than she needs), how many tons should her bunker tanks be able to carry? (6)
- (c) Why should she carry surplus fuel? (4)
- (d) How will the carriage of extra fuel affect her fuel consumption? (4)
- 1.2 The bulk carrier *Tasman Trader* (Length 220 m; Beam 30 m) needed to drydock urgently in Port X. She berthed in Port X at 00:01 on 12 November 2011, she finished discharging her grain cargo 5 full days later and she was ready for drydocking the following day. The drydocks in Port X are:

	<i>Length</i>	<i>Width</i>
Alpha Dock	302 m	59 m
Bravo Dock	262 m	42 m
Charlie Dock	182 m	35 m
Delta Dock	210 m	38 m

The following ships were booked already for the drydocks:

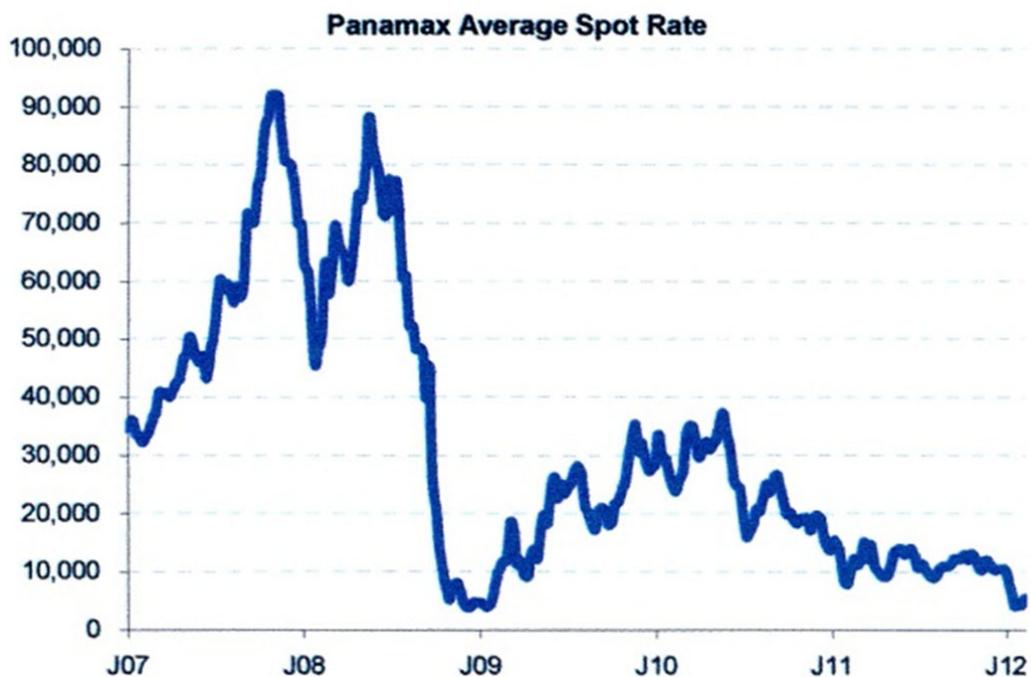
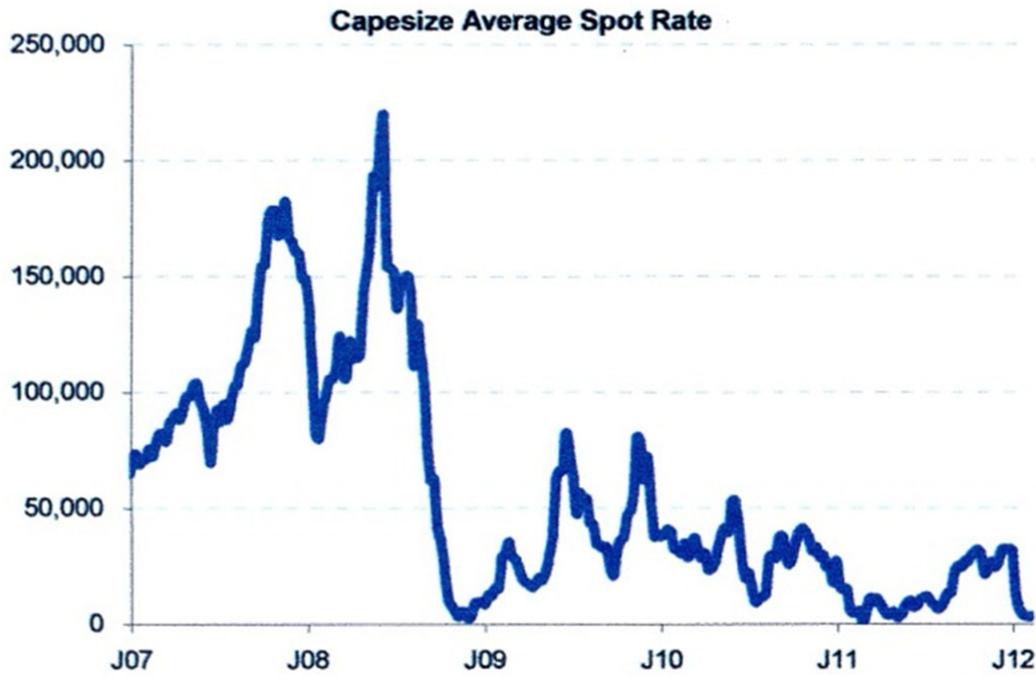
<i>NAME</i>	<i>Length</i>	<i>Beam</i>	<i>In Drydock</i>
Peace River	272 m	38 m	12 – 30 November
Ocean Pride	192 m	24 m	02 – 17 November
Potomac	154 m	22 m	09 – 19 November
Jason K	224 m	32 m	12 – 19 November
Athenic Dancer	282 m	42 m	01 – 05 December

- 1.2.1 Which drydock would have been best for *Tasman Trader*? (4)
- 1.2.2 Give **TWO** reasons for your answer to Question 1.2.1. (4)
- 1.2.3 What was the earliest that she would have been able to enter the drydock? (2)
- 1.2.4 The work was expected to take 5 full days. When would that drydock have been ready for another ship? (2)

1.3 Study the graphs *Average Spot Charter Rates* for bulk carriers below and answer the questions set.

NOTE:

- J07 means January 2007; J10 means January 2010.
- The rates shown are in US Dollars per day.
- A Spot Rate means the daily charter rate paid for a ship that is available for immediate charter.
- A Supramax bulker is a ship of about 185 metres and of about 45 000 deadweight.





[Source: Clarksons]

1.3.1 Look at the dimensions of *Tasman Trader* in Question 1.2 and the relevant graph above.

- (a) What type of ship is *Tasman Trader*? (2)
- (b) Find the position of November 2011 on the relevant graph. What was the daily spot charter rate that *Tasman Trader* would have earned in November 2011? (4)
- (c) How much would she have earned for her time in the drydock? (6)

1.3.2 The owner of a Capesize bulker has asked you to comment on whether trading conditions for Capesize ships have improved from January 2010. In no more than 50 words, describe the trends shown on the graph for Capesize ships.

(8)
[60]

QUESTION 2 SHIPPING OPERATIONS

2.1 Here are details about the vehicle carrier *Asian Tiger*:

She has six decks for vehicles		
Length		210 metres
Loaded Draught		11 metres
Beam		30 metres
Port of Registry		Majuro, Marshall Islands
Classification Society		American Bureau of Shipping
Cargo		960 cars
Owner		Centurion Shipping, Osaka, Japan
Managers		Jupiter Ship Management, Hong Kong
Charterer		Benz Shipping, Hamburg, Germany
She is on bareboat charter		
Insurers	H&M	Asian Maritime Insurers, Hong Kong
	P&I	Northern P&I Club
	FFO	Pacific Insurers, Sydney
Origin of Cargo		Benz Vehicle Assembly Plant, East London, South Africa
Loading Port		East London, South Africa
Discharge Port		300 cars at Fremantle, Australia
Balance of cargo at Sydney, Australia		
Owner of Cargo		Benz Vehicle Distributors, Australia
Cargo Insurers		Oz Marine Insurers, Sydney, Australia
Value of Ship		US\$42 million
Value of Cargo		All cars are valued at US\$80 000 each
Value of Bunkers on board		US\$1 520 000 (Owned by the shipowner)

2.1.1 Study the details given above.

- (a) Give an example of the type of incident that would be covered by Pacific Insurers. (2)
- (b) Explain why a shipowner may want to flag his ship out. (10)
- (c) Has *Asian Tiger* been flagged out? Answer YES or NO. (2)
- (d) Explain your answer to Question 2.1.1 (c). (4)

2.1.2 Assume the following when the cargo was loaded in East London:

- Loading was done at a rate of 20 cars an hour per ramp and she has two ramps.
 - Loading began at 08:00 on 17 October.
 - Loading is on a 24-hour basis apart from the breaks mentioned below.
 - Breaks (tea breaks, lunch, change of shift, etc.) total 8 hours for the duration of the loading process.
 - A severe hailstorm meant that no loading was done from 19:00 to 20:00 on 17 October.
 - Lashing of the vehicles will continue for four hours after completion of loading.
 - Before she can sail, various clearance procedures will take four hours once the lashing has been completed.
 - She can only sail in daylight hours.
- (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. (6)
- (b) How many hours will the entire loading process take? Include breaks and other stoppages. (4)
- (c) When will the lashing of the cargo be finished? (6)
- (d) Assume that the agreed laytime is 43 hours, including breaks, but excluding other stoppages. Did the loading process take longer than the agreed time? Answer YES or NO. (2)
- (e) Which was payable: demurrage or dispatch? (2)
- (f) Who would be liable for payment? Choose your answer from: SHIPOWNER or CHARTERER or AGENT. (2)
- (g) When will the ship be ready to sail from East London? (4)
- (h) Will she be able to sail at that time? Answer YES or NO. (2)
- (i) Why will loading have to be suspended during the hailstorm? (2)

2.1.3 Who is ...

- (a) the carrier? (2)
- (b) the shipper? (2)

2.1.4 Assume that the cargo was carried FOB (the INCOTERM for *free on board*).

Choosing your answers from either SHIPPER or CARRIER or CONSIGNEE, who pays for the following?

- (a) The costs of loading the cars in East London. (2)
- (b) The ocean freight costs between East London and Fremantle. (2)
- (c) The costs of insurance on the cargo. (2)

2.1.5 The vehicles are driven onto this ship. What is another term (other than vehicle carrier) for *Asian Tiger*? A ... ship. (2)

2.2 While under pilotage when sailing from Fremantle after dark on 31 October, a strong wind swings the bow of *Asian Tiger* unexpectedly, and she collides with a tug which sustains damage. Plating on the port bow of *Asian Tiger* is damaged but no water enters the ship. An initial survey indicates that she is in no danger, and she is instructed to anchor off the port. At sunrise the following morning, surveyors and divers inspect the ship which is still at anchor off Fremantle, but they clear her to continue her voyage to Sydney where repairs will be done.

2.2.1 Consult the details of the ship given in Question 2.1 and indicate the following:

- (a) The insurers who will ultimately receive a claim for the damage to the tug. (2)
- (b) The insurers who will ultimately receive a claim for the damage to the ship's plating. (2)
- (c) The **TWO** organisations that would have cleared *Asian Tiger* to proceed to Sydney for repairs. (4)

2.2.2 Who is in command of a ship when she is under pilotage in a port? Choose your answer from PILOT or MASTER or AGENT. (2)

2.2.3 The ship requires to be drydocked in Sydney for the plating to be repaired. The cost of the repairs totals US\$520 000 and the hire of the drydock is US\$140 000. General average is declared.

- (a) Who declares general average? Choose your answer from the following:

THE MASTER or THE CHARTERER or THE AGENT or THE OWNER or THE INSURERS. (2)

- (b) In terms of General Average, calculate the amount that the shipowner would pay towards the cost of repairs. (See the information given in Question 2.1 and be careful regarding the value of the cargo she had on board at the time of the accident.) (8)
- (c) If US\$1 = AUS\$1.58, how many Australian dollars did the repair company receive for the repair work? (6)

- 2.2.4 You were the officer on the forecastle (fo'c's'le) of the ship when the collision with the tug took place.
- (a) Where is the fo'c's'le on a ship? (2)
- (b) Write a report for the insurance company (not more than 80 words) in which you describe what happened. Remember to include details concerning the time, weather and sea state at the time of the accident. (14)
- 2.2.5 Consider the appearance of a vehicle carrier. Why might it not have been wise for the ship to sail from Fremantle that night? (6)
- 2.3 The parts for the manufacturing of the cars in East London come from Germany in containers. East London does not have a large container terminal, and, as large containerships cannot enter the port, some containers may be discharged at Port Elizabeth and taken to East London by a smaller ship.
- 2.3.1 Explain why it is better to containerise the car parts than to send them as break-bulk cargo. (8)
- 2.3.2 What is the term given to the service operated between Port Elizabeth and East London by that smaller ship? (2)
- 2.3.3 What is the document called that is issued by the carrier and governs the conditions under which cargo is carried by a ship? (2)
- [120]**

QUESTION 3 INTERNATIONAL TRADE

3.1 Read the article below and answer the questions set.

NOTE: Vale is a large Brazilian mining company that has also invested in building the largest bulk carriers of around 400 000 deadweight.

Mozambique to start work on Nacala coal terminal

Mozambique expects construction of a coal terminal to start in the next few months at the northern port of Nacala, with the aim of having it operational in two to three years, Prime Minister Aires Aly said in Tokyo on Thursday. "We need to have it up and running in the next two to three years," Aly told Reuters through a translator on the sidelines of a news conference, adding that he expects Nacala to have a total capacity of 25 million tons of coal.

Brazil's Vale has said it plans to spend \$4.4 billion to build the terminal and a 912 km railway line connecting its coal mine with the port. The railway line and port will initially have a capacity of 18 million tons to meet Vale's rising demand for exports. Separately, Japan is conducting a feasibility study, financed by its overseas aid department, on improving the capacity and operation of the port, including terminals for coal. Aly and his Japanese counterpart, Yoshihiko Noda, agreed earlier this week to start negotiations on an investment agreement.

But a Japanese foreign ministry official said on Thursday it is still unclear if and when Tokyo will help fund the Nacala port development. The weeklong visit by the leader of energy-rich Mozambique, which ends on Friday, comes at a time when Japan is struggling to meet its electricity needs, with most of its nuclear reactors (used to generate electricity) shut down due to safety fears sparked by the Fukushima radiation crisis. Japan, along with other countries, is also under pressure from the United States to cut oil imports from Iran.

Several Japanese companies, including Nippon Steel Corp and Mitsui & Co, have already tapped the resources of Mozambique.

Aly said test results so far have shown the country's offshore natural gas fields are promising, and he hoped liquefied natural gas (LNG) exports to Japan from a LNG facility in a project led by Anadarko Petroleum Corporation would start by 2018.

[Source: <lol.co.za/Reuters>]

- 3.1.1 Which **TWO** energy resources could Japan import from Mozambique? (4)
- 3.1.2 According to the article, why is Japan very keen to find new energy resources? (Give **TWO** reasons) (4)
- 3.1.3 Assume Japan does begin to import large volumes of the two energy resources from Mozambique.
- (a) How will this benefit shipping? (6)
- (b) Which types of ship will be used for this trade? (4)

- 3.1.4 A shipowner who may want to move one of the commodities from Nacala to Japan takes the following into consideration when calculating the costs of operating his ships for a round voyage. (NB: A round voyage is from the start of loading at Nacala until the ship arrives back at Nacala. He regards time at anchor as a day at sea.)

Operating costs		\$30 000 per day
Fuel consumption	HFO (at sea only)	55 tons per day
MDO (at sea and in port)		3 tons per day
Budgeted fuel costs	HFO	\$650 per ton
	MDO	\$950 per ton
Port costs	Nacala	\$5 000 per day
	Japan	\$8 000 per day
Time loading		3 days
Time at sea		26 days <i>each way</i>
Time discharging		5 days
Allowance for time at anchor during one round voyage		5 days
Sundry costs		\$220 000 per round voyage

- (a) What are the operational costs for a round voyage? (6)
- (b) What are the fuel costs for a round voyage? (6)
- (c) What are the port costs for a round voyage? (6)
- (d) What is the total cost of a round voyage? (6)
- (e) If his ship will carry 160 000 tons of cargo per voyage, what is the basic freight rate per ton of cargo, based on the cost of a round voyage? (6)

- 3.2 Because of the dispute over Iran's enrichment of uranium (which some say is for nuclear weapons, while Iran says it will be used for peaceful purposes), certain trade sanctions have been put in place against Iran. Some countries have stopped buying Iranian oil. Iran has threatened to close the Straits of Hormuz which is located off its south-western coast. About twenty tankers – loaded with crude oil – and numerous other ships carrying a variety of cargoes pass through the Straits of Hormuz each day.

- 3.2.1 Which important Gulf lies to the north-west of the Straits of Hormuz? (2)
- 3.2.2 If Iran does close the Straits of Hormuz or harasses ships passing through it, what will be the effect on the oil price? Choose your answer from IT WILL INCREASE or IT WILL DECREASE or IT WILL HAVE NO EFFECT. (2)
- 3.2.3 Explain your answer to Question 3.2.2. (6)
- 3.2.4 Name **THREE** other commodities (other than oil) that also move through the Straits of Hormuz on a daily basis. (6)
- 3.2.5 Name **TWO** other regions from which oil could be obtained if Iran closes the Straits of Hormuz. (4)

- 3.3 Which Code or Convention of the International Maritime Organisation would be contravened in each of the following cases?
- 3.3.1 A ship discharges oil overboard. (2)
- 3.3.2 A ship's lifeboats are not stocked with the correct items. (2)
- 3.3.3 The Third Mate is not properly qualified and no exemption certificate has been issued to allow him to act as Third Mate. (2)
- 3.3.4 A ship does not have an adequate security system. (2)
- 3.3.5 No fire drills have been held aboard a ship for two months. (2)
- 3.4 In July, a bulker is loading nitrates in Antofagasta, a Chilean port on the west coast of South America for discharge in Luanda, Angola. Her master has a choice of three routes from Chile to Luanda – via the Straits of Magellan, or via Cape Horn, or via the Panama Canal. However, his voyage instructions are that he should plan a passage via the Panama Canal, and **NOT** to proceed via the shorter routes through the Magellan Straits or around Cape Horn.
- 3.4.1 Give **TWO** reasons for this decision. (4)
- 3.4.2 What are nitrates used for? (2)
- 3.5 Give the meaning of each of the following terms which are applied in various ways to a shipment of containers:
- 3.5.1 FAS (2)
- 3.5.2 FCL (2)
- 3.5.3 TEU (2)
- [90]**

QUESTION 4 MARINE ENVIRONMENTAL CHALLENGES

The new *SA Agulhas II* that was scheduled to enter service earlier this year is a modern and sophisticated vessel. Her role is to support the operations of the South African National Antarctic Expedition base where research about polar science, physical science, polar animals and plants occur, and the base also plays an important part in global weather forecasting. The ship is designed to carry supplies, personnel and researchers for the Antarctic base, as well as the bases on Marion and Gough islands. The island bases are used for biological, environmental and climate research.

Among the studies being undertaken at these bases is research into climate change.

The vessel has fourteen laboratories, eight of which are permanent fixtures aboard the ship, while six are containerised. The vessel also has a weather station that transmits continuous data back to the South African Weather Service, and the ship will also be used as a floating research base for observing marine life.

Because she has a range of functions, the ship is also classified as a tanker (she carries diesel to the various bases), cargoship, passenger ship, research vessel, helicopter carrier and icebreaker.

Because of strict rules governing emissions from ships in polar regions, she is equipped with scrubbers to reduce carbon emissions from her exhausts, while she has a purification plant to recycle water.

4.1 The ship cost R1.3 billion and is expected to have a life of 30 years. Give your opinion (with sound reasoning) on whether you think it is worth spending that amount of money on this ship. (10)

4.2 Draw a badge for this ship, based on her main function – to service the Antarctic and island bases. (10)

4.3 A typical weather report during a voyage from Cape Town to Antarctica is as follows:

POSITION	45 DEGREES 50 MINUTES SOUTH 02 DEGREES 12 MINUTES EAST
WIND	WESTERLY GALE FORCE GUSTING 45 TO 50 KNOTS
SEA	SWELL 5 METRES FROM THE WEST, REACHING 6 METRES FROM THE WEST
RAIN	HEAVY AT TIMES WITH SOME SNOW FLURRIES
VISIBILITY	POOR IN THE RAIN AND SNOW

4.3.1 What weather feature will cause these conditions? (2)

4.3.2 How will these conditions affect life aboard the ship? (6)

4.3.3 When the ship is in the ice, the sea is calm. Why is this? (2)

[30]

Total: 300 marks