NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2024

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. Start each question on a new page.
8. **Final** answers to calculations on hours and days must be rounded off to the **next** unit.
9. It is in your own interest to write legibly and to present your work neatly.

IEB Copyright © 2024

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 Which of the following is not an advantage of the introduction of steamships?

A Their routes between ports were more direct.
B They were generally more vulnerable to spontaneous combustion.
C Their voyages generally took less time.
D They were less vulnerable to being driven ashore by wind or heavy seas. (2)

1.2 Which of the following diesel-electric propulsion systems is used by ocean mining vessels?

A Multi directional system
B Steam engine
C Dynamic Positioning System
D Azipods (2)

1.3 The most senior deck rating onboard a containership is called …

A Able Seaman.
B Bosun.
C Captain.
D Chief Officer. (2)

1.4 A trainee navigation officer onboard a ship is called …

A Deck Cadet.
B Deck Trainee.
C Engine Cadet.
D Ordinary Seaman. (2)

1.5 Why do most shipowners turn to countries like the Philippines to crew their ships?

A Philippine nationals are the hardest working crew members.
B There are relatively poor labour laws protecting Philippine crews.
C Their seafarers are more educated than other countries' seafarers.
D They have better command of the English language. (2)

1.6 The deepest South African port:

A Richards Bay
B Saldanha Bay
C Cape Town
D Durban (2)

IEB Copyright © 2024

1.7 Organisations that approve a ship to sail after repairs following an accident:

A Flag State and P&I Club
B Flag State and Classification Social Club
C Classification Society and Flag State
D Classification Society and Port State (2)

1.8 Which of the following is the key role of a Port State Control?

A Monitor ships registered in their country.
B Approve ship plans and monitor their construction.
C Conduct survey on foreign registered ships calling into their country's ports.
D Ensure that ships registered in their country comply with IMO conventions. (2)

1.9 'Mayday' is the key word for which onboard situation?

A Urgency situation
B Security situation
C Distress Situation
D Engine failure situation (2)

1.10 A city where most maritime disputes are settled:

A Durban
B London
C Shanghai
D Dubai (2)

1.11 SOLAS related requirements include …

A lifeboats, lifejackets, crew certificates.
B garbage record book, lifejackets, dangerous goods.
C life rafts, fire-pumps, lifejackets.
D ballast water exchange, lifejackets, fire-fighting equipment. (2)

1.12 A ship used to carry containers, drums of fuel, pallets of sugar, and trucks all at the same time:

A Multi-purpose ship
B Containership
C Ro-ro ship
D All-cargo ship (2)

1.13 A place where empty containers are cleaned and stowed, awaiting bookings:

A Container depot
B Container stack
C Container terminal
D Container berth (2)

IEB Copyright © 2024

1.14 A distance between the first bulkhead near the bow and the last bulkhead near the stern in the ship, that is important when arrangements are made for drydocking a ship is called …

A length overall.
B length between perpendiculars.
C beam extreme.
D moulded beam. (2)

1.15 Ship A collided with Ship B. After investigations, it was found that the collision was because of Ship B's fault. Which marine insurance will ultimately cover the hull damages sustained by Ship A?

A Ship A's P&I Club
B Ship A's Hull and Machinery
C Ship B's P&I Club
D Ship B's Hull and Machinery (2)

1.16 INCOTERMS are designed to establish responsibilities and liabilities between which two parties?

A Shipper and Master
B Shipper and Carrier
C Shipper and Consignor
D Shipper and Consignee (2)

1.17 Which of the following raw materials are vastly exported by South Africa to the international market?

A Manganese, iron ore, and steam coal
B Manganese, crude oil, and LNG
C LNG, iron ore, and steam coal
D Steam coal, rubber, and furniture (2)

1.18 Which maritime convergence zone is found between the Mediterranean Sea and the Atlantic Ocean?

A Suez Canal
B Panama Canal
C Bosphorus Strait
D Strait of Gibraltar (2)

1.19 Which maritime convergence zone uses a lock system for ships to pass through it?

A Suez Canal
B Panama Canal
C Bosphorus Strait
D Strait of Gibraltar (2)

IEB Copyright © 2024

1.20 To help with the documentation and transporting the cargo to or from the port, an **exporter** will appoint a …

A Ship Broker.
B Forwarding Agent.
C Ship Charterer.
D Personal Assistant (PA). (2)

1.21 Any ship can pass through a country's territorial waters and its exclusive economic zone, provided she is not involved in any illegal activity (e.g. drug smuggling, weapon smuggling, people trafficking, piracy, etc.). This is referred to as …

A Clear Passage.
B Sincere Passage.
C Innocent Passage.
D Harmless Passage. (2)

1.22 A tropical revolving storm when encountered off the Japanese coast.

A TRS
B Tropical Cyclone
C Hurricane
D Typhoon (2)

1.23 Fishing without a certified fishing license.

A Overfishing
B Stealing
C Poaching
D Ecosystem (2)

1.24 A ship steaming from Durban 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. (2)

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

A it kills dolphins.
B it kills phytoplankton.
C it kills seabirds.
D it might destroy the fishing industry. (2)

[50]

IEB Copyright © 2024

QUESTION 2 THE MARITIME WORLD

2.1 Maritime stakeholders are constantly finding ways to reduce air pollution by ships and make shipping more environmentally friendly. One other way is to use a specialised category of coatings applied as outer (outboard) layer to the hull of a ship to slow the growth of and facilitate detachment of subaquatic organisms that attach to the hull.

2.1.1 What is the name of this specialised coating? (2)

2.1.2 Explain how the use of this special paint assist with the reduction of greenhouse gas emissions from ships. (6)

2.2 Commercial steam-powered ships were replaced by motor vessels.

2.2.1 What fossil fuel was used to power steam ships? (2)

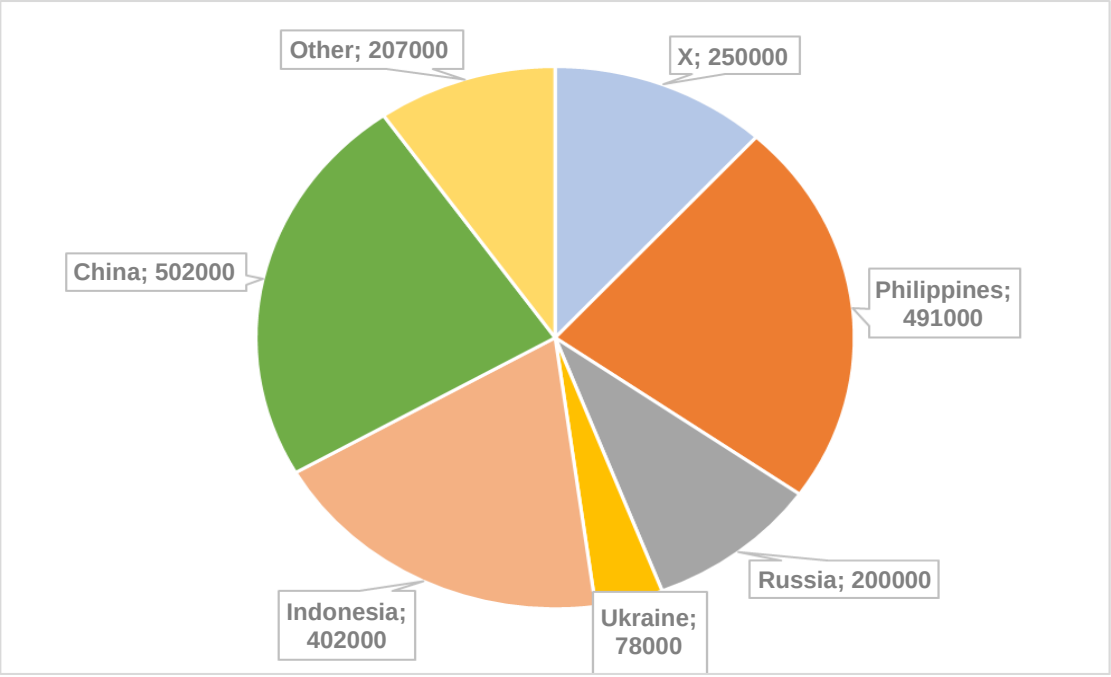
2.2.2 Motor ships normally use HFO on their main engines for bunkers. What does HFO stand for? (2)

2.2.3 Motor ships have a greater sailing range when compared to steam powered vessels. What does this mean? (2)

2.3 Nuclear power limits the need for refuelling while producing zero carbon emissions. However, it is not commonly used on commercial ships. Give THREE reasons why nuclear power is not commonly used by merchant ships. (6)

IEB Copyright © 2024

2.4 Study the following data represented below regarding the supply of seafarers and answer the questions set:



2.4.1 What is the proper name for the type of graph displayed above? (2)

2.4.2 Give a suitable heading of your choice for this graph. (2)

2.4.3 From which country does the majority of seafarers come? (2)

2.4.4 Which country is the third largest supplier of seafarers to global fleet? (2)

2.4.5 Which country is represented by 'X' on the graph? (2)

2.4.6 According to the given data, approximately how many seafarers are there in the maritime world? (4)

2.4.7 What is the percentage of China's seafarers' contribution to the global fleet of ships? Round off to two decimals. (4)

2.4.8 Which IMO convention or code deals with the training and certification of seafarers? (2)

2.4.9 Give THREE reasons why these Asian countries are now major suppliers of seafarers, as opposed to few decades ago when Western European countries were the major suppliers. (6)

2.4.10 Most seafarers work on contract basis, i.e., they are employed in one ship for a few months, then move to another ship for another few months, and so on. It is not a common practice to have seafarers return to the same ship all the time. Mention TWO adverse issues that may be caused by this practice. (4)

[50]

IEB Copyright © 2024

QUESTION 3 SHIPPING OPERATIONS

MV Jabali was on a six-month charter by Usafiri Container Line (UCL) on an agreed **daily charter rate of $39 600**. UCL is a shipping company that owns a fleet of 627 ships with a total capacity of over three million TEUs. Following are the details of *MV Jabali*:

IMO Number	9399193
Detailed vessel type	Container Ship
Cargo capacity	11356 TEU
Call sign	9HA2021
Owners	Nippon Kinzoku Co., Ltd., Japan
Flag	Malta [MT]
Gross Tonnage	131332
Summer DWT	131292 t
Summer draught	14,6 m
Length Overall	363,61 m
Breadth Extreme	45,6 m
Year built	2010
Port of registry	Valletta
Classification Society	Germanischer Lloyd
Builders	China State Shipbuilding Corporation
Service Speed	17 knots

3.1 Study the details of *MV Jabali* given above.

3.1.1 What type of charter was *MV Jabali* chartered on? (2)

3.1.2 In which country is Valletta? (2)

3.1.3 Give TWO possible reasons why Usafiri Container Line had to charter *MV Jabali*. (4)

3.2 3.2.1 Looking at the ship's registration details, mention FOUR possible reasons why her owners flagged her out. (8)

3.2.2 Draw a cross section of *MV Jabali's* **stern** and indicate all details engraved on her stern. Also, indicate the flag she will be flying at her stern when in port. (8)

IEB Copyright © 2024

3.3 *MV Jabali* commenced her 180 days charter at 00:01 08 February with Voyage Number 246 on the following port rotation:

LIMASSOL (CYPRUS) – MOMBASA – DAR ES SALAAM – DURBAN – LIMASSOL.

The voyage, with number of days spent in port shown in brackets, was planned as follows:

- Limassol (2) – Mombasa 9 days
- Mombasa (2) – Dar Es Salaam 1 day
- Dar Es Salaam (3) – Durban 5 days
- Durban (3) – Limassol 5 406 nautical miles

3.3.1 What is a 'port rotation'? (2)

3.3.2 How many days did *MV Jabali* spend at sea on her maiden voyage on charter? (8)

3.3.3 What was the total number of days for her voyage 246? (4)

3.3.4 How much did her owners earn for this first voyage (246) on charter? (4)

3.4 *MV Jabali* departed Limassol at 08:00 10 February. The Master sent the following message to the company agents in Mombasa:

ETA PILOT STATION 04:00 19 FEBRUARY. SIGNING OFF LEAVE FOR REPATRIATION PHILIPPINES 3RD ENGINEER DA SILVA, COOK MONTANA, STEWARD GOMEZ. ALL NATIONALS OF PHILIPPINES. PASSPORT DETAILS ATTACHED. IN ADDITION TO STORES LIST EMAILED TO YOU ON 08 FEBRUARY, WE REQUIRE 20 DRUMS LUBE OIL GRADE 223, 8 OIL FILTERS CODE XD334, 10 BOXES FRESH TOMATOES, 6 DOZEN BOXES LONG-LIFE MILK. ALSO REQUEST CHARTS SOUTH AFRICAN EAST COAST. ARRIVAL DRAFTS FWD 13.8, AFT 14.2. PLEASE ENSURE RADAR TECHNICIAN MEETS US ON ARRIVAL TO AVOID DELAY.

BHENGU, MASTER MV JABALI

3.4.1 Study the list of requirements the Master has given.

(a) Who will supply the stores for the ship? (2)

(b) What is lube oil used for? (2)

3.4.2 Which TWO important government departments need to be involved in the landing of the crew members? (4)

3.4.3 Besides booking the taxi and the government departments given in your answer to the question above, list the arrangements that the agent needs to make regarding the three crew members who will disembark from the ship. (6)

IEB Copyright © 2024

3.4.4 On arrival in Mombasa, *MV Jabali* was _____.

CHOOSE: trimmed by the head; trimmed by the stern; even trimmed (2)

3.4.5 *MV Jabali* had not been to Durban before this chartered voyage. Quote from the Master's message to support this statement. (2)

3.5 *MV Jabali* called into the port of Dar Es Salaam on 22 February to handle a total of 4 900 containers. She commenced cargo work at 10:00. She was allocated two gantry cranes each with a container handling rate of 25 lifts per hour. At 18:00, a third gantry crane, also working at a rate of 25 lifts per hour was added. How many hours did it take for the handling of all 4 900 containers, including 2 hours of breaks? (8)

3.6 Assume the following cargo manifest for *MV Jabali* on arrival in Durban:

Number	**Description**
2200	20-foot dry cargo containers
2710	40-foot dry cargo containers
84	20-foot tank containers
1104	40-foot reefer containers
502	20-foot reefer containers
08	40-foot flat rack containers

3.6.1 How many TEUs was she carrying on arrival in Durban port? (6)

3.6.2 Was she fully laden on arrival in Durban port? YES or NO. (2)

3.6.3 What does TEU stand for in the context of containerisation? (2)

3.6.4 She arrived in Durban at 08:00 01 March. Inwards clearances took 2 hours before cargo work commenced. Cargo work lasted for 68 hours. When was cargo work completed in Durban? (6)

3.6.5 Some of the containers discharged in Durban were destined for other smaller ports like East London and Beira. What name is given to Durban port and similar bigger ports because of this service? (2)

3.6.6 Other ships, usually smaller, offer a service to tranship containers from Durban port to their final ports of destination. What do we call this service? (2)

IEB Copyright © 2024

3.7 On a return voyage to Limassol, Northwest of Madagascar, *MV Jabali* suffered a major crankcase explosion which put her main engine out of commission. The engine failure left her drifting slowly in the southwest direction. Upon inspection, the damage caused by the explosion to the engine plating was so severe that the engineers onboard could not successfully repair the engine. The Chief Engineer advised the captain that they will need shoreside engineering assistance to restore the main engine.

The Master contacted the company's agents in Mombasa to arrange for an emergency berthing in the port of Mombasa for engine repairs. Furthermore, the Master, through their management company, called for a tug assistance. A salvage tug arrived at the scene, connected their towing line, and towed *MV Jabali* successfully into the port of Mombasa.

Engine repairs and other costs as a result of this incident totalled $1,6 million.

3.7.1 Why did the Master of *MV Jabali* not sign the Lloyd's Open Form Agreement with the salvage tug? (2)

3.7.2 A dispute arose when the salvage company claimed that their tug performed salvage operations and is therefore entitled to a salvage reward. The owners of *Jabali* insist that the tug was purely contracted for towage at a daily hire, not for salvage. What is the process of settling such maritime disputes called? (2)

3.7.3 During the time of engine failure, the ship was unable to meet the agreed conditions of charter. What is the term given to such period of time? (2)

3.8 *Jabali* was valued at $96 million at the time of the incident. She carried onboard bunkers owned by Usafiri Container Line valued at $1 million. Total value of cargo onboard was $102 million. Calculate the owners' share of general average payable towards the costs incurred. (6)

[100]

IEB Copyright © 2024

QUESTION 4 INTERNATIONAL TRADE

4.1 Billabong Aluminium (Pty) Ltd exported 2 160 blocks of aluminium to S&S Aluminium Ltd in Limassol, Cyprus. These aluminium blocks were palletised 30 blocks per pallet. The palletised cargo was then containerised at 6 pallets per container.

4.1.1 How many containers were used for this consignment? (6)

4.1.2 What type of containers were used for this shipment? (2)

4.1.3 Were these containers LCL or FCL? (2)

4.1.4 Which company was the shipper? (2)

4.1.5 Which company was the consignee? (2)

4.2 S&S Aluminium Ltd proposed that Billabong Aluminium be responsible and liable for the transportation of the cargo from their premises until goods arrive at S&S Aluminium's premises. Billabong Aluminium, on the other hand proposed that S&S Aluminium be responsible and liable for the transportation of the cargo from Billabong Aluminium's premises until the cargo reaches its destination. They eventually agreed that Billabong Aluminium will be responsible for the cargo until it is loaded on board the vessel.

4.2.1 Which incoterm did Billabong Aluminium propose? (2)

4.2.2 Which incoterm did S&S Aluminium propose? (2)

4.2.3 Which incoterm did they eventually agree on? (2)

4.3 A bill of lading covering only the ocean leg was issued.

4.3.1 Who issued the bill of lading?

CHOOSE: Shipper; Carrier; Consignee (2)

4.3.2 To whom was the bill of lading issued?

CHOOSE: Shipper; Carrier; Consignee (2)

4.3.3 What type of bill of lading was issued? (2)

IEB Copyright © 2024

4.4 *MV Jabali* took a direct voyage from Durban to Limassol. On departure from Durban she steamed northwards. List all the oceans, seas, straits and canals she sailed through to Limassol. (12)

4.5 Following is the list of containerships operated by UCL. Study their schedules and answer the questions set:

	JABALI		UNITED		THOFIQ		SUKSES
	ETA	ETD	ETA	ETD	ETA	ETD	ETA
DURBAN	01/03	04/03	08/03	11/03	15/03	18/03	22/03
LIMASSOL	18/03	20/03	25/03	27/03	01/04	03/04	08/04
MOMBASA	29/03	31/03	05/04	07/04	12/04	14/04	19/04
DAR ES SALAAM	01/04	04/04	08/04	11/04	15/04	18/04	22/04
DURBAN	09/04	12/04	16/04	19/04	23/04	26/04	30/04
LIMASSOL	26/04	28/04	03/05	05/05	10/05	12/05	17/05
MOMBASA	07/05	09/05	14/05	16/05	21/05	23/05	28/05
DAR ES SALAAM	10/05	13/05	17/05	20/05	24/05	27/05	31/05
DURBAN	18/05	21/05	25/05	28/05	01/06	04/06	08/06

S&S Aluminium Ltd in Limassol expected the next set of containerised aluminium blocks from Billabong Aluminium (Pty) Ltd by the 17th of May. Please note that Cyprus' customs clearance takes 3 days. The land leg transportation of containers from Limassol harbour takes 2 days.

4.5.1 What is the name of the **latest** ship used by Billabong Aluminium to ship the aluminium blocks to S&S Aluminium? (4)

4.5.2 When did the consignment reach S&S Aluminium factory? (4)

4.5.3 Containers must arrive at the port of load two days before their ship arrive to be cleared by customs and stored in a container stack. When was Billabong Aluminium required to deliver containers to the Durban port? (4)

4.5.4 What is the name of the agency that will clear the containers out of Durban port? (2)

4.5.5 When did *Sukses* depart the port of Durban on her second call as per the given schedule? (2)

4.6 *MV Jabali* had to send her 10 previous ports of call to Cyprus' maritime authority before arrival in Limassol.

4.6.1 According to which code or convention is this information required? (2)

4.6.2 After which incident was this code or convention introduced? (2)

IEB Copyright © 2024

4.7 Read the following article and answer the questions that follow.

How Houthi Attacks on Ships in Red Sea Affect Global Trade

Yemen's Houthi rebels have escalated attacks on ships passing through the Red Sea during the Israel-Hamas war, raising concerns about the impact on the flow of oil, grain and consumer goods through a major global trade artery.

Israeli-linked vessels have been targeted, but the threat to trade has grown as container ships and oil tankers flagged to countries such as Norway and Liberia have been attacked or drawn missile fire while traversing the waterway between Africa and the Arabian Peninsula. About 10% of the world's trade passes through the Red Sea.

A huge amount of Europe's energy supplies, including oil and diesel fuel, come through that waterway. So do food products such as palm oil and grain, as well as anything else brought over on container ships, which is most of the world's manufactured products.

[<https://www.voanews.com/a/how-houthi-attacks-on-ships-in-red-sea-affect-global trade/631.html>]

4.7.1 Initially, which vessels were particularly targeted by the Houthi group of rebels? (2)

4.7.2 How did these attacks affect international trade and production? (4)

4.7.3 What is the alternate route when vessels cannot sail via the Red Sea? (2)

4.7.4 About 11 billion tons of goods are transported by ships each year. How much of this cargo is transported through the Red Sea? (4)

[70]

IEB Copyright © 2024

QUESTION 5 MARINE ENVIRONMENTAL CHALLENGES

5.1 On her passage from Dar es Salaam to Durban, the Master of *MV Jabali* received a weather warning via Sat C navigation equipment concerning a tropical revolving storm in the vicinity moving in the direction towards their ship. At the time of the warning, the centre of this TRS was positioned at 08°02,3'S 054°30.2'E.

5.1.1 What do we call a TRS when encountered off the East-African coast? (2)

5.1.2 What is another name for the centre of a tropical revolving storm? (2)

5.1.3 In which direction will this storm initially move?

CHOOSE: North-East; South-East; South-West; North-West (2)

5.1.4 Once the cyclone has moved over land, it loses strength and dissipates. TRUE or FALSE? (2)

5.1.5 What weather features will *MV Jabali* experience because of the TRS in the vicinity? (6)

5.1.6 Give THREE reasons why ships must avoid these storms. (6)

5.2 Give TWO measures that can be used by ships' chief officers and shipowners, according to the Ballast Water Management convention, to mitigate the negative effects of uncontrolled deballasting by ships. (4)

5.3 Oil pollution can be extremely harmful to the marine environment. Tanker vessels are especially vulnerable to large oil pollution catastrophes. Provide THREE examples of major steps taken by the tanker sector to prevent the devastating effects of oil pollution. (6)

[30]

Total: 300 marks

IEB Copyright © 2024