

**NAROTTAM MORARJEE INSTITUTE OF SHIPPING
MUMBAI**

Examination Paper – March 2019

Associateship / Post Graduate Diploma in Shipping management – First year

ECONOMICS OF SEA TRANSPORT

Date: 09.03.2019

Total : 100 Marks

Time: 3 Hours.

NOTE: **Q.10** is compulsory which carry 20 marks.
Answer any 8 Questions from the rest, each carry 10 marks.
Please read the questions carefully before answering.

- Q1) Examine the factors that influence the demand for shipping and explain why demand for shipping is said to be a derived demand.
- Q2) Examine the critical role of ports in the global transport system.
- Q3) Explain the concept of 'Economies of scale' as it applies to the shipping industry. Also enlist limitations of this theory.
- Q4) What are the different types of charter? Compare and contrast the main differences between voyage and time charter, focusing on the division of costs and responsibilities between charterers and ship-owner.
- Q5) There are **FOUR** Incoterms relating specifically to sea and inland waterways. Name these and give an explanation of how they work and at what point risk and property pass.
- Q6) Write a brief on Bunker Management. Highlight the impact of IMO 2020 fuel Sulphur regulation.
- Q7) Describe the main factors that affect the revenue in shipping.
- Q8) Elucidate problems faced by coastal shipping industry in India.
- Q9) Why is cash flow so important to a shipping company and how would you go about ensuring you keep the company's cash flow remain positive?

P.T.O..... 2/-

- Q10) A ship performed a Voyage from Haypoint (Loadport) to Visakhapatnam (Disport). Vessel loaded B/L quantity 82116 MTS of coal. Vessel is fixed for a freight of USD. 17/- PMT. Final disbursements at Load and disport appended below-

Sr.No.	Particulars	All amount in USD.	
		Haypoint	Visakhapatnam
1.	Port Charges	75000	64000
2.	Stevedoring	26000	18000
3.	Light house dues	5000	2800
4.	Agency fees	3500	1750
5.	Wharfage	8600	2500

Bunker details as follows -

On commencement of voyage:	HO-	500 MT	MDO-	250 MT
On completion of voyage:	HO-	400 MT	MDO-	115 MT
Bunkers lifted:	HO-	750 MT	MDO-	0

Average bunker price HO : USD. 500 PMT and MDO : 612 PMT

Voyage days

Port stay - 3 days at Hay point and 5 days at Visakhapatnam

Steaming days - 20 days

Anchorage stay for lifting bunkers - 1 day

Address Commission 2.5 %; Standing charges USD. 6000 per day. Prepare Voyage Accounts and calculate GOP /day and NOP/day.

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MUMBAI

EXAMINATION - MARCH 2019

SUBJECT : EST

Q	1	2	3	4	5	6	7	8	9	10	11	12	Total
M	8	8	8	8		8	8	8	8	20			84

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Good

Q10

Working notes

BUNKER CALCULATION:-

	HO	DO
Commencement	500	250
Lifted	+ 750	0
	<u>1250</u>	<u>250</u>
Completion	- 400	- 115
Used	<u>850 mt</u>	<u>135 mt</u>

HO: $850 @ 500 = 425,000$ DO: $135 @ 612 \text{ mt} = 82,620$ Total Bunker consumed: Rs. 4,82,620/-VOYAGE DAYS:-Port days: $3 + 5 = 8$

Steaming: 20

Anchorage: 1

Total

29 days ✓1. Port charges: $75000 + 64000 = 139,000$ 2. Stevedoring: $26000 + 18000 = 44,000$ 3. Light dues: $5000 + 2800 = 7,800$ 4. Agency fees: $3500 + 1750 = 5,250$ 5. Wharfage: $8600 + 2500 = 11,100$

VOYAGE ACCOUNTS

A) Freight 82116 MTX17 Primage	-	1,395,972
B) Gross freight		1,395,972
Brokerage	-	
- Commission @ 2.5%	(34,899)	
C) Net freight		1,361,073
- DOE Port charges	(139,000)	
- Stevedoring	(44,000)	
- Light house dues	(7,800)	
- Agency fees	(5,250)	
- Wharfage	(11,100)	
- Bunkers consumed	(507,620)	
D) Gross Operating Profit (GOP)		646,303 \$
- Standing charges 29 @ 6000	(174,000)	
Interest / Depreciation	-	
E) NET OPERATING PROFIT (NOP)		472,303 \$

$$GOP/d = 646303/29 = 22286 \$$$

$$NOP/d = 472303/29 = 16286 \$$$

Q1

Shipping industry is truly global in nature. The demand for shipping arises only if there is another business transaction taking place between a Buyer & Seller where one leg of the transaction involves shipping of cargo.

If there is not demand for any product, there will be not cargo to ship. Therefore shipping is said to be a derived demand.

Factors that influence demand of shipping are as follows:-

1) Global Economy:-

As shipping works majorly on cargo being moved from one part of the world to another, it is affected by performance of global economy. When the global markets are going through an era of "Trough", the demand for shipping reduces as well.

2) Sea-borne trade:-

There are various means of trade available such as air, road, rail & sea-borne. Trade by sea has its distinct advantages in terms of cost per unit of transport & volume of transport. As long as the sea-borne trade flourishes between different countries, there is always demand for shipping.

3) Average Haul:-

A shipload of cargo carried from India to USA will be more beneficial in comparison to same ship carrying equal quantity of cargo to a nearby location such as Singapore. This is called average haul of the ship & longer the sea-routes, better is the average costing of transporting the goods. Hence, cargo moving across longer distances assist in increasing demand for shipping.

4) Transportation cost :-

For the shipping to remain as a preferred means of transport, it must remain cost effective in comparison to other means of transport and also for the business to be viable. Ships are dependent on the cost of bunkers they consume as a single largest factor among others. As long as the bunker cost remains favourable; transportation by ships remain economical & viable.

Q2 Role of ports

Ports are the gateway to any country and therefore their role in global transportation is critical.

Ports provide facilities for loading and unloading of cargo on ships, without ports it would not be possible to carry out cargo operations.

Ports make sea-borne trade possible. Since Earth's 70% surface is covered by water where no other means of transportation is possible, the importance of ports can-not be over-emphasized for global trade.

There are some natural harbours such as Mumbai but many ports that are man-made and provide shelter to ships in adverse weather conditions.

Ports interact with their hinterland on a regular basis. As a result development of industry, rail, road, ware-houses, etc takes place. Thus, ports contribute in development of these different means of transportation as well.

Ports not only provide loading / unloading facilities to ships but cater to a host of services required by them such as stores / spares / bunkers / fresh water / crew change / provisions etc.

Ports are an important link in the multi modal transportation system which makes the global trade possible.

Ports create development & employment opportunities for the area where they are developed. In some cases, government develops SEZ (Special Economic Zone) in ports area to boost economy & transportation.

With the limitations of weight carrying capacity & high cost, air traffic remains very limited as means of transportation of cargo. More than 90% of global trade takes place through the ports & sea.

Ports also provide means of transportation for passengers. In addition, passengers also use ships as means of tourism.

Q3 Economics of Scale

As the size of ship increases, its cargo carrying capacity increases much more in comparison to the capital & operation costs involved. This is called "Economics of Scale".

	SHIP A	SHIP B	Ratio
DWT	20,000 T	200,000 T	1:10
LENGTH	125 m	250 m	1:2
BREADTH	20 m	40 m	1:2
DEPTH	10 m	20 m	1:2
BUNKER/d	30 t	40 t	1:3
CREW	18	20	1:1

Above table demonstrates how a sample ship 'B' can carry 10 times the cargo carried by ship 'A' but the dimensions of the ship as well as the running costs do not increase in the same proportion.

As the size of the ship increases, the cost of transporting cargo in USD/MT reduces. Thus, larger ships are able to transport cargo more economically compared to smaller ships.

Larger ships also require bigger ports & better cargo handling facilities. This in turn triggers development of the port as well.

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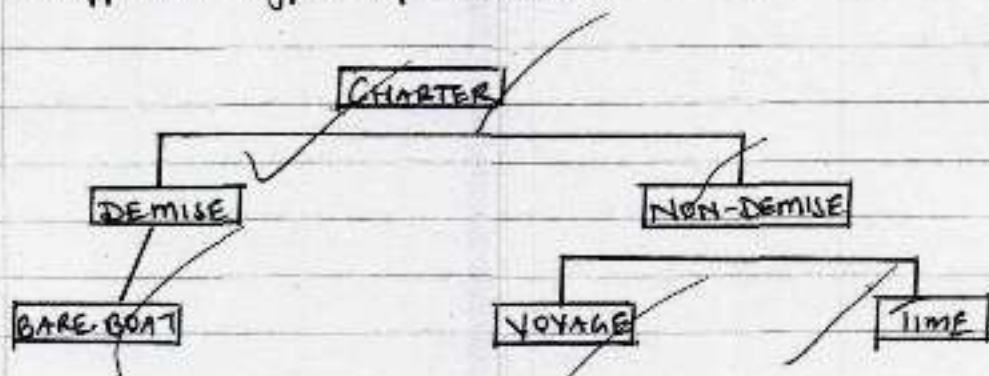
Limitations:-

The limitations of "Economics of scale" are as follows:-

- 1) The cargo carrying capacity of the big ship must be utilized completely otherwise the cost/mr for cargo transported goes up
- 2) Large ships need more port stay in order to load & discharge cargo
- 3) Large ships can not call every port due to draft restrictions. They can call only ports that allow sufficient depth as per their size
- 4) Insurance cost of bigger ships is much more, especially in case of tankers where pollution can become a major liability.
- 5) Large ships require bigger storage & other facilities of cargo.
- 6) Big ships can not pass through many shipping routes such as Panama Canal & Suez canal and need to steam much longer distances.

Q4

Different types of charter:



Charter can be broadly divided into demise and non-d demise charters. "Bare-boat" is a kind of demise charter whereas non-d demise charter can be either a voyage charter or a time charter.

Bare-boat charters are usually very long term in nature, where the completed ship is hired for a number of years and at the end of it, many time the charterer ends up buying the ship at a nominal price. Owner's participation is minimal during the charter period & charterer assumes most operational responsibilities.

In voyage charter, the ship's cargo carrying capacity is hired for a specific voyage and a specific cargo.

In Time charter, the charter hires the ship for a particular duration such as 1 year 5 years etc & pays the ship owner on per day or pro-rata throughput basis.

Differences between voyage & time charters are as follows:-

COST/ RESPONSIBILITY	TIME CHARTER	VOYAGE CHARTER
Capital interest	Owner	Owner
Insurance	Owner	Owner
Crew wages	Owner	Owner
Bunkers	Charterer	Owner
Freight	Paid USD/day	Paid USD/Ton of cargo
Fresh water	Owner (crew) / Charterer (for tank cleaning)	Owner
Port dues	Charterer	Owner
Pilots	Charterer	Owner
Tugs	Charterer	Owner
Provisions	Owner	Owner
Loading cost	Charterer	Owner
Unloading cost	Charterer	Owner
Stores / Spares	Owner	Owner
Repairs	Owner	Owner

Q6 Bunker management:-

Bunkers consumed by the ship are the largest source of expense in running of a ship. Therefore proper management of bunkers is very important in shipping industry.

Price of bunkers depends on various factors such as:

- Proximity to refinery
- Technical factors
- Chartering factors
- Operational factors
- Port factors.

Bunkering ports sometimes levy minimum or no customs duty. A therefore ~~become~~ become hub for bunkering. Shipowners benefit from comparatively lower prices of bunkers.

Slow-steaming at economical speed is ~~carried~~ followed by ships in order to save bunkers, especially in ballast passage, when awaiting cargo etc.

Older ships consume much ~~for~~ more bunkers than newer ships due to old design of engines that are not fuel efficient.

Ships that have developed marine growth on ship-side or propeller consume more bunkers due to hull resistance and

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activities such as hull cleaning & propeller polishing is required to reduce bunker consumption.

Bunkers include Heavy Oil (HO), Diesel Oil (DO) & low sulphur fuels such as LSFO (low sulphur fuel oil) & G.O (Gas oil). Proper management of all these grades are required.

SECA (Special Emission Control Areas) such as NW European waters require burning of low sulphur fuel only. Similarly ECA regions of USA & lately China also need low sulphur fuels that are expensive.

As per IMO 2020 fuel sulphur regulations, merchant ships all over the world will be required to use fuel with less than 0.5% sulphur content to meet emission norms. Ships are required to use scrubbers that will enable them to reduce SO_x content in the emission from M/E & other machinery. Other alternative is to use low sulphur fuel less than 0.5% sulphur at all times but there are availability issues and cost issues involved with such low sulphur fuels.

Q7 Revenue in Shipping

There are two means of determining freight in shipping, based on cost and based on revenue.

Freight determined on cost includes calculation of the cost incurred by the shipowner in carriage of cargo such as ~~loading~~, bunkers, loading, discharging etc & demanding the freight to recover atleast these costs.

Freight determined by revenue takes into account factors such as demand for the cargo, value of the cargo.

Ship owner some times ~~always~~ adds addition surcharge to protect its ~~interests~~. Some of the surcharges used are:-

- For fluctuations in currency, this takes into account ~~the~~ changes in the dollar exchange rate that may have occurred during the transaction.
- For fluctuations in ~~prices~~ of bunkers, as this is one of the ~~major~~ contributing costs.

Revenue is earned after deduction of costs from the freight earned, cost of the shipowner are as follows:-

1) Vessel related costs

Includes cost of maintenance, repairs, bunker cost, canal transit etc.

2) Voyage costs

Includes cost of agents, port dues, light dues, pilotage & tug costs, berth & anchorage costs etc.

3) Operational costs

Includes insurance, depreciation, interests etc.

4) Management costs

Includes shore staff wages, taxes paid, training costs, advertising costs etc.

Q8 Problems faced by coastal shipping

Indian coastline extends to 7500 km but remains underutilized due to variety of problems that plague coastal shipping and movement along inland waterways.

On one hand where Netherlands moves 41% of its tonnage through inland waterway, India moves only 0.1%. The issues faced are as follows:-

- Coastal shipping works in multiple states where different customs laws exist creating issues for clearance of cargo.
- Lack of interest by Indian govt. in the past has resulted in stagnation in shipping along Indian coast.
- Lack of navigational aids, buoys, light houses makes navigation difficult, specially during hours of darkness.
- Very limited draft is available in many places and thus large barges are not able to transit these areas.
- Lack of jetties, piers and development of ports for coastal & inland trade has resulted in retarded growth of domestic shipping.

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- Cabotage laws have been relaxed somewhat in recent times but otherwise, foreign shipping companies are not normally allowed in coastal shipping without voyage blank from O.G. shipping.
- Lack of development of inland waterways. Till date, only 6 are remain open but government is working now to open over 180 inland waterways.
- Competition from other means of transport such as rail & road has not allowed some specific coastal shipping routes to develop.
- Lobbying by land based transport authorities in spite of the fact that water transport is cheaper to establish & maintain.
- Lack of planning and development of inland waterways.

Q9

Cash flow:

Shipping, like any other business requires positive cash flow to remain viable. It becomes more relevant in shipping as it is a capital intensive industry.

Activities such as new ship building requires huge amount of investment. An oil tanker made in Korea, cost about 44 million\$. A ship owner is able to secure loan from banks for new building ~~from~~ program but will not be able to pay back principle & interest if there is no positive cash flow.

Shipping is also associated with many activities that are capital intensive, such as drydocking, major repairs, conversions as well as unforeseen events such as pollution, collision or other accidents for which he might need to pay large sums of money.

In order to ensure a positive cash flow, I will take following steps:-

- Employ the ships properly at all times so that no time or money is lost while awaiting cargo.
- Depending upon shipping market conditions, use vessels on time charter if more security is required or run them on spot (voyage) charter if freights are good.

- Ensure that fleet size is not overly expanded by keeping the new-building program controlled
 - Sell older ships that demand more maintenance & bunker costs but generate less freight.
 - Control consumption of stores & spares by effective monitoring.
 - Run vessels in cost effective manner.
- 