

Maharashtra State Board Class 11 Geography Solutions Chapter 7 Indian Ocean – Relief and Strategic Importance

1. Complete the chain.

Question 1.

A	B	C
(1) Pacific Ocean	(1) Christmas	(1) Bab-al-Mandeb
(2) Chagos	(2) Atlantic Ocean	(2) Lakshadweep
(3) Ashmore	(3) Maldives	(3) Indian Ocean
(4) Hormuz	(4) Malacca	(4) Cocos

Answer:

A	B	C
(1) Pacific Ocean	(1) Atlantic Ocean	(1) Indian Ocean
(2) Chagos	(2) Christmas	(2) Lakshadweep
(3) Ashmore	(3) Maldives	(3) Cocos
(4) Hormuz	(4) Malacca	(4) Bab-al-Mandeb

2. Give geographical reasons.

Question 1.

Salinity is less in the Bay of Bengal than in the Indian Ocean.

Answer:

Salinity is less in the Bay of Bengal than in the Indian Ocean because-

1. The salinity of ocean water is a measure of the concentration of dissolved salts, which are mostly sodium chloride, but also include salts containing magnesium, sulphur, calcium and potassium. It is expressed as parts per thousand (%).
2. The factors that affect the salinity of ocean water are rate of evaporation and quantitative supply of fresh water (primarily from rainfall and stream discharge) is being added to the ocean.
3. The average salinity of sea water is 35% But salinity in the Bay of Bengal is as low as 31%.
4. This is because huge discharge from the Ganga river system, the Peninsular River (Godavari, Krishna, etc.) and Irrawaddy enter the Bay of Bengal, thereby reducing its salinity.

Question 2.

The eastern coastal part of the Indian Ocean is seismically active.

Answer:

The eastern coastal part of the Indian Ocean is seismically active because-

1. The Andaman Sea is seismically active; it is a part of the Indian Ocean.
2. The Andaman sea is a part of the Indian Ocean. It is seismically active.
3. It is one of the most active plate margins in the world that generates frequent earthquakes.
4. Most of the islands in the eastern part of the Arabian Sea are volcanic islands because they are associated with the converging plate boundary. These islands are peaks of submerged mountains.
5. The Krakatau volcanic eruption has caused large tsunamis in the past.
6. Tsunamis have been generated due to earthquakes / volcanic eruption in the Indian region.

Question 3.

Gyre develops in Southern Indian Ocean.

Answer:

Gyre develops in Southern Indian Ocean because-

1. Gyre is a circular pattern of ocean currents. It is influenced by the shape of the coastline its extent and the peculiar arrangement of the wind system prevailing in the region.
2. The current system in the southern part of the Indian Ocean leads to the development of a large gyre.
3. The two major arms of this gyre are:
4. The south equatorial current flowing east to west direction under the influence of easterlies.
5. The 'West Wind Drift' flowing from west to east under the influence of westerlies.
6. The circulation is completed in the west by Mozambique-Agulhas currents and in the east by West Australian currents. It is considered to be one of the major gyres on global scale.

Question 4.

Temperatures are high in pre-monsoon season in the equatorial region in northern Indian Ocean.

Answer:

1. During the pre-monsoon season, when the summer solstice (June 21st) is approaching, the temperatures generally increase, as the sun shines vertically on 23/4 North, Tropic of Cancer.
2. They are generally much higher in the southern portion closer to the equator. This is the northern portion of the Indian Ocean.
3. Therefore, temperatures are high in pre-monsoon season in equatorial region in northern Indian Ocean.

3. Write short notes on.

Question 1.

The width of continental shelf in the Bay of Bengal and the Arabian Sea

Answer:

The continental shelf in the Bay of Bengal is narrow but the continental shelf in the Arabian sea is very wide.

The river which bring sediments to the continental shelf of the Arabian Sea are short and swift. Therefore, the sediments in the river are deposited in the Continental shelf. The rivers which bring sediments to the continental shelf of the Bay of Bengal are long, sluggish and voluminous, therefore sediments are deposited in deltas and not in the continental shelf.

There are a greater number of estuaries along the coastline of Arabian sea. There are a greater number of deltas along the coastline of the Bay of Bengal.

Question 2.

Mineral resources in the Indian Ocean

Answer:

There are large reserves of hydrocarbons being tapped in the offshore areas of Saudi Arabia, Iran, India and Western Australia. About 40% of the world's offshore oil production comes from the Indian Ocean.

The beach sands along the coastline of the Arabian Sea is very rich in valuable minerals like uranium, thorium, radium, etc. Beach sands, rich in heavy minerals and offshore deposits are activity exploited by bordering countries particularly India, South Africa, Indonesia and Sri Lanka.

The Abyssal plains of Indian ocean have deposits of polymetallic nodules. These nodules are the source of nickel, copper, manganese and cobalt.

Question 3.

Ocean Currents in the Indian Ocean.

Answer:

1. The system of the ocean currents in the Indian Ocean is highly influenced by shape of its coastline, its extent, and the peculiar arrangement of the wind system that prevails in the region.
2. It has the equatorial currents but the north equatorial current is weaker than the south equatorial current.
3. North of the equator, the currents are influenced by the seasonally reversing monsoon wind system.
4. The current system in the southern part of the Indian Ocean leads to development of a large gyre.
5. South equatorial current flowing east to west direction under the influence of easterlies.
6. The 'West Wind Drift' flowing from west to east under the influence of westerlies.
7. The circulation is completed in the west by Mozambique-Agulhas currents and in the east by West Australian current. It is considered to be one of the major gyres on global scale.
8. In the northern portion of the Indian Ocean, seasonal Monsoonal winds drive the currents. Mostly, these currents follow along the coastlines.
9. During summer, they follow in the clockwise direction and during winter, their direction shows a complete reversal and they flow in the anticlockwise direction.

Question 4.

Oil and natural gas in the Indian Ocean

Answer:

1. The oil and natural gas zone are spread across an area of 83,419 sq. km. in the Indian Ocean.
2. Large reserves of hydrocarbons are being tapped in the offshore areas of Saudi Arabia, Iran, India and Western Australia.
3. An estimated 40% of the world's offshore oil production comes from the Indian Ocean.
4. Offshore deposits of oil and natural gas are actively exploited by bordering countries, particularly India, South Africa, Indonesia and Sri Lanka.

4. Answer in detail.

Question 1.

Outline the importance of the Indian Ocean with respect to trade and transport routes.

Answer:

1. The Indian Ocean Region connects three continents namely Asia, Africa and Australia.
2. It supports some of Asia's biggest economies.
3. This shows the economic and political significance that the Indian Ocean has.
4. It contains three busiest straits namely Hormuz, Malacca and Bad-el-Mandeb.
5. Majority of crude oil exported by Gulf Countries passes through this route via Strait of Hormuz which links the Persian Gulf with the Arabian Sea.
6. Hence, the Indian Ocean serves as an important route for crude oil supplies worldwide.

7. The Indian Ocean provides major sea routes connecting the Middle East, Africa and East Asia with Europe and the Americas.
8. It carries a particularly heavy traffic of petroleum and petroleum products from the oil fields of the Persian Gulf and Indonesia.

Question 2.

Evaluate the strategic location of India with respect to its location in the Indian Ocean.

Answer:

1. India occupies a central and strategic location in the Indian Ocean area.
2. India's national and economic interests are inseparably linked up with the Indian Ocean.
3. The trans Indian Ocean routes which connect the countries of Europe in the West and the countries of East Asia provide a strategic location to India.
4. The Deccan Peninsula protrudes into the Indian Ocean, help India establish a close contact with West Asia, Africa and Europe from the western coast and with south east and East Asia on the eastern coast.
5. India has a long coastline and on the Indian Ocean which becomes favourable for trading ports and commerce hubs for other countries.
6. The coastal regions of India are famous for agriculture, trade and industrial centres, tourist centres, fishing and salt-making. They provide important hinterlands for the ports.

Question 3.

Explain the Indian ocean with respect to following aspects:

- (a) Ocean Trenches
- (b) Abyssal Plains
- (c) ridges
- (d) Ocean Currents

Answer:

(a) Ocean Trenches

1. Trenches are the deepest portions in the oceans.
2. There are very few deeps and trenches in the Indian Ocean as compared to other oceans.
3. Most trenches of the Indian Ocean are located towards its eastern boundary.
4. These are located along the converging boundaries of the Indo-Australian Plate and the Pacific Plate.
5. The trenches in Indian Ocean are Java or Sunda Trench (7,450m deep) and Ob Trench (6,875m deep).
6. This area is seismically active because of plate movements.

(b) Abyssal Plains:

1. Beyond the continental slope, lie the abyssal plains. They have a gentle slope and cover about 66 percent of the oceanic floor area.
2. Abyssal plains of the ocean have deposits of polymetallic nodules. These nodules are a source of nickel, copper, manganese and cobalt.
3. India has been allotted an area of 2 million square kilometres for research and excavation of polymetallic nodules by the International Seabed Authority in the Indian Ocean.

(c) Ridges:

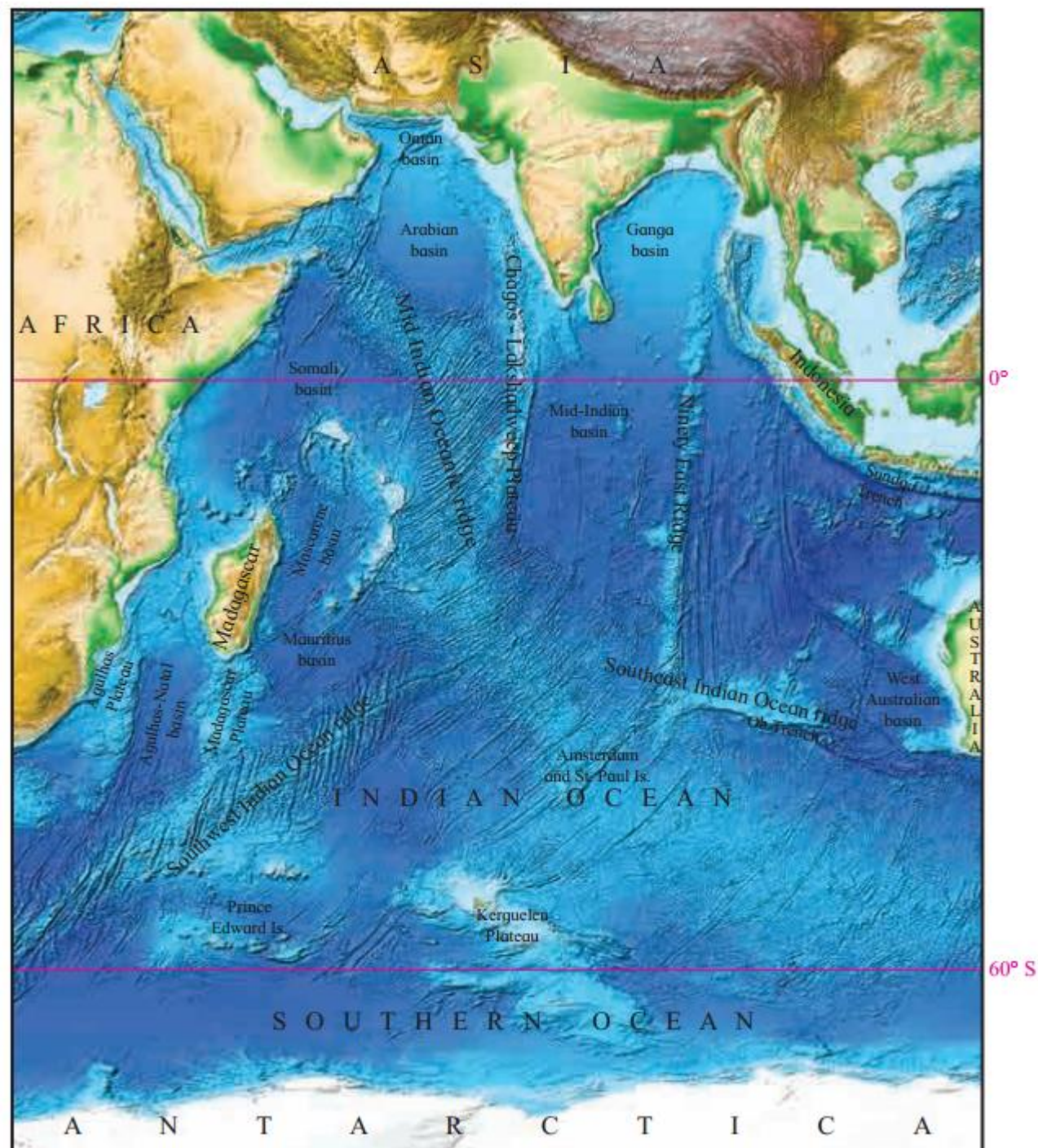
1. Mid Oceanic ridges are submerged mountain ranges that separate deep portions of the sea (ocean) floor.
2. The Indian Ocean also Has a Mid Oceanic ridge called as a Mid Indian Oceanic ridge.
3. It originates from the Gulf of Eden near the Peninsula of Somalia.
4. Further it extends toward the south and on the East side of Madagascar, it gets divided into two branches. Among these, one branch diverts towards southwest and extends up to Prince Edward Island. It is known as Southwest Indian Ocean ridge.
5. The second branch extends southeast up to Amsterdam and St. Paul Island.
6. Mid Indian Oceanic Ridge has many parallel ridges. This ridge is not continuous due to many fracture zones in it, such as Owen Fracture Zone, Amsterdam Fracture Zone, etc.

(d) Ocean Currents:

1. The pattern of currents in the Indian Ocean differs from those in Pacific or Atlantic Oceans.
2. The monsoon wind system has an effect on the currents in northern Indian Ocean.
3. The shape of the coastline of the Indian Ocean, its extent, and the peculiar arrangement of the wind system that prevails in the region also influence the system of the ocean currents in the Indian Ocean.
4. It has Equatorial Currents but the north equatorial current is weaker than the south equatorial current.
5. North of the equator the currents are influenced by the seasonally reversing monsoon wind system.
6. The current system in the southern part of the Indian Ocean leads to the development of a large gyre.
7. South equatorial current flowing east to west direction under the influence of easterlies. The circulation is completed in the west by Mozambique – Agulhas currents.
8. The second arm is 'West Wind Drift' flowing from west to east under the influence of westerlies and the circulation is completed in the east by West Australian current. It is considered to be one of the major gyres on global scale.
9. In the northern portion of the Indian Ocean seasonal monsoonal winds drive the current. During summer, they follow clockwise direction and during winter, their direction shows a complete reversal and they flow in anticlockwise direction.

5. On an outline map of the world, locate the following and make an index:

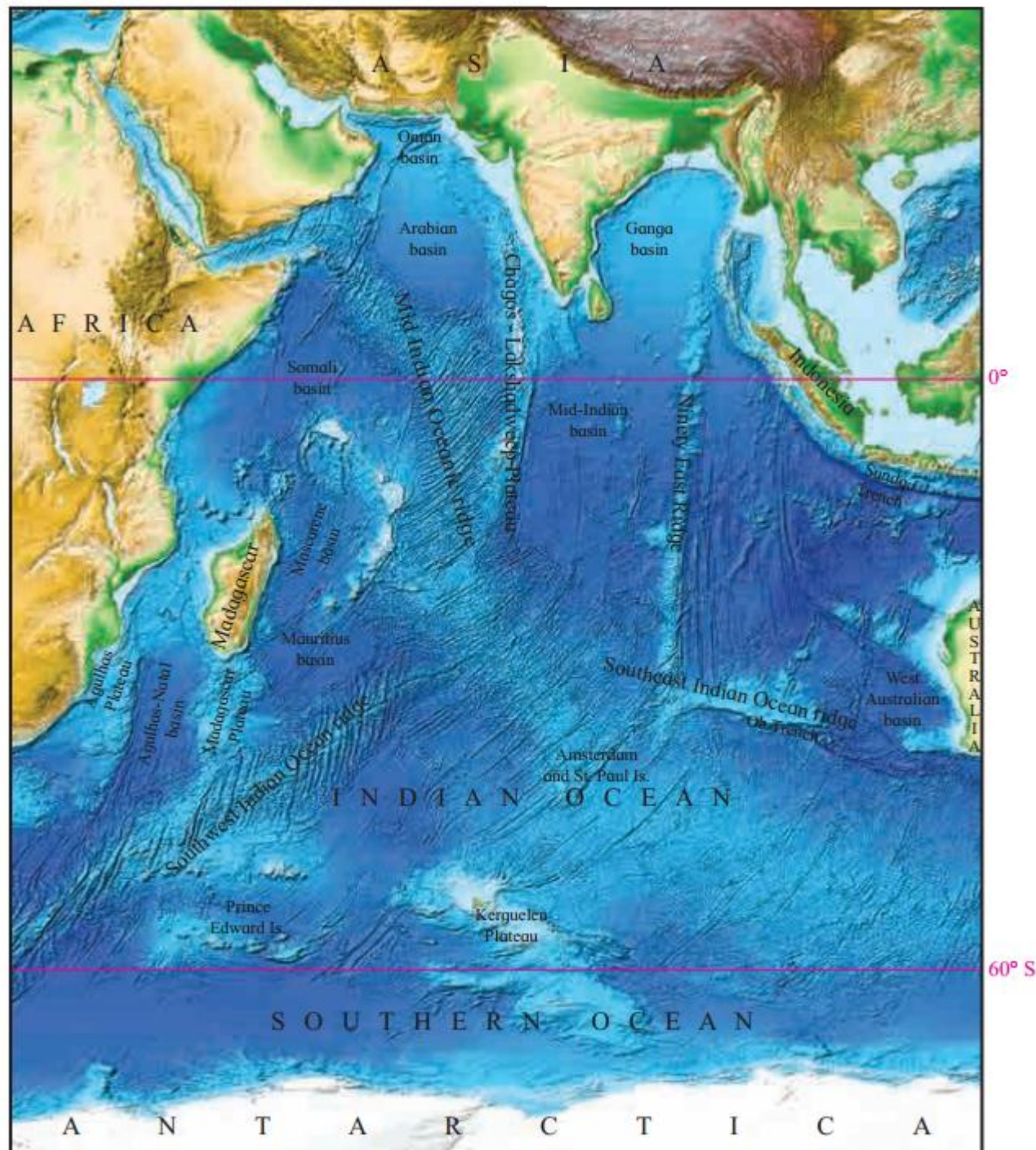
1. Sunda Trench
2. Diego Garcia
3. SW Monsoon
4. Agulhas Current
5. West Australian Current
6. Ninety East ridge
7. Strait of Holmuz
8. Chabahar port



11th Geography Digest Chapter 7 Indian Ocean – Relief and Strategic Importance Intext Questions and Answers

[Make friends with maps! \(Textbook Page No. 75\)](#)

Look at the figure 7.1 and answer the following questions.



Question 1.

What does this map show?

Answer:

This map shows the relief of the Indian Ocean floor.

Question 2.

Which continents and sub-continent are visible in this map?

Answer:

The continents of Africa, Antarctica, Australia and the Indian sub-continent are visible in the map.

Question 3.

What lies between the continents?

Answer:

The Indian Ocean and the Southern Ocean lie between the continents.

Question 4.

Chagos Plateau, Sunda Trench, Central Mountain range are a part of what?

Answer:

The Chagos plateau is a part of Lakshadweep Plateau.

The Sunda Trench is a part of the Java Trench located in the Indian Ocean near Sumatra, formed where Australian – Capricorn Plates subduct under a part of the Eurasian Plate. The central Mountain Range is a part of Mid Indian Oceanic ridge.

Question 5.

What are the conclusions you can draw after looking at the map?

Answer:

1. The relief of the ocean floor of the Indian Ocean shows many features.
2. The Indian Ocean lies mostly in the southern hemisphere.
3. It is surrounded by the Continent of Africa in the northwest, the Indian sub-continent in the north and north-east, the continent of Australia in the east and the Southern Ocean and the Continent of Antarctica in the south.
4. The ocean floor has features like the Agulhas plateau, the Madagascar plateau, Chagos and Lakshadweep plateau, and the Kerguelen plateau.
5. It also has ridges like the Southwest Indian Ocean ridge, the Southeast Indian Ocean ridge and the Mid Indian Ocean ridge.

6. The other feature are basins like the Agulhas – Natal basin, the Mauritius basin, the Mascarene basin, the Mid-Indian basin, the Ganga basin and the West Australian basin.
7. The Trenches include Sunda trench.
8. The Island includes Amsterdam and St. Paul Island and Prince Edward Island.

[Find Out! \(Textbook Page No. 77\)](#)

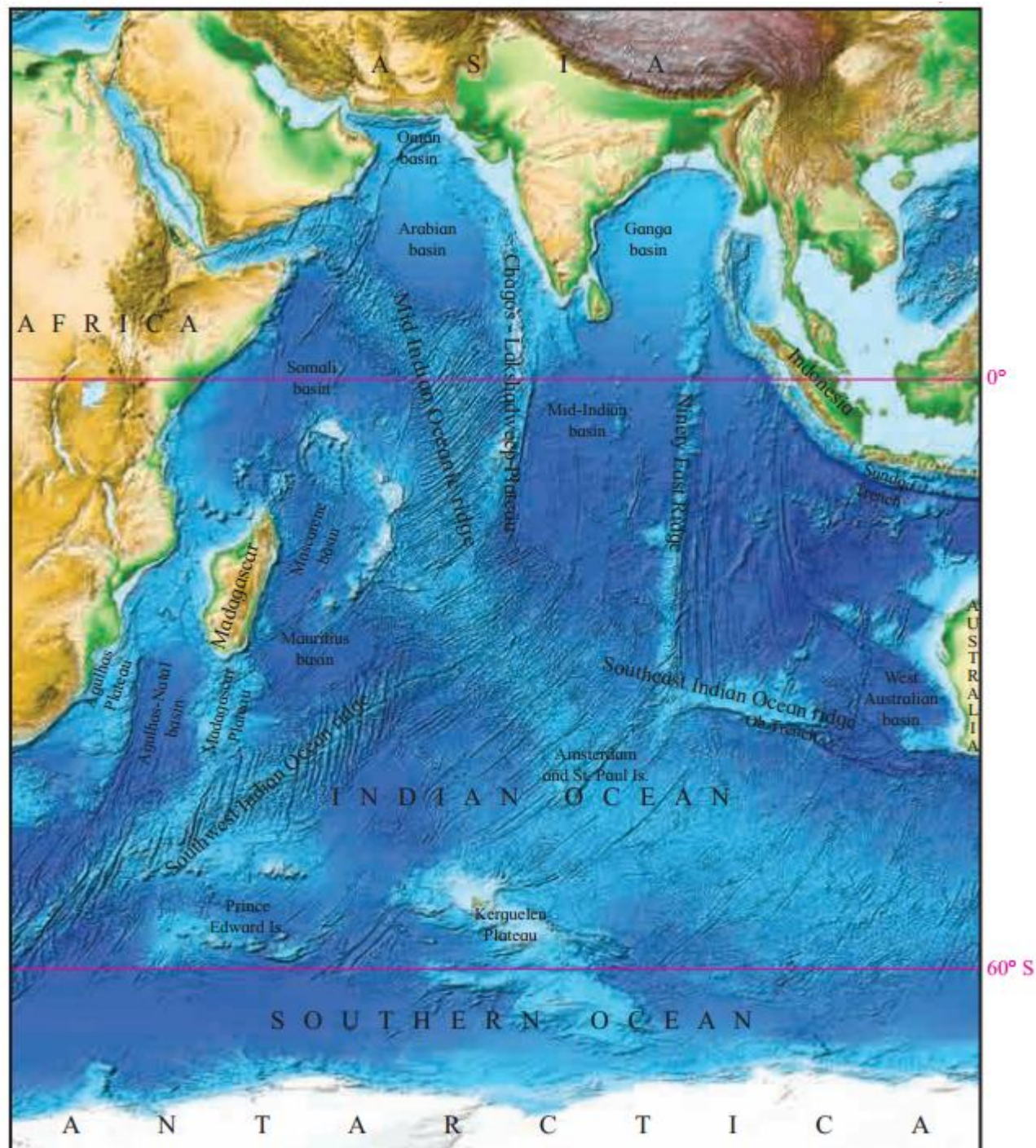
Why Ninety East ridge name has been given to this ridge?

Answer:

1. This land form is named as the Ninety East ridge because it is located near the spot where the parallel of latitude strikes along the 90th Meridian at the centre of the eastern hemisphere.
2. It is one of the important relief features of the Indian Ocean because it divides the Indian Ocean into west and east Indian Ocean.

[Try This. \(Textbook Page No. 78\)](#)

Given below are names of some ocean basins in the Indian Ocean. Identify these in figure 7.1. Write a note on their locations, their separators and the rivers entering into them. Rank these according to their size on the basis of your perception.



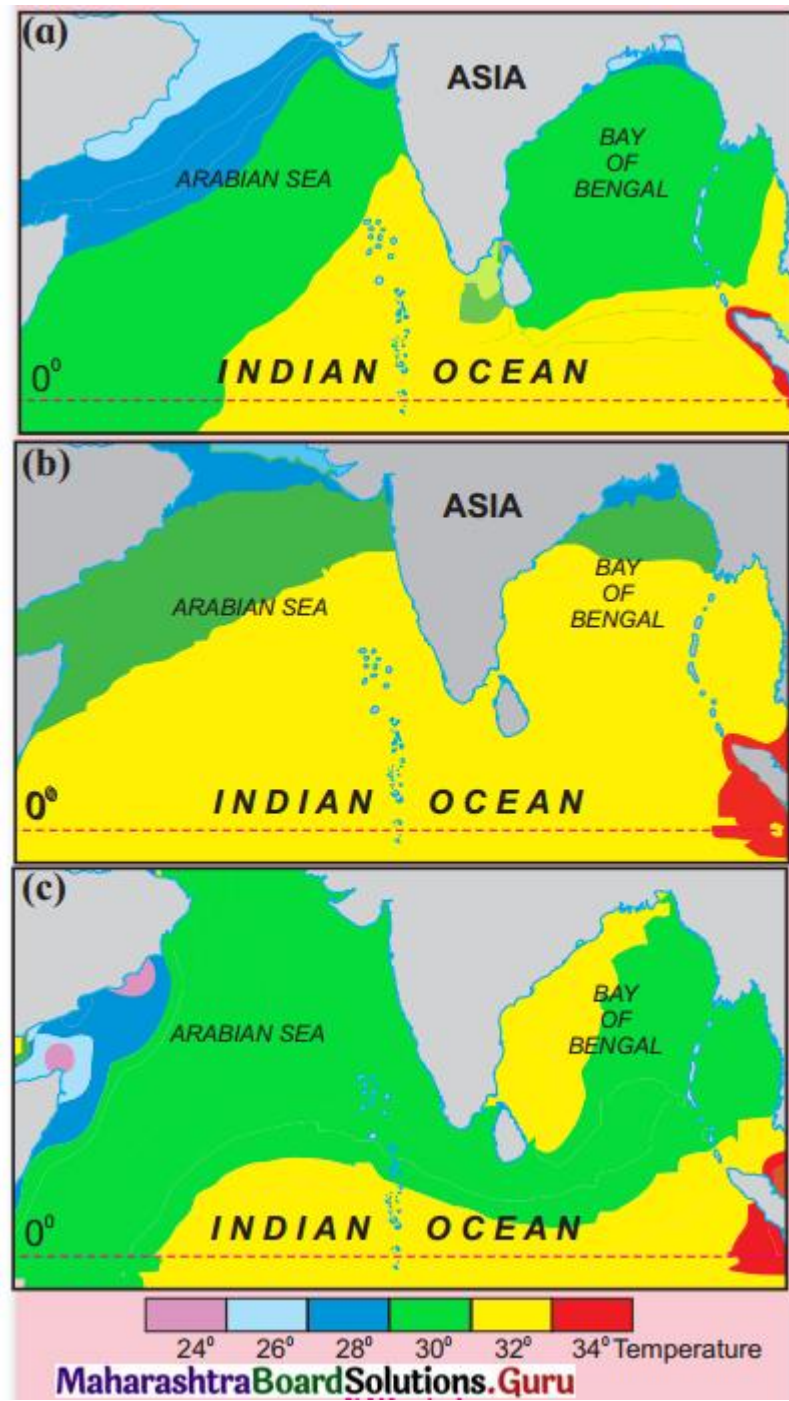
(1) Oman basin (2) Arabian basin (3) Somali basin (4) Mauritius basin (5) Mascarene basin (6) Agulhas-Natal basin (7) West Australian basin (8) Mid-Indian basin (9) Ganga basin

Answer:

No.	Basin	Location	Separators	Rivers entering into them
1.	Oman Basin	Faces the Gulf of Oman.	—	—
2.	Arabian Basin	Southern part of the Arabian Sea between the Arabian Peninsula and India.	Between Lakshadweep-Chagos ridge and Sumatra-Chagos ridge.	Indus, Narmada, Tapi, Sabarmati and Mahi.
3.	Somali Basin	South-Western part of the Arabian Sea, arm of the Indian Ocean, south of Somalia.	Between Socotra island, Chagos ridge and the African Horn.	River Jubba
4.	Mauritius Basin	South-West part of the Indian Ocean, north of the Tropic of Capricorn	—	The Grand river
5.	Madagascar Basin	Lying between Madagascar and the Seychelles Plateau in the northwest Indian Ocean.	Amirante Arc	—
6.	Agulhas-Natal Basin	South of Africa between the Agulhas Bank and Agulhas Plateau.	— AGS	—
7.	West Australian Basin	North-West of Western Australia.	—	—
8.	Mid-Indian Basin	North-Western part of the Indian Ocean	—	—
9.	Ganga Basin	Between the Himalayas and the Vindhya and Chota Nagpur Plateau.	—	—

Can you do it?

1. Study maps given in the figure 7.2 carefully. These maps are showing the portion of Indian Ocean lying north of equator. Maps in the figure depict the temperature conditions in three seasons: (a) pre-SW monsoon (b) NE monsoon (c) during SW monsoon. Answer the following questions. (Textbook Page No. 78)



Question 1.

Why are isotherms not drawn on the continental part?

Answer:

The isotherms are not drawn on the continental part because there is summer season and the temperature is high almost everywhere. Since there is no variation in temperature, isotherms are not drawn.

Question 2.

Why is the temperature low in Arabian Sea than in Bay of Bengal?

Answer:

The temperature is low in Arabian Sea than in Bay of Bengal due to following reasons-

1. The salinity of the Arabian Sea is high so it lowers the temperature but the salinity of Bay of Bengal is Low.
2. The Arabian Sea is open and broad sea compared to Bay of Bengal which is narrow and enclosed by landmasses. There is a lot of movement of ocean water in the Arabian Sea as compared to the Bay of Bengal.

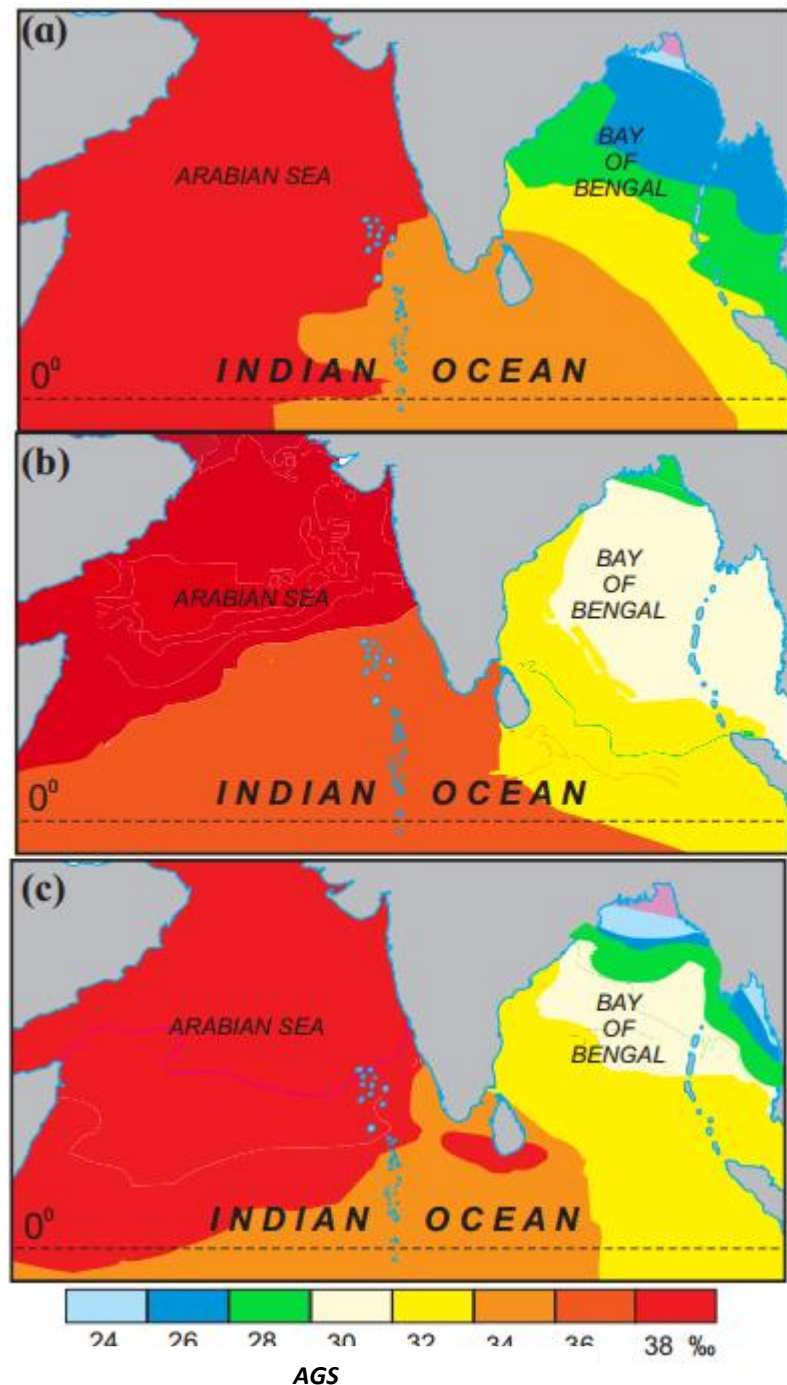
Question 3.

Why is the temperature higher in southern portion of Indian Ocean during pre-SW monsoon?

Answer:

The southern portion of the Indian Ocean is closer to the equator compared to the northern portion of the Arabian Sea. During pre-SW monsoon period, Uttarayan is observed therefore the temperature is high.

2. The given maps are depicting the salinity distribution of northern Indian Ocean. Study the maps (a) NE monsoon (b) pre-SW monsoon (c) SW monsoon given in the figure 7.3 carefully and answer the following questions. (Textbook Page No. 79)



Question 1.

Why does the Arabian Sea record higher salinity than the Bay of Bengal?

Answer:

1. The Arabian Sea experiences higher rate of evaporation due to low air humidity, high temperature and lower rainfall.
2. The number of rivers adding fresh water to the Arabian Sea are fewer in number as compared to the number of long rivers that add fresh water into the Bay of Bengal.
3. Due to huge discharge from Ganga system and also from long rivers of peninsular India like Krishna. Mahanadi. Cauvery (Kaveri), etc., salinity is low.

This leads to higher salinity in the Arabian Sea as compared to the salinity of the Bay of Bengal.

Question 2.

What is the minimum salinity in the Bay of Bengal? In Which seasons do we find it?

Answer:

The minimum salinity in the Bay of Bengal is 30 PSU (Practical Salinity Unit). This occurs in the late autumn and early winter months (November to January) when the East India Coastal Current flows southwards carrying low salinity water.

Question 3.

Account for the high salinity in the Arabian Sea throughout the year?

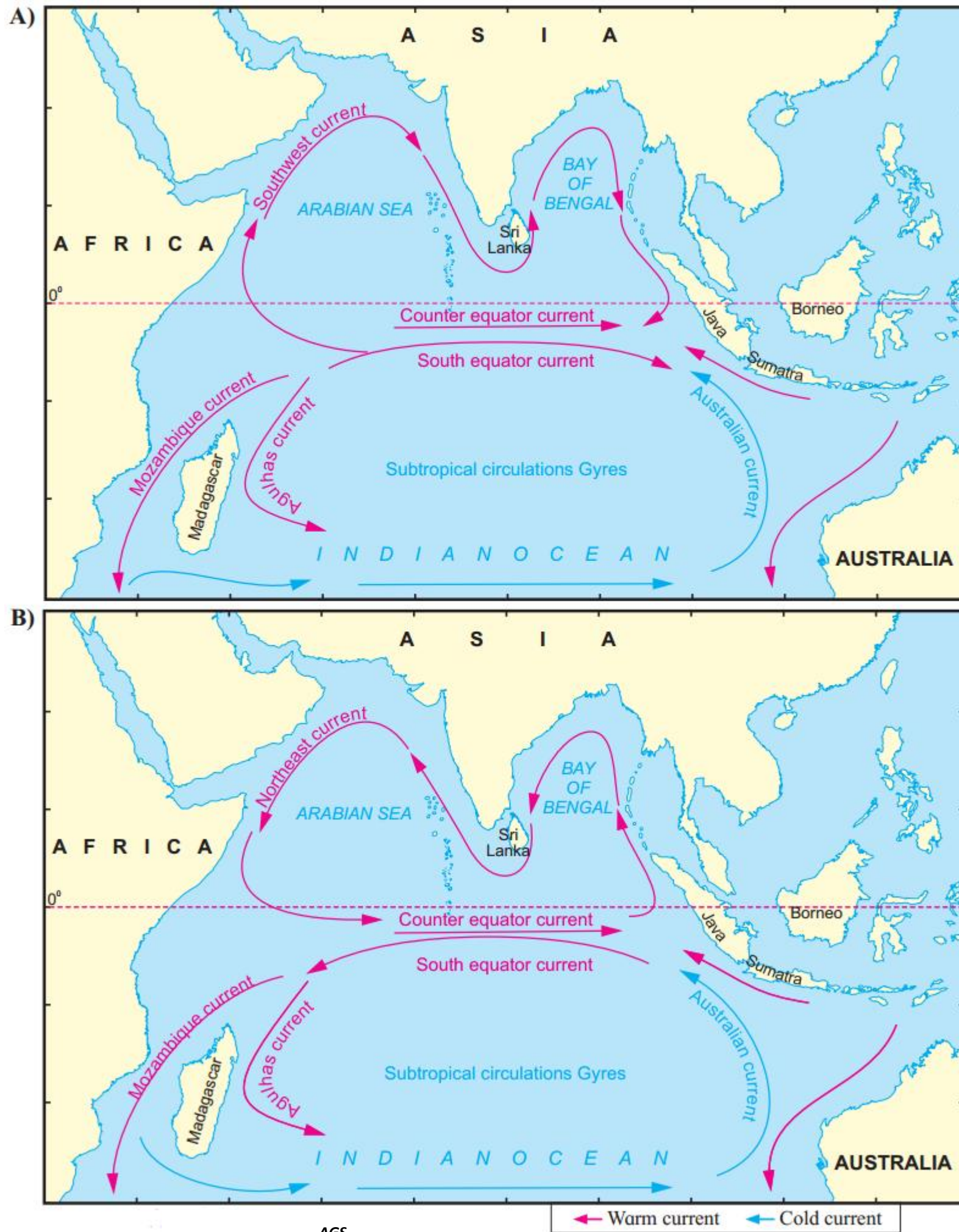
Answer:

1. The Arabian Sea experiences higher rate of evaporation due to low air humidity, high temperature and lower rainfall.
2. The number of rivers adding fresh water to the Arabian Sea are fewer in number as compared to the number of long rivers that add fresh water into the Bay of Bengal.
3. The rivers joining the Arabian Sea are short and swift so their volume of water is less. As a result, supply of fresh water is less.

This leads to higher salinity in the Arabian Sea as compared to the salinity of the Bay of Bengal.

[Do you know? \(Textbook Page No. 80\)](#)

See the maps in figure 7.4 A and B. They show the pattern of ocean currents in the Indian Ocean during different seasons. Study the maps carefully and answer the following questions.



Question 1.

Identify the season each map is representing and name them accordingly.

Answer:

1. Map A shows the summer season condition because in the northern portion of Indian Ocean the Ocean Currents (South Equator Current) flow along the coastlines and flow in the clockwise direction.
2. Map B shows the winter season condition because in the northern portion of Indian Ocean, the Ocean Currents flow in a complete reverse direction that is in the anticlockwise direction.

Question 2.

What difference do you notice in the direction of currents between winter and summer in Northern Part of the Indian Ocean?

Answer:

In the Northern Part of the Indian Ocean, during summer, the ocean currents flow along the coastlines and flow in the clockwise direction. In the winter season, these ocean currents flow a complete reverse and they flow in anticlockwise directions.

Question 3.

How many cold currents are there in the Indian Ocean? Name them.

Answer:

There are four cold currents in the Indian Ocean. The cold currents in the Indian Ocean are the North-East Monsoon Current, Somali Current, West Australian Current and South Indian Ocean Current.

Question 4.

Why do you think the cold currents are fewer in Indian Ocean?

Answer:

1. The Indian Ocean has land masses of three sizes.
2. There is varying surface circulation.
3. There is no arctic contact.
4. The waters remain between 72° and 82° Fahrenheit across the upper layer. So, there are fewer colder currents in the Indian Ocean.

Question 5.

Which currents maintain the direction in both the seasons?

Answer:

The Mozambique Current, The Equatorial Counter Current, the Agulhas Current and the Australian Current maintain the direction in both the seasons.

Question 6.

Can you see any circulation in the currents of the Indian Ocean? What are such circulations called? If yes, name the currents sequentially.

Answer:

Yes, such circulations are currents called gyre.

1. The South Equatorial Current flowing east to west direction is under the influence of easterlies.
2. The 'West Wind Drift' flowing from west to east is under the influence of the westerlies.
3. The circulation is completed in the west by the Mozambique-Agulhas currents and in the east by West Australian Current,

[Can you tell? \(Textbook Page No. 81\)](#)

(i) Name the Gulf countries

(ii) In which direction do they lie in the Asian continent?

Answer:

(i) The Gulf countries are Kuwait, Oman, Saudi Arabia, UAE, Qatar and Bahrain. They are called as Gulf countries because they are members of the GCC (Gulf Co-operation Council).

(ii) They lie in the western direction in the Asian continent.