

# Drainage



"If we look at the physical map we will notice that small streams flowing from different directions come together to form the main river, which ultimately drains into a large water body such as a lake or a sea or an ocean. The term **drainage** describes the river system of an area."

## 10.1 Drainage of India

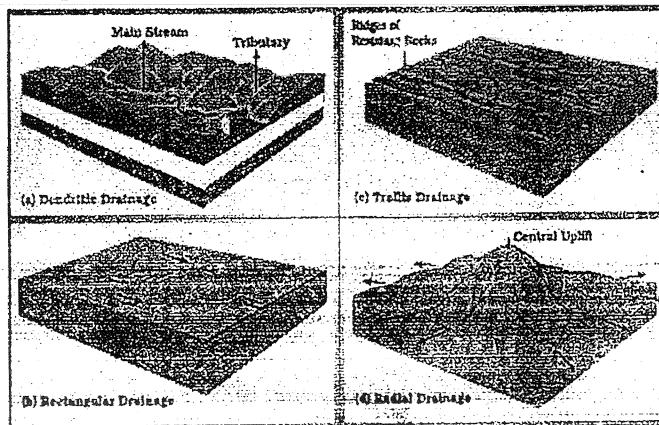


Fig.1 Types of drainage

**Drainage** : The term drainage is used to describe the river system of an area.

**Drainage basin** : The area drained by a single river system is called a drainage basin.

**Water divide** : The upland that separates the flow of two rivers or river system.

**River system** : A river, along with its tributaries may be called a river system.

## 1.2 Drainage pattern

A drainage system refers to the origin and development of stream through time while drainage pattern means arrangement and form of drainage system in terms of geometrical shapes in the area. They are of different types.

**Trellis Pattern** : In this pattern, the tributaries can be seen meeting the main stream at almost right angle



71 per cent of the world's surface is covered with water, but 97 per cent of that is salt water.

Of the 3 per cent that is available as freshwater, three quarters of it is trapped as ice.

(Indus, Ganga, Brahmaputra)  
Prinind river - Origin

from glacier. @ Large Catchment area. @ Pass through Gorge, Ganga deep valley. @ Young River. @ use in agriculture.

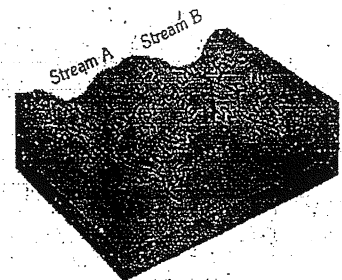


Fig.2 Water divide

Chauani, Mahandi, Brahmaputra  
Insular River - Origin  
from plateau. @ Small Catchment. @ Pass through deep valley. @ Mature River



Though the Indus is a perennial river, much of its water is lost as it flows through the Thar Desert. The delta formed by this river is mostly wasteland, since it is usually flooded with brackish water.

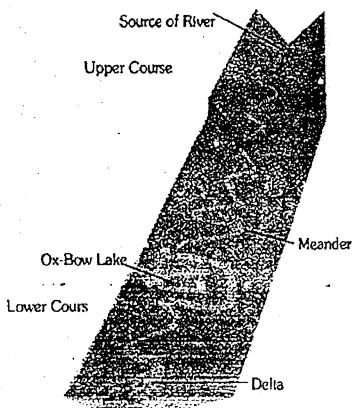


Fig.3 Some features made by rivers



According to the regulations of the Indus Water Treaty (1960), India can use only 20 per cent of the total water carried by Indus river system. This water is used for irrigation in Punjab, Haryana and the southern and western parts of Rajasthan.

- **Dendritic drainage pattern** : This pattern develops where the river channel follows the slope of the terrain. The stream with its tributaries resembles the branches of tree.
  - **Rectangular drainage pattern** : In this pattern numerous rivers which are parallel to each other and follow the regional slope of the rocky terrain.
  - **Radial drainage pattern** : Radial drainage pattern also known as centrifugal pattern is formed by the stream which diverges from a central higher point in all directions.
- On the basis of origin, two broad drainage systems of India are generally recognised.

1. The Himalayan Rivers
2. The Peninsular Rivers.

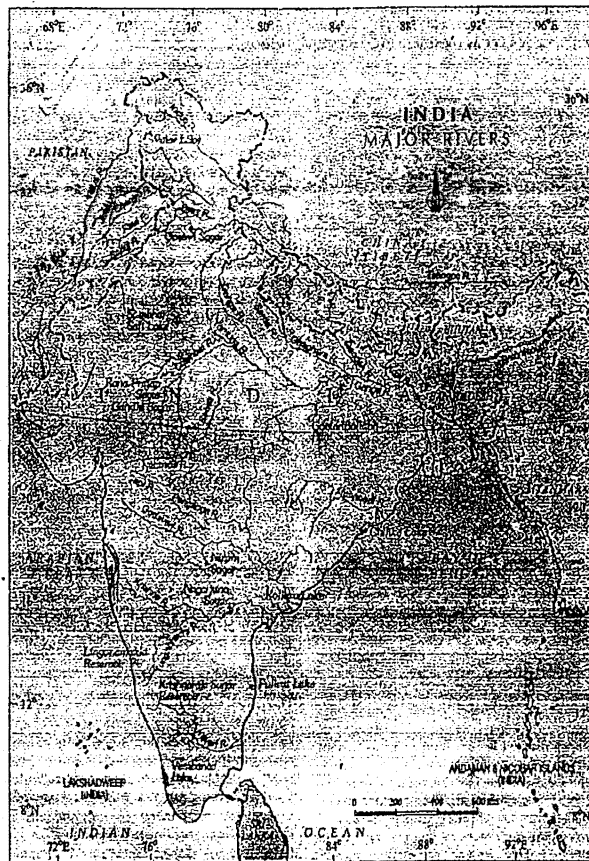


Fig.4 Major rivers & lakes

### 10.3 The Himalayan river system

#### (a) The Indus River System

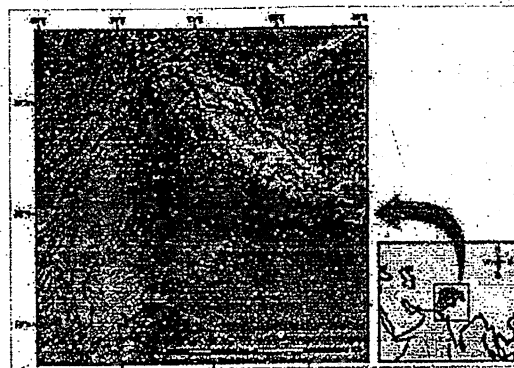


Fig.5 Indus basin

- The Indus originates from the glaciers of the Kailash range in Western Tibet near Mansarovar Lake.
- It flows west and north west wards and enters Indian territory in Jammu & Kashmir. It cuts through the mountains & forms a spectacular gorge. It flows through Ladakh, Baltistan and Gilgit to finally emerge out of the hills at Attock. Here the Indus is joined by the Kabul river from Afganistan. The Indus flows south west wards across Pakistan to reach the Arabian sea in east of Karachi.
- With a total length of 2,900 k.m., the Indus is considered as one of the longest rivers of the world.
- Satluj, Chenab, Jhelum, they join together to enter the Indus near Mithankot. Beas and Ravi are its main tributaries.

(b) The Ganga drainage system

- The head waters of the Ganga, called the Bhagirathi is fed by the 'Gango'tri' Glacier and joined by the Alaknanda at Dev Prayag in Uttranchal.
- The major tributaries of Ganga are : The Yamuna, The Ganga, The Gandak and The Kosi.
- Flowing south westwards, the Ganga comes out of Himalayas near Haridwar.
- The total length of the Ganga is 2500 km.
- The main tributaries which come from the peninsular upland are the Chambal, the Betwa and the Son.
- Beyond Farakka it flows south east ward and is divided into distributaries the Bhagirathi which goes to West Bengal and other goes to Bangladesh where it is known as Padma.
- Before falling into Bay of Bengal, the Padma joins the Brahmaputra which is known as Jamuna & Meghna here.
- The Yamuna and the Son are the two main river bank tributaries of the Ganga.



Fig.6 : Confluence of Bhagirathi and Alaknanda at Devprayag

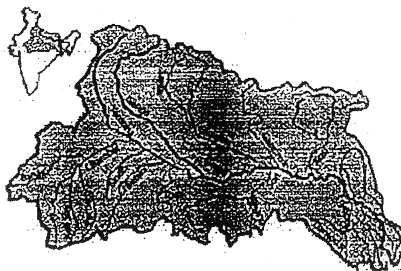


Fig.8 Ganga drainage system



The Sundarban Delta derived its name from the Sundari tree which grows well in marshland. It is the world's largest and fastest growing delta. It is also the home of Royal Bengal tiger.

Brahmaputra is known as the Tsang Po in Tibet and Jamuna in Bangladesh.

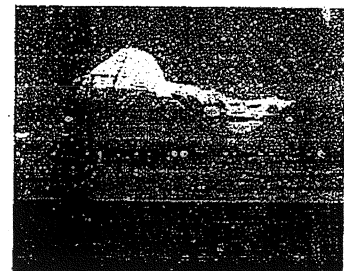


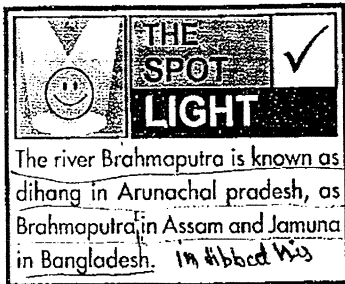
Fig.7 Mansarovar lake



The river Kaveri makes the second biggest waterfall in India. It is known as Sivasamudram. The fall supplies hydroelectric power to Mysore, Bangalore and the Kolar Gold Field.

**CHECK YOUR LEARNING 10.1**

- 1 Categorise the following rivers into two sections : Himalayan rivers and Peninsular rivers.  
Ghaghra, Narmada, Mahanadi, Beas, Sarda, Krishna, Godavari, Brahmaputra, Gandak, Tapi.



*নামক জসাম্পু (দীংখা)*



The Ganga basin forms 25 per cent of the total area of India. It is the longest river in the country. The Ganga and the Brahmaputra flow in opposite direction to meet together in Bangladesh where they form the largest delta of the world. The major part of the Ganga-Brahmaputra delta lies in Bangladesh.



River Damodar is known as the 'Sorrow of Bengal' as it causes widespread destruction of lives, cattle and crops due to frequent flooding. It joins the Ganga from the right.

## CHECK YOUR ANSWERS 10.1

1.

|     | Hamalayan rivers | Peninsular rivers |
|-----|------------------|-------------------|
| (1) | Ghaghra          | Krishna           |
| (2) | Brahmaputra      | Narmada           |
| (3) | Beas             | Godavari          |
| (4) | Gandak           | Mahanadi          |
| (5) | Gandak           | Tapi              |

### The Yamuna

- It is the largest and most important tributary of the Ganga.
- It originates from the Yamunotri Glacier on the Bandarpunch Peak in Garhwal.
- After cutting a deep gorge across the lesser Himalayas, it flows towards the south west and enters the Ganga plain near Tajewala. It flows parallel to the Ganga and as a right bank tributary, meets the Ganga at Allahabad.

### (c) The Brahmaputra Drainage system

- The Brahmaputra rises in Tibet east of Mansarowar lake very close to the source of the Indus and the Satluj.
- It is one of the largest river in the world with a total length of 2900 km.
- It flows eastwards parallel to the Himalayas.
- On reaching the Namacha Barwa (7757 m). It takes a U turn and enters India in Arunachal Pradesh through a gorge. Here it is called the Dihang and is joined by the Dibang, the Lohit, the Kenula and many other tributaries to form the Brahmaputra in Assam.
- In Tibet, the river carries a smaller volume of water and less silt as it is cold and dry area.
- In India the river carries a large volume of water as it passes through a region of high rainfall and considerable amount of silt.



Fig.9 A Gorge

## 10.4 The Peninsular Rivers

### (a) Major features of Peninsular rivers

- Almost all the rivers of the Peninsula are in the mature stage.
- They flow through wide valleys.
- Except the Narmada and Tapi which drain west wards into the Arabian Sea, the other major streams discharge their water into the Bay of Bengal.

### (b) The East flowing rivers

- **The Mahanadi :** The river rises in the highlands of Dandakaranya in Chhattisgarh. It flows through Orissa to reach the Bay of Bengal. The total length of the river is about 860 km. Its drainage basin is shared by Maharashtra, Chhattisgarh, Jharkhand and Orissa.
- **Godavari Basin :** It is the largest river of the Peninsula. It originates from the Plateau of the north Sahyadri near Nasik. The Godavari is often referred as 'Vridha Ganga' or 'Dakshina Ganga' because of its large size and extent.

Its principal tributaries include the Pranhita, Wardha, Purna, Manjra, Penganga, Wainganga.

- **Krishna Basin :** Rising from a spring near Mahabaleshwar, the Krishna flows for about 1400 km and reaches the Bay of Bengal. Its tributaries are the Tungabhadra, the Koyana, the Ghatprabha, the Musi and the Bhimi. Its drainage basin is shared by Maharashtra, Karnataka and Andhra Pradesh.
- **The Kaveri Basin :** It rises in the Brahmagiri range of the Western Ghats and it reaches the Bay of Bengal in south of Cuddalore in Tamil Nadu. Total length of the river is about 760 km. Its main tributaries are Amravati, Bhavani, Hemavati and Kabini. Its basin drains parts of Karnataka, Kerala and Tamil Nadu.

#### Other east-flowing rivers

Beside three major rivers there are some smaller rivers flowing towards the east like the Damodar, the Subarnrekha, the Brahmani, the Penmen, the Pannaiyar and Vaigai.

#### (c) The west flowing rivers

##### The Narmada Basin

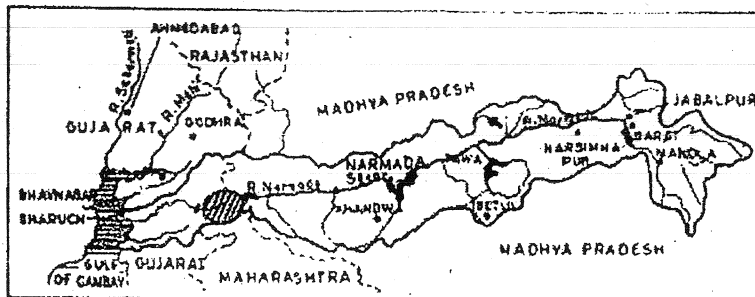


Fig.10 Narmada basin

- This river originates from Amarkantak hills in Madhya Pradesh.
- It flows towards the west in a rift valley formed due to faulting.
- On its way to the sea, the Narmada creates many picturesque locations. The 'Marble rocks' near Jabalpur where the Narmada flows through a deep gorge and the 'Dhuadhar falls' where the river plunges over steep rocks are some of the notable ones.
- All the tributaries of the Narmada are very short and most of these join the main stream at right angles.
- The Narmada basin covers parts of Madhya Pradesh and Gujarat.

##### The Tapi

- This river originates from the sacred tank of Multai on Satpura Plateau in Betul district of Madhya Pradesh.
- It is the second largest west flowing river of the Peninsular India.
- It also flows in a rift valley parallel to the Narmada but it is much shorter in length.
- Its basin covers parts of Madhya Pradesh, Gujarat and Maharashtra.

The coastal plains between Western ghats and the Arabian sea are very narrow. The main west flowing rivers are Sabarmati, Mahi, Brahmaputra and Periyar.

|   |               |   |
|---|---------------|---|
| ☺ | THE           | ✓ |
|   | SPOT<br>LIGHT |   |

Perennial Rivers : These are the rivers which flow through out the year as they get water from the rainfall as well as melting of ice.



Fig.11 Loktak Lake

|   |               |   |
|---|---------------|---|
| ☺ | THE           | ✓ |
|   | SPOT<br>LIGHT |   |

Distributary : A distributary is that river which originates from a main river. It is formed near the mouth of river before it falls into the sea. It is found in the lower course of the river.

**THE  
SPOT  
LIGHT**

River Sharavati in the state of Karnataka is famous for its Gersoppa (Jog Falls). These falls can be considered as one of the world's greatest waterfalls in the rainy season. But like other peninsular rivers, the Sharavati has very little water in the dry season.

**THE  
SPOT  
LIGHT**

Some rivers of the Peninsular Plateau flow towards Ganga, e.g., Chambal, Betwa, Ken, Sindh and Son. These rivers rise in the Vindhya range.

## 10.5 Lakes

- **Lakes :** A lake is a body of water lying on a hollow on the earth's surface and being surrounded by lakes. Following are the major types of lakes found in India.
- **Freshwater lakes :** Most of the fresh water lakes are in the Himalayan region. They are of glacial origin. The Dal lake, Bhimatal, Nainital, Loktok and Barapani are some of the fresh water lakes of India.
- **Lakes of Tectonic origin :** Folding and faulting produce hollows in the earth's crust. These hollows contain either salt or fresh water lake. The Wular lake in Jammu & Kashmir is the result of tectonic activity.
- **Salt water lake :** Any lake that has no natural drainage outlet, either as a surface of stream or as a sustain, subsurface flow, will become saline. The Sambhar lake in the desert region of Rajasthan is a salt water lake. It is used for producing salt.
- **Man made lakes :** In order to harness water for generation of hydel power, to provide irrigation water to crops and to provide drinking water to urban places, a number of lakes have been constructed. e.g. Guru Govind Sagar (Bhakra Nangal Project).

### CHECK YOUR LEARNING 10.2

- 1 Categorise the following lakes into freshwater and salt lakes.  
Wular lake, Kolleru, Sambhar lake, Pulicat lake, Chilika lake, Loktak lake, Bhimtal, Barapani.
- (a) **Importance of Rivers**
- (i) Rivers have been of fundamental importance throughout the human history.
  - (ii) Water from the rivers is a basic natural resource, essential for various human activities.
  - (iii) The river banks have attracted settlers from ancient times, which have now become big cities.

## 10.6 Role of rivers in the economy

- **Development of civilization :** Rivers have played role in the development of civilisation. Most of the ancient civilisations like Indus, etc developed around the river.
- **Development for agriculture :** Rivers and their associated alluvial soils provide the most productive agricultural lands of the country.
- **Settlement :** Most of the large cities are located on the banks of a river. Not only these rivers provide water supplies but also they provide transportation.
- **Industrial development :** It has flourished along rivers. In many industries river water is used as a coolant and for the generation of hydro electricity.
- **Means of transportation :** River provide primary channel of inland transportation.

### 10.7 River Pollution

- The growing domestic and industrial demand for water from rivers naturally affects the quality of water. As a result more and more water is being drained out of the rivers reducing their volume.
- A heavy load of untreated sewage and industrial effluents are emptied into the rivers. This affects not only the quality of water but-also the self cleaning, capacity of rivers.
- The increasing urbanisation and industrialization is also responsible for increasing pollution level of many rivers.

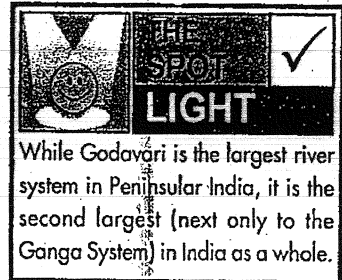
### 10.8 National Rivers Conservation plan

The activities of Ganga Action plan (GAP) phase-I, initiated in 1985, were declared closed on 31st March 2000. The Steering Committee of the National River Conservation Authority reviewed the progress of the GAP and necessary correction on the basis of lessons learnt and experiences gained from GAP phase-I. These have been applied to the major polluted rivers of the country under the NRCP.

The Ganga Action Plan (GAP) phase-II, has been merged with the NRCP. The expanded NRCP now covers 152 towns located along 27 interstate rivers in 16 states. Under this action plan, pollution abatement works are being taken up in 57 towns. A total of 215 schemes of pollution abatement have been sanctioned. So far, 69 schemes have been completed under this action plan. A million litres of sewage is targeted to be intercepted, diverted and treated.

### CHECK YOUR ANSWERS 10.2

|     |                         |                         |
|-----|-------------------------|-------------------------|
| 1.  | <b>Freshwater lakes</b> | <b>Salt water lakes</b> |
| (1) | Wular lake              | Chilika lake            |
| (2) | Loktak lake             | Kolleru lake            |
| (3) | Bhimtal                 | Sambhar lake            |
| (4) | Barapani                | Pulicat lake            |



## IMPORTANT TERMS

### ARTIFICIAL LAKE

A pond or lake built for storage of water, usually by the construction of a dam across a river. Also called man-made lake.

### BARS/SANDBARS

A submerged (or partly submerged) ridge in a river or along a shore.

### BRACKISH WATER LAKE

A lake which has water that has more salinity than fresh water, but not as much as seawater.

### BRAIDED CHANNEL

A river channel in which bars and islands have been deposited and around which the river flows. Braiding occurs when the discharge fluctuates frequently, when the river cannot carry its full load, where the river is wide and shallow, where banks are easily eroded and where there is a copious bedload.

### DENDRITIC DRAINAGE

A drainage pattern that may develop on homogeneous rock, which has a shape resembling the pattern made by the branches of a tree or the veins of a leaf.

### FRESH WATER LAKE

A large inland body of fresh water.

### GLACIER

A huge mass of ice slowly flowing over a land mass, formed from compacted snow, in an area where snow accumulation exceeds melting and sublimation.

### GORGE

A deep narrow passage with steep rocky sides through which a river may flow.

### HEADWATERS

The tributary streams of a river in the area in which it rises.

### INDUS WATER TREATY

This is a water-sharing treaty between India and Pakistan, signed in Karachi on 19th September, 1960. The treaty gives India exclusive use of all the waters of the eastern rivers (Sutlej, Beas and Ravi) and their tributaries before the point where the rivers enter Pakistan. Similarly, Pakistan has exclusive use of the western river (Indus, Jhelum and Chenab).

### LEFT BANK

The bank of a river which is to the left while facing downstream.

### MEANDER

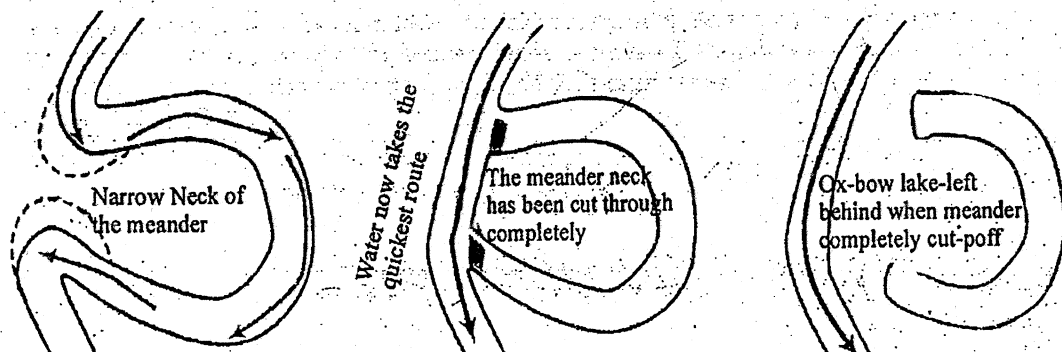
This is formed when the moving water in a stream erodes the outer banks and widens its valley. The result is a snaking pattern as the stream meanders back and forth across its axis.

### NRCP

National River Conservation plan. This has been initiated by the Government of India for pollution abatement works in major rivers of the country.

### OX-BOW LAKE

A crescent-shaped lake formed when a meander of a river or stream is cut off from the main channel (see figures below).



## EXERCISE # 1

### Multiple choice questions

- What is an area drained by a single river system called ?  
(1) Drainage basin (2) Water divide  
(3) ~~Drainage~~ (4) Doab
- Which kind of a drainage pattern is formed when tributaries join rivers at almost right angles ?  
(1) Dendritic drainage (2) ~~Trellis~~ drainage  
(3) Rectangular drainage (4) Radial drainage
- Which one of the following drainage patterns develops on a strongly jointed rocky terrain ?  
(1) ~~Radial~~ (2) Centrifugal  
(3) Trellis (4) ~~Rectangular~~
- What is an upland that separates two drainage basins known as ?  
(1) Drainage basin (2) ~~Drainage system~~  
(3) Water divide (4) River system
- Meanders are formed in which one of the following courses of a river ?  
(1) ~~Upper course~~  
(2) Middle course  
(3) Lower course  
(4) Both upper and middle
- Which one of the following drainage patterns does the Ganga river form ?  
(1) The Trellis Pattern  
(2) The Radial Pattern  
(3) ~~The Dendritic Pattern~~  
(4) The Rectangular Pattern
- The river Indus originates in :  
(1) Nepal (2) Bhutan  
(3) Tibet (4) ~~Bangladesh~~
- Alaknanda and Bhagirathi converge to be called as Ganga at :  
(1) ~~Haridwar~~ (2) Kedarnath  
(3) Badrinath (4) ~~Devprayag~~
- Which one of the following is a southern tributary of the Ganga?  
(1) Ghaggar (2) ~~Son~~  
(3) Gomti (4) Gandak
- Which one of the following rivers has the largest drainage pattern in India ?  
(1) The Indus (2) ~~The Ganga~~  
(3) ~~The Brahmaputra~~ (4) The Mahanadi
- The Brahmaputra (Tsangpo) river rises in :  
(1) Sikkim (2) ~~Tibet~~  
(3) Bhutan (4) Nepal
- Which one of the following statements about the river Narmada is not true ?  
(1) It flows through a rift valley  
(2) ~~It flows through a gorge near Jabalpur~~  
(3) It plunges over steep rocks at the Dhuadhar falls  
(4) Its tributaries are Tungabhadra and Musi

## FORMATIVE ASSESSMENT

- Which of the following rivers rises in the highlands of Chhattisgarh?  
(1) ~~Mahanadi~~ (2) ~~Godavari~~  
(3) Chambal (4) Damodar
- The Wainganga and the Penganga are tributaries of which of the following rivers?  
(1) The Mahanadi (2) The Narmada  
(3) ~~The Godavari~~ (4) The Krishna
- Which of the following is not a tributary of river Krishna?  
(1) Tungabhadra (2) Koyna  
(3) ~~Wardha~~ (4) Bhima
- Which type of lakes contain water only during the rainy season?  
(1) Oxbow lakes  
(2) Lagoons  
(3) ~~Lakes in basins of inland drainage~~  
(4) Glacial lakes
- Which is the largest freshwater lake in India?  
(1) ~~Wular Lake~~ (2) Dal Lake  
(3) Bhimtal (4) Nainital
- In which of the following states is Sambhar Lake situated ?  
(1) ~~Rajasthan~~ (2) Uttar Pradesh  
(3) Bihar (4) Jammu and Kashmir
- Why have the river banks attracted settlers from ancient times?  
(1) Water is a basic natural resource  
(2) Rivers provide water for irrigation  
(3) Rivers provide facilities for inland navigation  
(4) ~~All the above~~
- Which of the following is not one of the causes of river pollution ?  
(1) Dumping of garbage  
(2) ~~Aquatic organisms and algae~~  
(3) Discharge of untreated sewage  
(4) Discharge of industrial effluents

### True or false

- The area drained by a single river system is called drainage.
- In their middle and lower course, the Himalayan rivers form meanders, oxbow lakes, and many other depositional features in their floodplains.
- The Satluj, the Beas, the Ravi, the Chenab and the Jhelum join together to enter the Indus near Karachi in Pakistan.

4. Brahmaputra is slightly longer than the Indus, and most of its course lies outside India.
5. Godavari basin covers parts of Madhya Pradesh, Gujarat and Maharashtra.
6. Rising from a spring near Mahabaleshwar, the Krishna flows for about 1400 km and reaches the Bay of Bengal.
7. Most of the fresh water lakes are in the Peninsular region.
8. Lakes are of great value to human beings.
7. The ..... lake in Jammu and Kashmir, is the result of the tectonic activity.
8. .... banks have attracted settlers from ancient times. These settlements have now become big cities.

#### Match the column

1.

| Column-I |             | Column-II |   |
|----------|-------------|-----------|---|
| (1)      | Indus       | (i)       | rises near a spring near Mahabaleshwar  |
| (2)      | Brahmaputra | (ii)      | rises in the Amarkantak hills in Madhya Pradesh                                   |
| (3)      | Narmada     | (iii)     | rises from the slopes of the Western Ghats, in the Nashik district of Maharashtra |
| (4)      | Godavari    | (iv)      | rises in Tibet, east of Mansarovar Lake   |
| (5)      | Krishna     | (v)       | rises in the Brahmagiri range of the Western Ghats                                |
| (6)      | Kaveri      | (vi)      | rises in Tibet, near Lake Mansarovar  |

- Fill in the blanks
1. Most of the Himalayan rivers are ..... It means that they have water throughout the year.
2. A large number of Peninsular rivers are seasonal, as their flow is dependent on .....
3. Yamuna flows parallel to the Ganga, as a right bank tributary, meets the Ganga at .....
4. The Narmada and Tapi are the only long rivers, which flow west and make .....
5. Mahanadi rises in the highlands of ..... It flows through Orissa to reach the Bay of Bengal.
6. A meandering river across a flood plain forms cut-offs that later develop into ..... lakes.

### ANSWER KEY

#### Multiple choice questions

| Q.No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| Ans.  | 1 | 2 | 4 | 3 | 3 | 3 | 3 | 4 | 2 | 2  | 2  | 4  | 1  | 3  | 3  | 3  | 1  | 1  | 4  | 2  |

#### True or false

1. False    2. True    3. False    4. True    5. False    6. True    7. False    8. True

#### Fill in the blanks

1. Perennial    2. rainfall    3. Allahabad    4. estuaries    5. Chhattisgarh    6. Ox-bow
7. Wular    8. River.

#### Match the column

1. (1) → vi ; (2) → iv ; (3) → ii ; (4) → iii ; (5) → i ; (6) → v

## EXERCISE # 2

## SUMMATIVE ASSESSMENT

### Short answer type questions

1. What are perennial and non-perennial rivers? Give reasons why the Himalayan region consists of perennial rivers.
2. Why is the Godavari often referred to as the 'Dakshin Ganga'? Write a note on the river Godavari and its tributaries.
3. What is a lagoon? How does it differ from a lake?
4. Where are India's most of the freshwater lakes located and why?
5. Write a note on the river Krishna and its tributaries.
6. Name the three Himalayan river system. Give two tributaries of each.
7. Which factors mainly control the drainage system of the Indian subcontinent? Into which major groups are the Indian rivers divided? Write three points of difference between the two.
8. Why are lakes of great value to human beings? Explain any three reasons.

9. Explain the various types of drainage patterns.
10. Give the main features of peninsular rivers.

### Long answer type questions

1. What are the differences between the Himalayan rivers and the Peninsular rivers?
2. Write a note on the Indus Drainage System.
3. Write a note on the Brahmaputra Drainage System.
4. Name any two major river systems of the Himalayan region. Describe any one in detail.
5. Why are rivers important for a country's economy?
6. Write a note about the causes and remedies of river pollution.
7. Discuss any three causes of water pollution.
8. Write a short note on National Rivers Conservation Plan.
9. Explain the role of rivers in the economy.
10. What are the different types of lakes? Explain any one in detail.

## NCERT QUESTIONS WITH ANSWERS

1. Choose the right answer from the four alternatives given below:

(i) Which one of the following describes the drainage patterns resembling the branches of a tree?

- (1) Radial (2) Dendritic (3) Centrifugal (4) Trellis

Ans. Dendritic

(ii) In which of the following States is the Wular Lake located?

- (1) Rajasthan (2) Uttar Pradesh (3) Punjab (4) Jammu and Kashmir

Ans. Jammu and Kashmir

(iii) The river Narmada has its source at:

- (1) Satpura (2) Brahmagir (3) Amarkantak (4) Slopes of the Western Ghats

Ans. Amarkantak

(iv) Which one of the following lakes is a salt water lake?

- (1) Sambhar (2) Dal (3) Wular (4) Gobind Sagar

Ans. Sambhar

(v) Which one of the following is the longest river of the Peninsular India?

- (1) Narmada (2) Krishna (3) Godavari (4) Mahanadi

Ans. Godavari

(vi) Which among the following rivers flows through a rift valley?

- (1) Damodar (2) Tungabhadra (3) Krishna (4) Tapi

Ans. Tapi

2. Answer the following questions briefly.

(i) What is meant by a water divide? Give an example.

Ans. Any elevated area such as a mountain or an upland that separates two drainage basins is called a water divide. An example of water divide is the Western Ghats.

(ii) Which is the largest river basin in India?

Ans. The Ganga river basin is the largest river basin in India.

(iii) Where do the rivers Indus and Ganga have their origin?

Ans. Indus rises in Tibet near Lake Mansarovar. Ganga has Bhagirathi as the head water which is fed by the Gangotri glacier.

(iv) Name two headstreams of the Ganga. Where do they form the Ganga?

Ans. The two headstreams of the Ganga are the Alaknanda and the Bhagirathi and they both meet to form the Ganga at Devprayag.

(v) Why does Brahmaputra in the Tibetan part have less silt despite a longer course?

Ans. Called river Tsangpo in Tibet, Brahmaputra has very little volume of water. So it obviously carries little silt. But once it enters India, Brahmaputra is fed by heavy rains, and it carries lot of water and silt.

(vi) Which two peninsular rivers flow through troughs? What features do they form while entering the sea?

Ans. The two rivers that flow through troughs are Narmada and Tapi. They form estuaries while entering the sea.

(vii) Give five economic benefits of rivers and lakes.

Ans. Role of rivers in the economy :

(a) Rivers create alluvial soils.

(b) River irrigation is the backbone of agriculture in areas that have insufficient rainfall.

(c) Many industrial processes depend on river water as a coolant and for generation of hydroelectricity.

- (d) Rivers provide inland channels for transport.
- (e) Rivers provide fisheries, scope for developing adventure sports like rafting and entertainment joints. Lakes like the Sambhar Lake provide edible salt. They also help develop tourism and provide recreation.
3. Below are given names of a few lakes of India. Group those under two categories - natural and created by human beings.

- |                     |                       |                 |             |
|---------------------|-----------------------|-----------------|-------------|
| (a) Wular           | (b) Dal               | (c) Nainital    | (d) Bhimtal |
| (e) Gobind Sagar    | (f) Loktak            | (g) Barapani    | (h) Chilika |
| (i) Sambhar         | (j) Rana Pratap Sagar | (k) Nizam Sagar | (l) Pulicat |
| (m) Nagarjuna Sagar | (n) Hirakud           |                 |             |

**Ans.** Natural Lakes : Wular, Dal, Nainital, Bhimtal, Chilika, Pulicat, Sambhar, Barapani, Loktak  
Created by human beings : Gobind Sagar, Hirakud, Rana Pratap Sagar, Nagarjuna Sagar, Nizam Sagar

4. Discuss the significant differences between the Himalayan and the Peninsular rivers.

**Ans.** The Indian rivers are divided into two major groups :

- (a) The Himalayan rivers and (b) The Peninsular rivers.

**Points of difference :**

- (a) The Himalayan rivers mostly originate in the Himalayan ranges whereas the Peninsular rivers mostly originate in the Western Ghats
- (b) The Himalayan rivers are perennial whereas the Peninsular rivers are seasonal
- (c) The Peninsular rivers have shorter and shallower courses in comparison to the Himalayan rivers.
5. Compare the east-flowing and the west-flowing rivers of the Peninsular Plateau.

**OR**

Why are the rivers of Peninsula seasonal ? Give two differences between the west-flowing and east-flowing rivers of Peninsular Plateau.

**Ans.** The major rivers of the peninsula the Mahanadi, the Godavari, the Krishna etc. are flowing eastward and merges into the Bay of Bengal. Only the river Narmada and Tapi are flowing towards west and merge into the Arabian Sea. The essential differences between the two rivers are as follows :

|   | East flowing Rivers  |   | West flowing Rivers   |
|---|--|---|---|
| 1 | The east-flowing rivers have deltas at their mouth.                                    | 1 | The west flowing rivers do not have deltas at their mouth. They form estuaries. |
| 2 | All rivers east flowing drain into the Bay of bengal.                                  | 2 | All west flowing rivers merges into the Arabian Sea.                            |
| 3 | All there rivers passed through a varied topography, i.e. hills, plains, plateaus etc. | 3 | These rivers are flowed through the rift valley.                                |
| 4 | Most rivers are fed by many east-west-flowing long tributaries.                        | 4 | A few small tributaries joining at right angles are only found.                 |

6. Why are rivers important for the country's economy?

**Ans.** Rivers are the lifelines of a nation. Rivers have been of fundamental importance in the settlement and progress of man throughout the human history. The rivers form broad, fertile alluvial plains that have been the cradle of human civilisation. Water from the river is a basic natural resource, essential for various human activities. They provide water for domestic use. Rivers provide water for irrigation that helps to develop agriculture in the surrounding area. The fertile soil of the riverine plain, abundant supply of water and the flat land provides opportunities for the development of agriculture. In an agricultural country like India, rivers play a major role in shaping the country's economy. Rivers supply water for industrial use. Rivers provide for a cheap mode of transportation, inland navigation. Hydro-electricity harnessed from river water supplies power to our industries, to our homes and to our agricultural fields. Integrated water management of rivers through River Valley Projects by building dams provide hydro-electricity, water for irrigation, inland navigation, fishing, recreation etc. Hence, rivers are of prime importance in the flourishing of a country's economy.

### MAP SKILLS

1. (i) On an outline map of India mark and label the following rivers : Ganga, Satluj, Damodar, Krishna, Narmada, Tapi, Mahanadi, and Brahmaputra.
- (ii) On an outline map of India mark and label the following lakes : Chilika, Sambhar, Wular, Pulicat, Kolleru.

