Chapter 3

Graphical Representation of Data

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

Question1(i).

Which one of the following map shows the population distribution?

(a) Choropleth maps

(b) Isopleth maps

(c) Dot maps

(d) Square root map

Answer:

(c) Dot maps

Question1(ii).

Which one of the following is best suited to represent the decadal growth of population?

(a) Line graph

(b) Bar diagram

(c) Circle diagram

(d) Flow diagram

Answer:

(a) Line Graph

Question1(iii).

Polygraph is constructed to represent:

(a) Only one variable

(b) Two variables only

(c) More than two variables

(d) None of the above

Answer:

(c) More than two variables

Question1(iv).

Which one of the following maps is known as "Dynamic Map"?

(a) Dot map

(b) Choropleth

(c) Isopleth

(d) Flow map

Answer:

(d) Flow map

2. Answer the following questions in about 30 words:

Question 2(i).

What is a thematic map?

Answer:

Maps drawn to study a particular theme like rainfall, temperature, soil type, etc. is called a thematic map. Thematic maps, graphs and diagrams serve a useful purpose in providing a comparison between the internal variations within the data of different characteristics represented.

Question 2(ii).

Differentiate between multiple bar diagram and compound bar diagram.

Answer:

Multiple Bar Diagram: Multiple bar diagrams are constructed to represent two or more than two variables for the purpose of comparison.

For example, we can draw two bars one indicating literacy rate of males and other literacy rate of females.

Compound Bar Diagram: When different components are grouped in one set of variables or different variables of one component are put together, their representation is made by a compound bar diagram. In this method, different variables are shown in a single bar with different rectangles.

For example, total electricity produced in India is subdivided into hydro power, thermal power, nuclear power, etc.

Question 2(iii).

What are the requirements to construct a dot map?

Answer:

The dot maps are drawn to show the distribution of phenomena such as population, cattle, types of crops, etc. The dots of same size as per the chosen scale are marked over the given administrative units to highlight the patterns of distribution.

Requirements:

- An administrative map of the given area showing state/district/block boundaries.
- Statistical data on selected theme for the chosen administrative units, i.e. total population, cattle, etc.
- Selection of a scale to determine the value of a dot.
- Physiographic map of the region especially relief and drainage maps.

Precautions:

- The lines demarcating the boundaries of various administrative units should not be very thick and bold.
- All dots should be of same size.

Question 2(iv).

Describe the method of constructing a traffic flow map.

Answer:

Traffic flow map is a combination of graph and map. It is drawn to show the flow of commodities or people between the places of origin and destination. It is also called Dynamic Map. Transport map, which shows number of passengers, vehicles, etc., is the best example of a flow chart. These charts are drawn using lines of proportional width. Many government agencies prepare traffic flow maps to show density of the means of transportation on different routes.

Methods for the Preparation of a Traffic Flow Map:

- A route map depicting the desired transport routes along with the connecting stations.
- The data pertaining to the flow of goods, services, number of vehicles, etc. along with the point of origin and destination of the movements.
- The selection of a scale through which the data related to the quantity of passengers and goods or the number of vehicles is to be represented.

Question 2(v).

What is an Isopleth map? How an interpolation is carried out?

Answer:

The word Isopleth is derived from Iso meaning equal and pleth means lines. Thus, an imaginary line, which joins the places of equal values, is referred as Isopleth.The more frequently drawn isopleths include Isotherm (equal temperature), Isobar (equal pressure), Isohyets (equal rainfall), Isonephs (equal cloudiness), Isohels (equal sunshine), contours (equal heights), Isobaths (equal depths), Isohaline (equal salinity), etc. Interpolation is used to insert the intermediate values between the observed values of two stations/locations, such as temperature recorded at Chennai and Hyderabad or the spot heights of two points. Generally, drawing of isopleths joining the places of the same value is also termed as interpolation.

Methods of Interpolation:

- Firstly, determine the minimum and maximum values given on the map.
- Calculate the range of value, i.e. range = maximum value – minimum value.
- Based on range, determine the interval in a whole number like 5, 10, 15, etc.
- The exact point of drawing an isopleth is determined by using the following formula

$$\text{Point of Isopleth} = \frac{\text{Distance between two points in cm}}{\text{Difference between the two values of corresponding points}} \times \text{Interval}$$

Question 2(vi).

Describe and illustrate important steps to be followed in preparing a Choropleth map.

Answer:

The Choropleth maps are drawn to prepare the characteristics of data as they are related to the administrative units. These means are used to represent the literacy rate, sex ratio and density of population.

Steps to be followed:

- Arrange the data in ascending or descending order.
- Group the data into 5 categories to represent very high, high, medium, low and very low concentrations.
- The interval between the categories may be identified on the following formula, i.e. Range/5 and Range = maximum value – minimum value.
- Patterns, shades or colour to be used to depict the chosen categories should be marked in an increasing or decreasing order.

Original Data on Literacy in India		
SI.No.	States/Union territories	Literacy Rate
1.	Jammu 8s Kashmir	55.5
2.	Himachal Pradesh	76.5

3.	Punjab	69.7
4.	Chandigarh	81.9
5.	Uttarakhand	71.6
6.	Haryana	67.9
7.	Delhi	81.7
8.	Rajasthan	60.4
9.	Uttar Pradesh	56.3
10.	Bihar	47.0
11.	Sikkim	68.8

12.	Arunachal Pradesh	54.3
13.	Nagaland	66.6
14.	Manipur	70.5
15.	Mizoram	88.8
16.	Tripura	73.2
17.	Meghalaya	62.6
18.	Assam	63.3
19.	West Bengal	68.6
20.	Jharkhand	53.6

21.	Odisha	63.1
22.	Chhattisgarh	64.7
23.	Madhya Pradesh	63.7
24.	Gujarat	69.1
25.	Daman & Diu	78.2
26.	Dadra 8s Nagar Haveli	57.6
27.	Maharashtra	76.9
28.	Andhra Pradesh	60.5
29.	Karnataka	66.6

30.	Goa	82.0
31.	Lakshadweep	86.7
32.	Kerala	90.9
33.	Tamil Nadu	73.5
34.	Puducherry	81.2
35.	Andaman & Nicobar Islands	81.3

Original Data on Literacy in India		
SI.No.	States/Union territories	Literacy Rate
10.	Bihar	47.0

20.	Jharkhand	53.6
12.	Arunachal Pradesh	54.3
01.	Jammu 8s Kashmir	55.5
9.	Uttar Pradesh	56.3
26.	Dadra 8s Nagar Haveli	57.6
08.	Rajasthan	60.4
28.	Andhra Pradesh	60.5
17.	Meghalaya	62.6
21.	Odisha	63.1

18.	Assam	63.3
23.	Madhya Pradesh	63.7
22.	Chhattisgarh	64.7
13.	Nagaland	66.6
29.	Karnataka	66.6
06:	Haryana	67.9
19.	West Bengal	68.6
11.	Sikkim	68.8
24.	Gujarat	69.1

03.	Punjab	69.7
14.	Manipur	70.5
05.	Uttarakhand	71.6
16.	Tripura	73.2
33.	Tamil Nadu	73.5
02.	Himachal Pradesh	76.5
27.	Maharashtra	76.9
25.	Daman & Diu	78.2
34.	Puducherry	81.2

35.	Andaman & Nicobar Islands	81.3
07.	Delhi	81.7
04.	Chandigarh	81.9
30.	Goa	82.0
31.	Lakshadweep	86.7
15.	Mizoram	88.8
32.	Kerala	90.9

Construction:

- Arrange the data in ascending order as shown above.
- Identify the range within the data. The states recording the lowest and highest literacy rates are Bihar (47%) and the Kerala (90.9%) respectively. Hence, the range would be 91.0 − 47.0 = 44.0.
- Divide the range by 5 to get categories from very low to veiy high. (44.0/ 5 = 8.80. We can convert this value to a round number say 9.0.
- Determine the number of the categories along with range of each category. Add 9.0 to the lowest value of 47.0 as so on.

Following categories will be obtained:

(i) 47 − 56

Very low (Bihar, Jharkhand, Arunachal Pradesh, Jammu and Kashmir)

(ii) 56 − 65

Low (Uttar Pradesh, Rajasthan, Andhra Pradesh, Meghalaya,

Odisha, Assam, Madhya Pradesh, Chhattisgarh)

(iii) 65 − 74

Medium (Nagaland, Karnataka, Haryana, West Bengal, Sikkim, Gujarat, Punjab, Manipur, Uttarakhand, Tripura, Tamil Nadu)
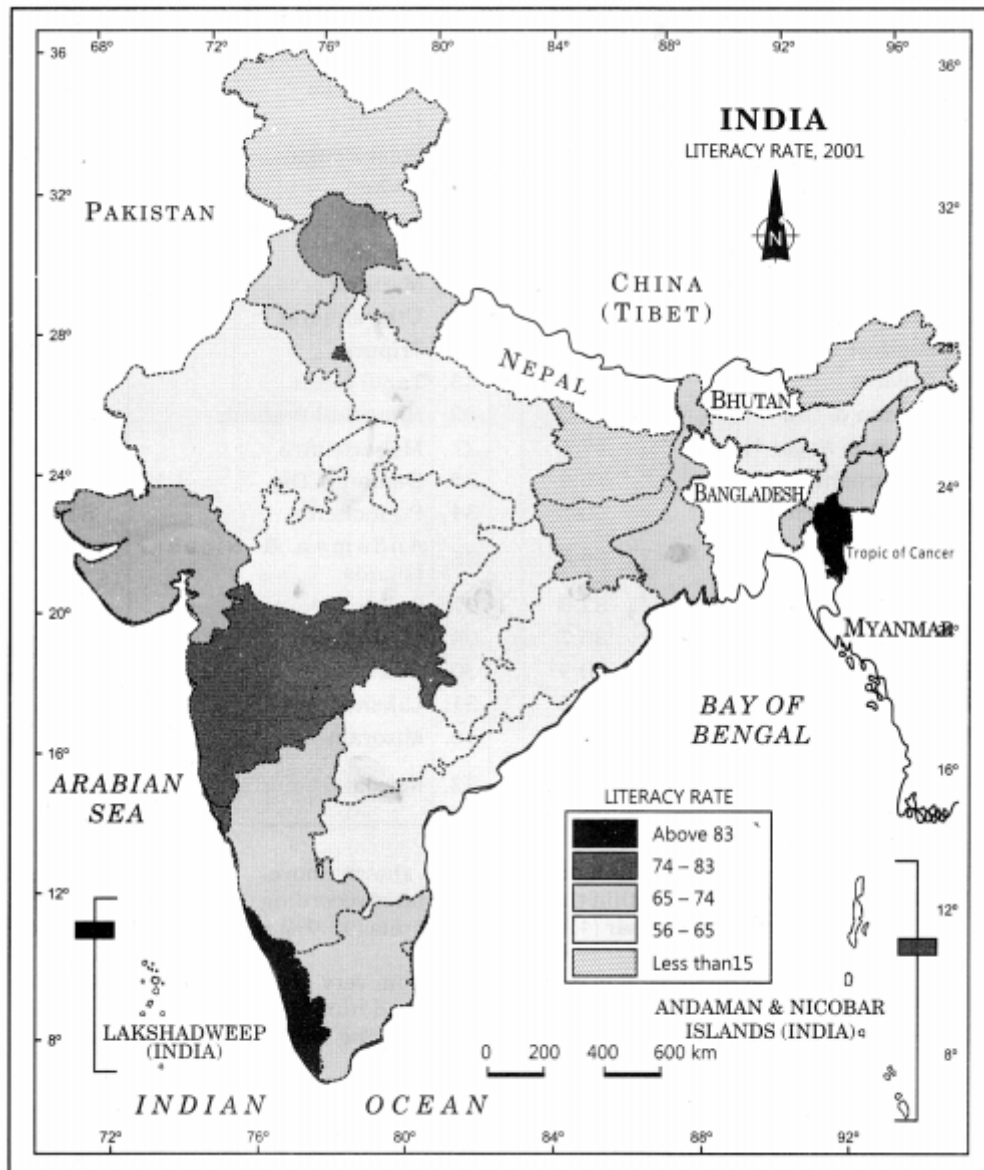
(iv) 74 − 83

High (Himachal Pradesh, Maharashtra, Delhi, Goa)

(v) 83 − 92

Very High (Mizoram, Kerala)

- Assign the shades/pattern to each category ranging from lower to higher hues

INDIA
LITERACY RATE, 2001

LITERACY RATE
Above 83
74 – 83
65 – 74
56 – 65
Less than15

Question 2(vii).

Construct a pie chart with this information.

Students in an adult school were surveyed about the type of transport they use to travel to school.

The results were:

Walking 3, Train 6, Tram 9, Car 10, Bicycle 12.

pie chart

Total Population of Students=40

Transport Type	Number of Students	Percentage of students preferring transport type	Angle size for Pie Chart
Walking	3	$\frac{3}{40} \times 100 = 7.5\%$	7.5% of 360 ° = 27°
Train	6	$\frac{6}{40} \times 100 = 15\%$	15% of 360 ° = 54°
Tram	9	$\frac{9}{40} \times 100 = 22.5\%$	22.5% of 360 ° = 81°
Car	10	$\frac{10}{40} \times 100 = 25\%$	25% of 360 ° = 90°
Bicycle	12	$\frac{12}{40} \times 100 = 30\%$	30% of 360 ° = 108°

Total Population of Students=40

Transport used by Adult Students when travelling to school.
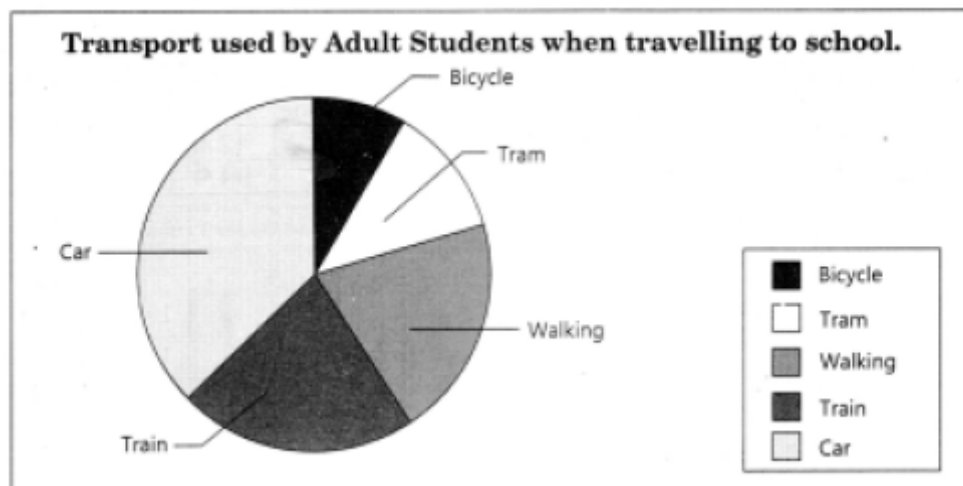
ACTIVITY

Question 1.

Represent the following data with the help of suitable diagram.

Year	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001
Decennial growth (%)	0.35	8.27	19.12	31.97	41.42	26.41	38.23	46.14	36.47	31.13

Answer:

Range of the data = 46.14 − 0.35=45.79

Line graph will be the right method to present these data.
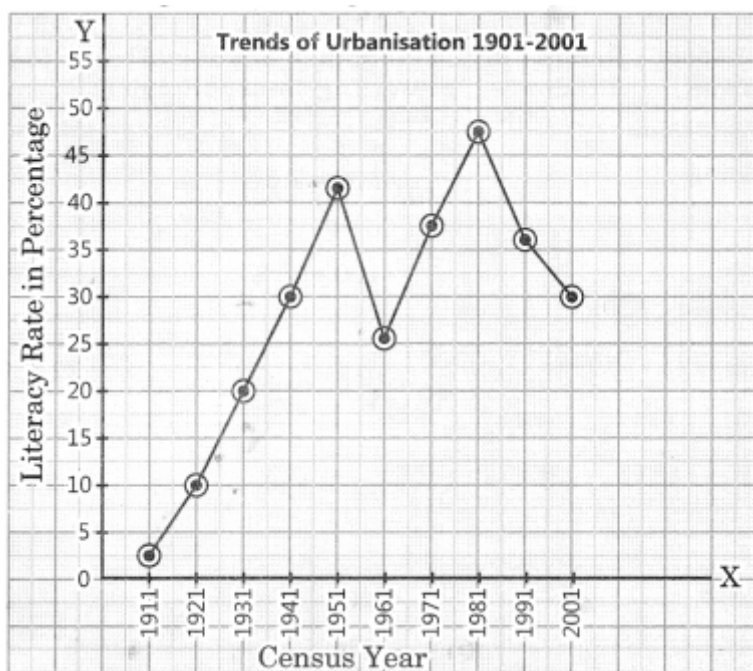
Question 2.

Represent the following data with the help of suitable diagram.

India: Literacy and Enrolment Ratio in Primary and Upper Primary Schools

Year	Literacy Ratio			Enrolment Ratio Primary			Enrolment Ratio Upper Primary		
	Person	Male	Female	Male	Female	Total	Male	Female	Total
1950-51	18.3	27.2	8.86	60.6	25	42.6	20.6	4.6	12.7
1999-2000	65.4	75.8	54.2	104	85	94.9	67.2	50	58.8

Answer:

Literacy and Enrolment Ratio in Primary and Upper Primary Schools
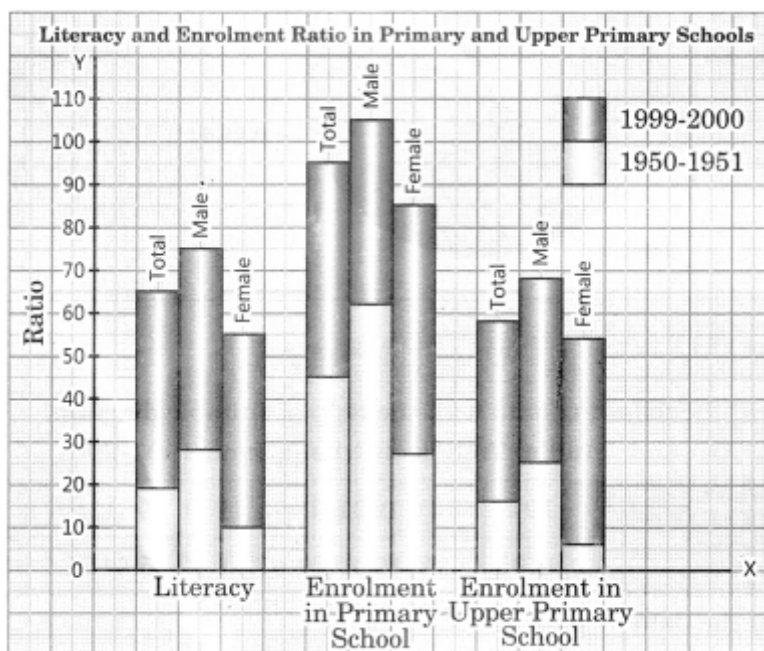
Question 3.

Represent the following data with help of pie-diagram.

India: Land use 1951-2001

Year	1950-51	1998-2001
Culturable Waste Land	8	5
Pasture and Tree	9	5
Fallow Land	10	8
Forest	14	22
Not available for cultivation	17	14
Net Sown Area	42	46

Answer:
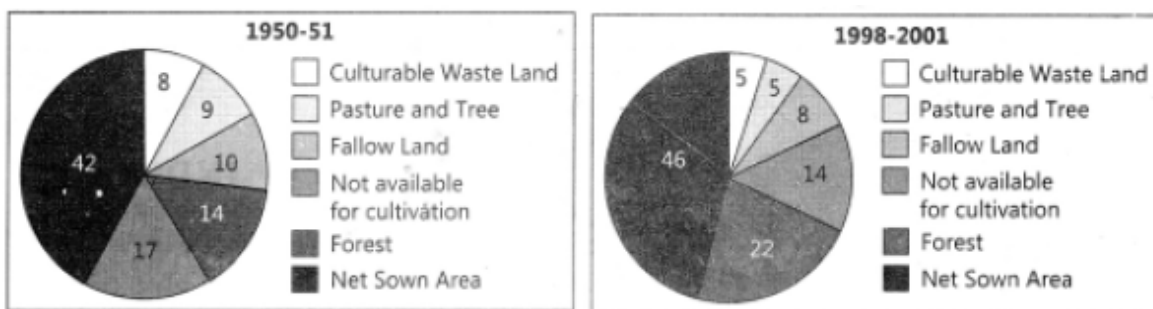
Question 4.

Study the table given below and draw the given diagrams/maps.

Area and Production of Rice in Major States

States	Area in 000 ha	% to total area	Production 000 tones	% to total Production
Bihar	3,671	8.3	5,417	6.4
Tamil Nadu	2,113	4.8	7,218	8.5
Punjab	2,611	5.9	9,154	10.8
Andhra Pradesh	4,028	9.1	12,428	13.5
Uttar Pradesh	5,839	13.2	11,540	13.6
West Bengal	5,435	12.3	12,428	14.6

Construct a multiple bar diagram to show area under rice in each state.
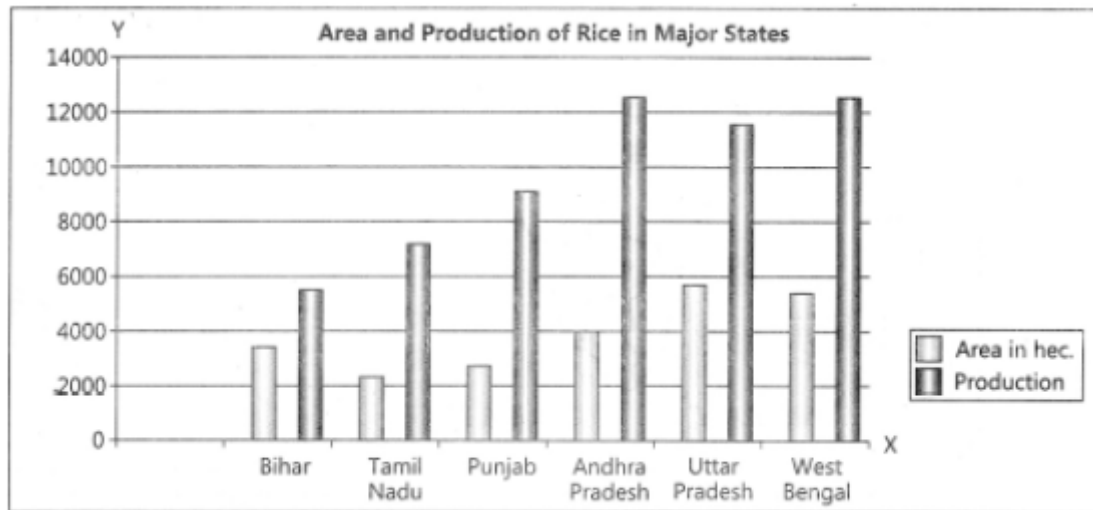
Construct a pie-diagram to show the percentage of area under rice in each state.

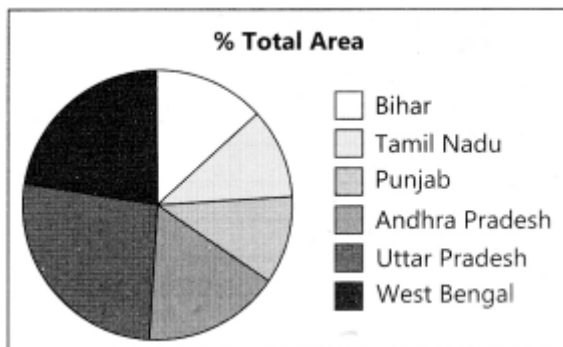**Construct a dot map to show the production of rice in each state.**

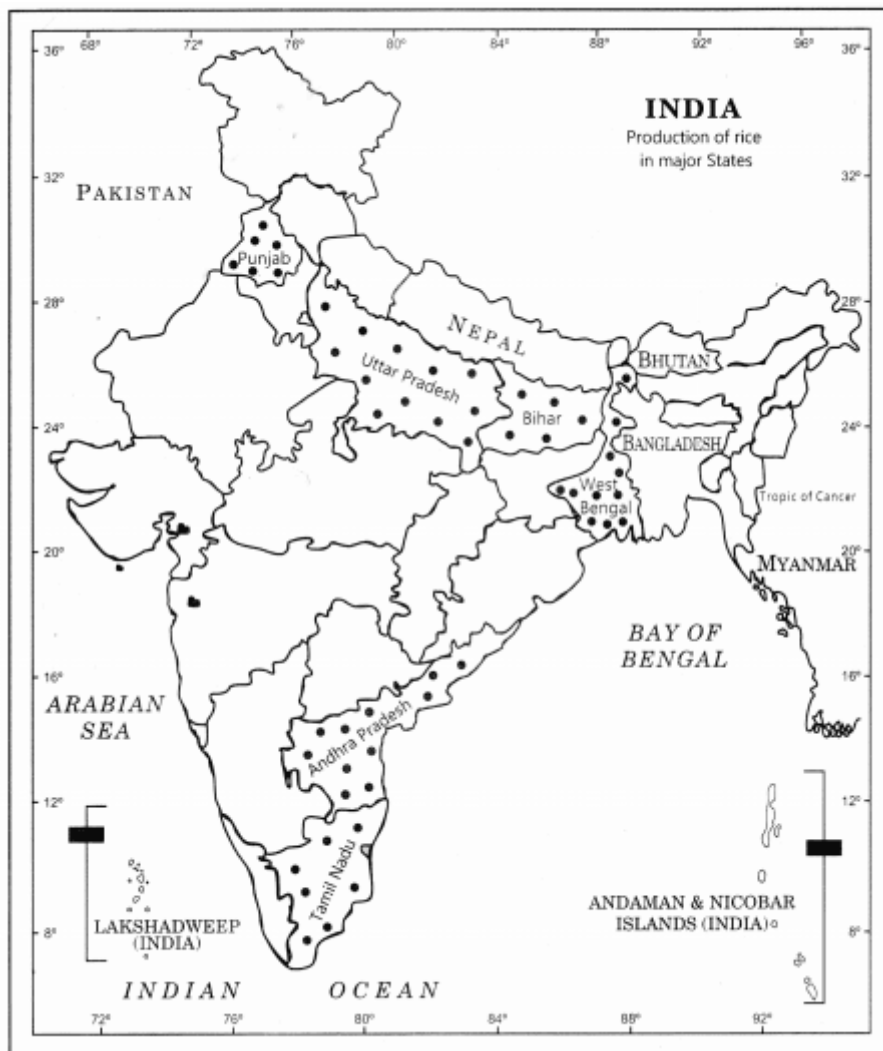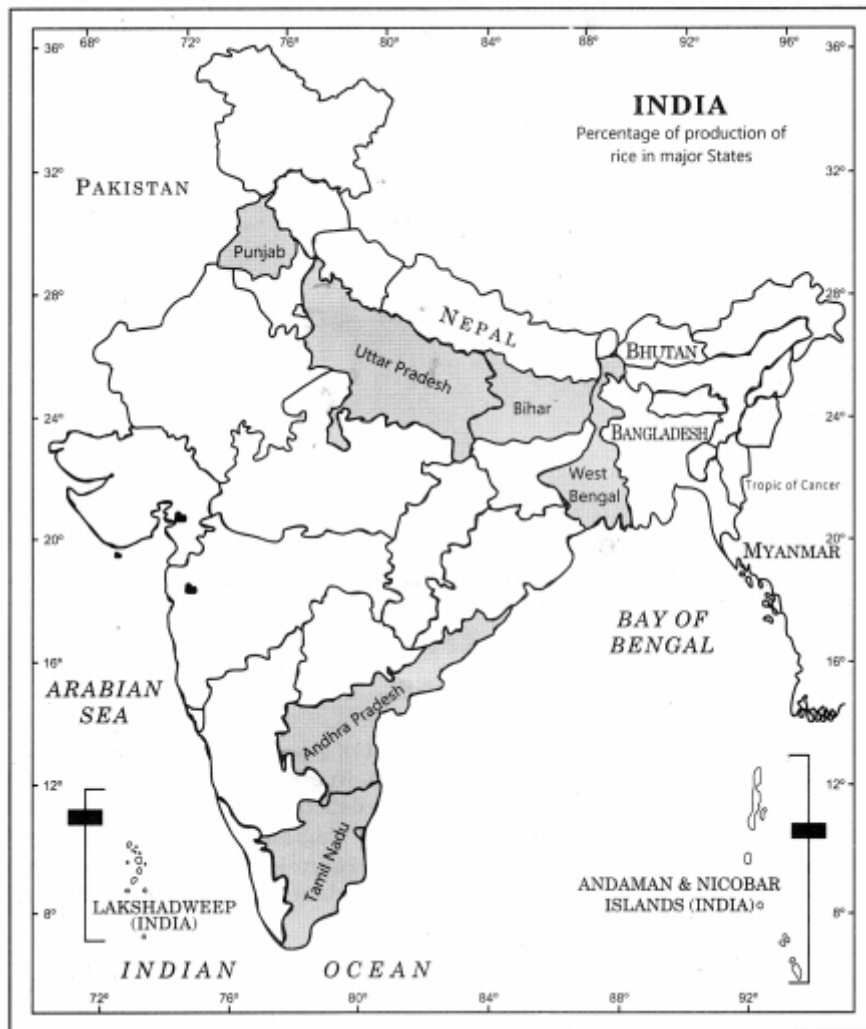**Construct a Choropleth map to show the percentage of production of rice in states.**

Answer:

(a)

Area and Production of Rice in Major States

(b)

% Total Area

(c)

(d)

INDIA
Percentage of production of rice in major States

Question 5.

Show the following data of temperature and rainfall of Kolkata with a suitable diagram.

Months	Temperature in ^{0}C	Rainfall in cm
Jan.	19.6	1.2

Feb.	22.0	2.8
Mar.	27.1	3.4
Apr.	30.1	5.1
May	30.4	13.4
June	29.9	29.0
Jul.	28.9	33.1
Aug.	28.7	33.4
Sep.	28.9	25.3
Oct.	27.6	12.7

Nov.	23.4	2.7

Dec.	19.7	0.4

Answer: