

ISC Class 12 Geography Specimen Paper 2

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Maximum Marks: 70 | Time Allowed: Three hours | Reading Time: 15 minutes

All 13 questions are compulsory. Section A carries 14 marks, Section B 28 marks and Section C 28 marks. Internal choice is given in Questions 4, 5, 8, 10 and 11. Question 1 is answered on an outline map of India.

General Instructions

Write your answers on the separate answer paper provided. The first 15 minutes are for reading the paper, and you may not write during that time. The paper has 13 questions in three sections, A, B and C, and all of them are compulsory. Section A has fourteen very short answer parts of 1 mark each; Section B has seven short answer questions of 4 marks each; Section C has four long answer questions of 7 marks each. Internal choice is given in Questions 4, 5 and 8 of Section B and in Questions 10 and 11 of Section C: where two alternatives are separated by OR, attempt only one of them. For multiple choice parts write only the option you choose. Question 1 is map work and must be answered on a standard outline map of India of the kind used for school map work, not in the answer booklet. Mark each feature on it in pencil, label it with the part number and its name, use arrows where the map would otherwise be crowded, write your index number on the map and fasten it inside your answer booklet. Draw sketch maps and diagrams yourself, in pencil, wherever they help an answer. Marks for each question, or part of a question, are shown in brackets. No maps, graphs, tables or pictures are printed in this paper: any data you need are given in words. Population figures are from the Census of India 2011 unless another source is stated, and climate figures are rounded long-term averages. This theory paper carries 70 marks; the remaining 30 marks of the subject are for the Practical Work and Project Work assessed in school.

SECTION A (14 Marks)

Attempt all questions from this Section.

Question 1 [8]

Answer the whole of this question on your outline map of India. Each part carries 1 mark. In each part decide which option is correct, then mark that feature on the map in pencil and label it with the part number and its name. Write the option letter beside the label.

(A) Mark and label the correct option on the outline map.

(i) The gap in the Western Ghats, between the Nilgiri and the Anaimalai hills, through which a road and a railway link Kerala with Tamil Nadu:

- (a) Thal Ghat (b) Bhor Ghat (c) Palghat (d) Shencottah Gap

(ii) The plateau of north-east India that is separated from the main Peninsular block by the Garo and Rajmahal gap:

- (a) Malwa Plateau (b) Meghalaya Plateau
(c) Chota Nagpur Plateau (d) Deccan Plateau

(iii) The coastal plain on the east coast that extends from the Mahanadi delta to the Krishna delta:

- (a) Konkan (b) Malabar (c) Coromandel (d) Northern Circars

(iv) The southern tip of the Indian mainland, at about 8°4'N:

- (a) Cape Comorin (b) Indira Point (c) Point Calimere (d) Dhanushkodi

(B) Identify the correct option from the description, then mark and label it on the outline map.

(i) The right-bank tributary of the Ganga that rises on the Amarkantak plateau and joins the Ganga a little upstream of Patna:

- (a) Ken (b) Betwa (c) Damodar (d) Son

- (ii) The nuclear power station of Karnataka, on the Kali river in Uttara Kannada district:
(a) Kaiga (b) Kalpakkam (c) Tarapur (d) Jaitapur
- (iii) Among the states, the one with the highest proportion of urban population at Census 2011 (about 62 per cent):
(a) Tamil Nadu (b) Kerala (c) Goa (d) Maharashtra
- (iv) The oldest oil refinery of India, working since 1901 in Upper Assam:
(a) Bongaigaon (b) Numaligarh (c) Guwahati (d) Digboi

Question 2 [6]

Each part carries 1 mark. For parts (i) to (iii) write only the option you choose. Answer parts (iv) to (vi) in one or two sentences.

- (i) Assertion (A): The Visakhapatnam steel plant is described as a shore-based integrated steel plant.
Reason (R): It was located there because large deposits of iron ore and coking coal are found close to Visakhapatnam.
(a) Both A and R are true, and R is the correct explanation of A. (b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true but R is false. (d) A is false but R is true.
- (ii) Assertion (A): Kerala recorded the highest literacy rate among the states at Census 2011. Reason (R): Kerala recorded the highest sex ratio among the states at Census 2011.
(a) Both A and R are true, and R is the correct explanation of A. (b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true but R is false. (d) A is false but R is true.
- (iii) Consider the following statements about the south-west monsoon. P: In early summer the subtropical westerly jet stream shifts to the north of the Himalayas. Q: A tropical easterly jet stream develops over peninsular India during the monsoon season. R: El Nino years are usually associated with above-normal monsoon rainfall in India. S: Intense heating of north-western India produces a low-pressure area that helps to draw in the moist south-west winds. Which of the statements are correct?
(a) P, Q and S (b) P and R only (c) Q, R and S (d) R and S only
- (iv) What is a footloose industry? Give one example.
- (v) Why was the meridian of 82°30'E chosen as the standard meridian of India?
- (vi) Give one reason why the Gulf of Khambhat is considered a promising site for tidal power.

SECTION B (28 Marks)

Attempt all questions from this Section. Each question carries 4 marks. Internal choice is given in Questions 4, 5 and 8.

Question 3 [4]

- (i) Explain two differences between the Peninsular Plateau and the Himalayas in their geological origin and structure. [2]
- (ii) Distinguish between bhangar and khadar in the Northern Plains. [2]

Question 4 [4]

- (i) The sex ratio of India, in females per 1,000 males, was 946 in 1951, 941 in 1961, 930 in 1971, 934 in 1981, 927 in 1991, 933 in 2001 and 943 in 2011. Describe the trend these figures show, and explain three reasons why India's sex ratio has remained below 1,000. [4]

OR

- (ii) At Census 2011 about 31 per cent of India's population was below 15 years of age, about 60 per cent was between 15 and 59 years and about 9 per cent was 60 years or older. Explain two advantages and two challenges that this age structure presents for India's development. [4]

Question 5 [4]

- (i) Approximate long-term averages for Chennai and Leh are as follows. Chennai: mean temperature about 25 °C in January, about 32 °C in May and about 31 °C in July; rainfall between about 55 mm and 145 mm in each month from June to September, about 280 mm in October, about 375 mm in November and about 185 mm in December; annual total about 1,400 mm. Leh: mean temperature about –6 °C in January and about 20 °C in July; precipitation below 20 mm in every month; annual total roughly 100 mm, the winter part of it falling as snow.
- (a) Explain why Leh receives so little precipitation even in July, when most of India receives its heaviest rain, and use the data to explain why Leh is described as a cold desert. [2]
- (b) Explain why Chennai receives its heaviest rainfall in October and November and not in July. [2]

OR

- (ii) Explain the conditions under which tropical cyclones form over the Bay of Bengal, and give two reasons why the east coast of India suffers more from them than the west coast. [4]

Question 6 [4]

- (i) Explain two ways in which tourism contributes to the economy of a hill state such as Himachal Pradesh or Uttarakhand. [2]
- (ii) Explain two harmful effects of mass tourism on the environment of such a state, and state how ecotourism tries to reduce them. [2]

Question 7 [4]

Read the extract given below and answer the questions that follow. "Drive through the Krishna and Godavari deltas of coastal Andhra Pradesh and you pass mile after mile of rectangular ponds where paddy fields once stood. Farmers say a hectare of shrimp can earn several times what the same land earned under rice, and processing plants near Bhimavaram and Kakinada ship frozen shrimp to buyers in the United States and Europe. Andhra Pradesh has become the leading fish-producing state of India, most of its output coming from inland aquaculture rather than from the sea. Some villagers, however, complain that their wells have turned salty and that waste water from the ponds is drained into the canals."

- (i) Explain two geographical factors that favour inland aquaculture in the Krishna and Godavari deltas. [2]
- (ii) Evaluate the conversion of paddy land into aquaculture ponds by stating one benefit and one environmental cost, and suggest one measure to reduce the cost. [2]

Question 8 [4]

- (i) Explain four factors that led to the development of the Chota Nagpur industrial region. [4]

OR

- (ii) Explain four factors that have made Gujarat the leading state for the petrochemical industry, with reference to Koyali and Vadodara. [4]

Question 9 [4]

- (i) Explain two reasons why the average size of operational land holdings in India is small, and state one effect of this on farming. [2]
- (ii) Explain two ways in which the mangrove forests of the Sundarbans protect the coast and the people who live there. [2]

SECTION C (28 Marks)

Attempt all questions from this Section. Each question carries 7 marks. Internal choice is given in Questions 10 and 11.

Question 10 [7]

- (i) Explain four ways in which the mineral resources of Chhattisgarh have shaped the industrial development of the region. [4]
- (ii) Explain the importance of Kosa silk and other forest-based activities for the tribal communities of Chhattisgarh. [3]

OR

- (iii) Explain three features of agriculture in the plain of Chhattisgarh that have earned the region the name of the rice bowl of India. [3]

Question 11 [7]

- (i)
 - (a) Explain four reasons for the development of Haldia as a port and an industrial centre. [4]
 - (b) Describe the hinterland of Haldia port, and explain why it extends beyond India's borders. [3]

OR

- (ii)
 - (a) Explain four ways in which the Dedicated Freight Corridors are expected to benefit the Indian economy. [4]
 - (b) Explain three changes in the pattern of India's international trade in recent years. [3]

Question 12 [7]

- (i) Evaluate the Green Revolution in north-west India by explaining two of its achievements and two of its environmental costs. [4]
- (ii) Explain three geographical conditions required for jute cultivation, and give a reason why it is concentrated in the Ganga and Brahmaputra delta of West Bengal. [3]

Question 13 [7]

Read the extract given below and answer the questions that follow. "In 1950 farmers at Loni in Ahmednagar district, now renamed Ahilyanagar, pooled their cane and their savings and began crushing at the first cooperative sugar factory in Asia. Today Maharashtra and Uttar Pradesh are the two largest producers of sugar in India, and in several recent seasons Maharashtra has produced more, although Uttar Pradesh grows more cane. Much of Maharashtra's cane is grown in drought-prone districts of Marathwada and western Maharashtra, where a hectare of cane can need as much water as several hectares of jowar or pulses."

- (i) Apart from the cooperative movement mentioned in the extract, explain four geographical and economic reasons why the sugar industry of peninsular India, especially Maharashtra, has grown faster than that of Uttar Pradesh and Bihar. [4]
- (ii) Evaluate the concern about water raised in the extract, and suggest two ways in which cane can be grown with less water. [3]

ANSWER KEY AND MARKING SCHEME

A full model answer is given for every part. Marks shown in italics are the step marks an examiner would award, and they add up to the marks for the part. Answers in Sections B and C are marked point by point: credit goes to each correct and relevant point that is explained, not to the wording used here, and any other correct point, example or Indian case study should be accepted. A point that is only named, where the question asks for it to be explained, earns half the credit at most. In Question 1 the mark needs both the correct feature and its correct placing and label on the outline map; the location of each feature is described here in words (state, approximate latitude and longitude and neighbouring features) so that the map can be checked, and a reasonable tolerance should be allowed for freehand marking on a small outline map. For the multiple choice parts of Question 2 only the option letter is needed. Where alternatives are separated by OR, mark only the alternative attempted; if both are attempted, mark both and keep the better mark. Population figures in the paper are from the Census of India 2011 and climate figures are rounded averages; accept more recent official figures used correctly. A neat, relevant sketch map or diagram may earn the mark for a point it shows clearly.

Question 1 [8]

(A)

- (i) (c) Palghat (Palakkad Gap). Mark it on the Kerala and Tamil Nadu border at about 10.8°N, 76.7°E, between the Nilgiri hills to the north and the Anaimalai hills to the south, linking Palakkad in Kerala with Coimbatore in Tamil Nadu.
- (ii) (b) Meghalaya Plateau. Shade the plateau occupying the state of Meghalaya at about 25.5°N, 91°E, between the Brahmaputra valley of Assam to the north and the plains of Bangladesh to the south, made up of the Garo, Khasi and Jaintia hills from west to east, with Shillong on it.
- (iii) (d) Northern Circars. Shade the strip of coastal plain along the Bay of Bengal from the Mahanadi delta in Odisha (about 20°N) south-westwards to the Krishna delta in Andhra Pradesh (about 16°N), including the Godavari delta and Visakhapatnam.
- (iv) (a) Cape Comorin (Kanyakumari). Mark it at 8°4'N, about 77.5°E, in Kanyakumari district of Tamil Nadu, where the Arabian Sea, the Indian Ocean and the Bay of Bengal meet. Indira Point, at about 6°45'N in Great Nicobar, is the southernmost point of India but is not on the mainland.

(B)

- (i) (d) Son. Draw the course from the Amarkantak plateau (about 22.7°N, 81.8°E) on the Madhya Pradesh and Chhattisgarh border, northwards and then north-eastwards along the foot of the Kaimur range, through the south-eastern corner of Uttar Pradesh into Bihar, to join the Ganga near Patna (about 25.6°N, 85.0°E), and name it.
- (ii) (a) Kaiga. Mark it at about 14.9°N, 74.4°E, in the Western Ghats of north-western Karnataka, inland (east) of Karwar, on the Kali river.
- (iii) (c) Goa. Shade the small coastal state at about 15.4°N, 74°E, between Maharashtra to the north and Karnataka to the south and east, on the Arabian Sea coast.
- (iv) (d) Digboi. Mark it at about 27.4°N, 95.6°E, in Tinsukia district in the far north-east of Assam, south-east of the Brahmaputra, near the Arunachal Pradesh border.

1 mark for each part, given only when the correct feature is marked in the right place on the map and labelled. For a river, the course should be drawn and named; for a state, region or plateau, the area should be shaded or outlined and named; for a town, pass or power station, a dot or symbol in the right place with its name.

Question 2 [6]

- (i) (c) A is true but R is false. The plant stands on the coast because it imports most of its coking coal by sea and exports part of its steel through the adjoining ports; its iron ore comes by rail from mines in Chhattisgarh and Odisha, several hundred kilometres inland, not from deposits near the city.
- (ii) (b) Both are true (literacy about 94 per cent, sex ratio 1,084), but the sex ratio does not explain the literacy. Kerala's literacy rests on a long history of schooling under the old states of Travancore and Cochin and missionary effort, public investment in education and the literacy campaigns; its sex ratio reflects the long life expectancy of women and the migration of men for work.

- (iii) (a) P, Q and S. Statement R is wrong: El Nino, the warming of the eastern Pacific, usually weakens the Indian monsoon and is linked with deficient rainfall and drought years.
- (iv) A footloose industry is one that is not tied to the location of a particular raw material or source of power, because its inputs and products are light and of high value, so it can be set up in a wide range of places; examples are the assembly of electronic goods or software services.
- (v) India extends across about 29° of longitude, a difference of nearly two hours in local time between Gujarat and Arunachal Pradesh; 82°30'E passes close to the centre of the country (near Mirzapur), so local time nowhere differs too much from standard time, and it gives a time exactly 5 hours 30 minutes ahead of Greenwich.
- (vi) It has one of the largest tidal ranges on the Indian coast, because its funnel shape narrows and raises the incoming tide, so a large difference in water level between high and low tide is available to drive turbines.

1 mark for each correct part. No mark is deducted for a wrong option. In parts (iv) to (vi) accept any correct answer in the candidate's own words that carries the substance of the model answer.

Question 3 [4]

- (i) Origin and age: the Peninsular Plateau is part of the ancient landmass of Gondwanaland, made largely of very old igneous and metamorphic rocks such as granite and gneiss; it has been a land surface for an immense period and its hills, such as the Aravallis, are worn-down remnants. The Himalayas are young fold mountains formed, mainly in the last few tens of millions of years, when the Indian plate moved north and collided with the Eurasian plate, folding and lifting the sediments deposited in the Tethys Sea. Structure and stability: the Peninsula is a rigid, stable block that has undergone faulting and block movement, with rift valleys such as that of the Narmada, but little folding, and it is less prone to earthquakes; the Himalayas are made of folded and faulted sedimentary and metamorphic rocks arranged in parallel ranges, are still rising and form a very unstable, earthquake-prone zone.

Difference in origin and age of rocks 1. Difference in structure and stability 1.

- (ii) Bhangar is the older alluvium that forms the higher land of the plains, above the level of the floods; it is darker, more clayey in places and contains calcareous concretions called kankar, and it is less fertile because it is not renewed. Khadar is the newer alluvium of the low-lying flood plains along the rivers; it is light in colour, fine and sandy or loamy, and it is renewed almost every year by floods, so it is very fertile and suits intensive farming.

Bhangar correctly described 1. Khadar correctly described, with the contrast in fertility or age 1.

Question 4 [4]

- (i) Trend: the sex ratio fell from 946 in 1951 to a low of 927 in 1991, with a small rise in 1981, and then improved to 933 in 2001 and 943 in 2011, though it remained adverse to women throughout. Reasons: (1) Preference for sons: in much of the country sons are valued for economic support, inheritance and religious duties, which has led to sex-selective abortion of female foetuses despite the law against sex determination, so fewer girls are born; the child sex ratio of 919 in 2011 shows this. (2) Neglect of girls and women: girls often receive less food, medical care and attention than boys, so their death rates in childhood are higher. (3) Maternal mortality and women's health: early marriage, frequent pregnancies, anaemia and poor access to health care raised the death rate of women in the reproductive ages. Under-counting of women in some areas has also been suggested. The recent rise reflects longer life expectancy of women, better maternal care and campaigns such as Beti Bachao Beti Padhao.

Trend described with reference to the figures 1. Preference for sons and sex-selective abortion 1. Neglect of girls 1. Maternal mortality or women's health 1.

OR

- (ii) Advantages: (1) A large working-age population, often called the demographic dividend, means a big labour force and a falling dependency ratio, so if people find productive work, output, savings and investment can rise quickly. (2) A young population brings a growing domestic market for goods and services and a supply of adaptable, educated workers for new industries such as information technology, which also earn from abroad. Challenges: (1) Employment: millions of young people enter the labour market every year, and unless enough jobs are created, especially outside agriculture, the dividend turns into unemployment,

underemployment and frustration. (2) Education, skills and health: the large number of children, nearly a third of the population, needs schools, nutrition and health care, and young adults need training to be employable; at the same time the number of elderly people is rising, which will need pensions and health care.

First advantage explained 1. Second advantage explained 1. First challenge explained 1. Second challenge explained 1.

Question 5 [4]

(i)

- (a) Leh lies in the Indus valley of Ladakh, north of the Great Himalaya and between the Ladakh and Zaskar ranges, so it is in the rain shadow of the Himalaya: the moist south-west monsoon winds shed their moisture on the southern slopes and the Himalayan ranges and only a little crosses into Ladakh, making Leh a cold desert. Its height of about 3,500 m and its great distance from the sea add to the dryness. It is a desert because its annual precipitation, roughly 100 mm, is far too little for ordinary farming, and a cold one because its height keeps winter temperatures well below freezing, about -6°C as the January mean.

Rain shadow of the Himalaya, or distance and height, explained 1. Cold desert explained from the precipitation and the winter temperature in the data 1.

- (b) In July the south-west monsoon winds of the Arabian Sea branch shed their moisture on the Western Ghats, leaving the Coromandel coast in a rain shadow, while the Bay of Bengal branch blows roughly parallel to this coast, so Chennai gets only moderate rain. In October and November, as the monsoon retreats, the winds blow from the north-east across the Bay of Bengal, pick up moisture and strike the Tamil Nadu coast directly (the retreating or north-east monsoon); depressions and tropical cyclones that form over the Bay at this season also cross this coast and bring very heavy rain.

Rain shadow or parallel winds in July explained 1. North-east or retreating monsoon and Bay depressions in October and November explained 1.

OR

- (ii) Conditions of formation: a large area of warm sea, with a surface temperature above about 26°C to 27°C , which supplies heat and moisture; a location at least about 5° from the equator, so that the Coriolis force is strong enough to set up a rotating circulation; a pre-existing low-pressure disturbance; weak vertical wind shear, so that the developing storm is not torn apart; and the release of latent heat as moist air rises and condenses, which deepens the low. Over the Bay of Bengal these conditions are met chiefly in April and May and in October to December. Reasons the east coast suffers more: (1) many more cyclones form over the Bay of Bengal than over the Arabian Sea, because the Bay is warmer and also receives the remnants of disturbances from the Pacific; (2) the prevailing easterly steering winds carry the Bay cyclones westwards onto the coasts of Odisha, Andhra Pradesh, Tamil Nadu and West Bengal, while many Arabian Sea cyclones move away from India towards Oman or weaken over cooler water; (3) the east coast is low and flat, with wide deltas and a shallow sea floor near the shore, so storm surges flood far inland, and the funnel shape of the northern Bay heightens them.

Warm sea surface and Coriolis force 1. Pre-existing low, weak wind shear or latent heat, with the seasons 1. First reason for the east coast 1. Second reason for the east coast 1.

Question 6 [4]

- (i) First, income and employment: hotels, homestays, restaurants, transport, guides, adventure sports such as trekking and rafting, and the sale of handicrafts and local produce give work to many people in areas where farming is limited by steep slopes and short seasons, and the state earns revenue from taxes and fees. Second, development of infrastructure and other sectors: roads, airports, ropeways, water supply and telecommunication built for tourists also serve local people, and the demand for fruit, vegetables, dairy products and woollens helps horticulture and cottage industries; pilgrimage centres such as Kedarnath and Badrinath in Uttarakhand and hill stations such as Shimla and Manali spread income into surrounding villages.

Income and employment explained 1. Infrastructure or linked sectors explained 1.

- (ii) Harmful effects: unplanned construction of hotels and roads on steep slopes cuts forests and weakens slopes, increasing landslides and the damage done by floods, as in the Kedarnath disaster of 2013; crowds

and vehicles create traffic jams, air pollution, piles of plastic and other solid waste, and sewage that pollutes streams and strains scarce water. Ecotourism is responsible travel to natural areas that keeps visitor numbers within the carrying capacity of a place, uses small, locally owned homestays built with local materials, avoids waste and plastics, and shares income with local communities so that they have a reason to conserve forests, wildlife and culture.

Two harmful effects explained 1. Principles of ecotourism stated 1.

Question 7 [4]

- (i) First, land and water: the deltas are flat and low-lying, so ponds are easy to dig, and the dense network of irrigation canals from the Krishna and the Godavari supplies fresh water, while creeks and the nearness of the sea supply brackish water for shrimp; the Kolleru lake area adds freshwater fish farming. Second, climate and infrastructure: the warm climate allows fish and shrimp to grow all through the year, giving two or more harvests, and hatcheries, feed mills, cold storage, processing plants and the ports of Kakinada and Visakhapatnam make it easy to supply inputs and to export the produce.

Flat land and water supply explained 1. Warm climate or supporting infrastructure explained 1.

- (ii) Benefit: farmers earn several times as much from a hectare of shrimp or fish as from rice, and the industry creates jobs in hatcheries, processing and transport and earns foreign exchange. Environmental cost: brackish water seeps from the ponds and makes nearby wells and fields saline, and waste water rich in feed, chemicals and antibiotics drained into canals pollutes drinking water and harms other farming; paddy land and wetland habitats are lost. Measure: zoning that keeps ponds away from drinking water sources and fertile paddy belts, lined ponds, and compulsory treatment of waste water before release, under the rules of the Coastal Aquaculture Authority.

One benefit and one environmental cost 1. A suitable measure 1.

Question 8 [4]

- (i) (1) Coal: the region contains India's main coking coal fields in the Damodar valley, such as Jharia, Bokaro, Giridih and Karanpura, with Raniganj close by, which supply fuel to steel plants and thermal power stations. (2) Iron ore and other minerals: rich haematite deposits in Singhbhum and in the adjoining Keonjhar and Sundargarh districts of Odisha, together with manganese, limestone, dolomite, bauxite, mica and copper, lie close to the coal, so heavy industries can be located near both; this explains the steel plants at Jamshedpur, Bokaro, Burnpur, Durgapur and Rourkela. (3) Power and water: the Damodar Valley Corporation, set up in 1948, built dams and thermal and hydel stations that supply electricity and water to industry. (4) Transport and market: the region is crossed by the main railway lines between Kolkata and northern India and is close to the port of Kolkata and Haldia, through which machinery is imported and goods exported, and the Ganga plain provides a large market. Cheap labour from the region and from neighbouring states, and government investment in public sector plants such as Heavy Engineering Corporation at Ranchi, also helped.

Coal explained 1. Iron ore and other minerals explained 1. Power and water explained 1. Transport, port, market, labour or government investment explained 1.

OR

- (ii) (1) Raw materials: crude oil and natural gas are produced in the Cambay basin at Ankleshwar and Kalol and offshore, and gas from Mumbai High is landed at Hazira; the Gujarat refinery at Koyali near Vadodara, whose aromatics unit (UDEX) was set up to recover benzene, toluene and xylene, and the giant refineries at Jamnagar supply naphtha and other feedstock. (2) Early public investment: Indian Petrochemicals Corporation Limited (IPCL) set up a major complex at Vadodara, next to Koyali, which made polymers, synthetic fibres and other petrochemicals and attracted many downstream units. (3) Ports: the long coastline with ports such as Kandla (Deendayal), Mundra, Sikka, Hazira and Dahej allows crude oil to be imported and products exported cheaply. (4) Market, policy and enterprise: the synthetic textile industry of Surat and the plastics industries of western India provide a ready market; the state offers industrial estates, a petroleum, chemicals and petrochemicals investment region at Dahej, good power supply and an entrepreneurial business community with capital.

Oil and gas and the refinery at Koyali 1. IPCL complex at Vadodara 1. Ports 1. Market, policy or enterprise 1.

Question 9 [4]

- (i) The average holding was only about 1.1 hectares in the Agriculture Census of 2015-16, and most holdings are small or marginal. Reasons: the laws and customs of inheritance divide a family's land among all the heirs in each generation, so holdings become smaller and more fragmented; and the rapid growth of population, with too few jobs outside agriculture, keeps most families dependent on land, which increases the pressure on it. Effect: small, scattered plots make the use of tractors, tube wells and other investment uneconomic, raise the cost of cultivation and keep incomes low, and many farm families remain underemployed.

Two reasons: inheritance and population pressure 1. One effect on farming 1.

- (ii) First, the dense mangroves, with their tangled stilt roots and breathing roots, act as a natural barrier that reduces the force of the wind and the height and speed of storm surges during cyclones, so that villages behind them suffer less flooding and damage. Second, their roots trap silt and bind the soft mud, which stabilises the shoreline and the islands of the delta against erosion by tides and waves; the forests also support livelihoods through fish, crabs, prawns and honey, since they are breeding grounds for many species.

Protection from cyclones and storm surges 1. Control of erosion, or support of livelihoods 1.

Question 10 [7]

- (i) (1) Iron and steel: the iron ore of Dalli-Rajhara supplies the Bhilai steel plant, set up with Soviet help and producing since 1959, which made Bhilai and Durg a major industrial centre with many ancillary engineering units; the high-grade ore of Bailadila in Dantewada is sent to Visakhapatnam and other plants, and a new steel plant has been built at Nagarnar in Bastar. (2) Coal and power: the coalfields of Korba, Mand-Raigarh and Hasdeo-Arand support large pithead thermal power stations, especially around Korba, so the state supplies electricity to other states as well. (3) Aluminium: bauxite from Mainpat and Kawardha, together with cheap power from Korba, led to the aluminium smelter of BALCO at Korba. (4) Cement and other minerals: limestone and dolomite around Raipur, Baloda Bazar and Durg support many cement plants and supply flux to steel works, and Chhattisgarh is the only producer of tin concentrate in India, from Bastar. Mineral royalties give the state revenue for development, and the mining towns have attracted railways and roads.

Iron ore and the steel industry 1. Coal and thermal power 1. Bauxite and aluminium 1. Limestone and cement, tin, or revenue and transport 1.

- (ii) Kosa is a tasar silk obtained from silkworms reared on trees such as arjun, sal and saja in the forests of the state. Rearing the silkworms and collecting cocoons gives tribal families a cash income from the forest without clearing it, and the reeling and weaving of Kosa saris and fabric at centres such as Champa and Raigarh supports many households of weavers; the cloth sells in other states and abroad. Other forest-based activities include the collection of tendu leaves for bidis, mahua flowers and seeds, sal seeds, lac, honey, tamarind and medicinal plants, which provide food, fuel and income in the lean season when there is little farm work; the state purchases many of these at a minimum support price. Together these activities supplement low incomes from rain-fed farming, reduce migration and give communities a stake in conserving the forest, which covers about two fifths of the state.

Kosa silk: rearing on forest trees and income 1. Weaving centres and markets 1. Other minor forest produce and its role in incomes and conservation 1.

OR

- (iii) First, the physical base: the Chhattisgarh plain, drained by the Mahanadi and its tributaries such as the Seonath and the Hasdeo, is a wide, gently sloping basin with red and yellow soils and heavier clayey soils in the low-lying fields that hold water well, and it receives about 120 cm to 150 cm of monsoon rain, which suits transplanted and broadcast paddy. Second, rice dominates the cropping pattern: it occupies most of the kharif area, the state is a major producer and contributor of rice to the central pool, and the region is famous for its great number of traditional rice varieties, which have been collected and conserved by its agricultural university at Raipur. Third, irrigation and support: reservoirs such as Gangrel on the Mahanadi and Minimata Bango on the Hasdeo, together with tanks and tube wells, irrigate part of the area and allow a second crop, and the state buys paddy from farmers at an assured price through cooperative societies, which keeps rice

the preferred crop.

Physical base: Mahanadi basin, soils and rainfall 1. Dominance and diversity of rice 1. Irrigation or state procurement 1.

Question 11 [7]

(i)

- (a) (1) Limitations of Kolkata: the Kolkata docks lie far up the Hooghly, and silting of the river and its shifting sandbars limit the draught, so large modern ships could not reach them; Haldia, about 100 km downstream at the confluence of the Haldi and the Hooghly and much nearer the sea, offers deeper water and takes larger vessels. It was developed as the second dock system of the port of Kolkata, opening in 1977 after an oil jetty in 1968. (2) Bulk cargo: Haldia was designed to handle bulk cargo such as coal, iron ore, fertilisers and crude oil and petroleum products, which need deep berths and large storage areas, and the Farakka barrage (1975) was built partly to keep the Hooghly navigable by flushing it with water from the Ganga. (3) Industries: the port and flat, available land attracted the Indian Oil refinery (1975), Haldia Petrochemicals and many downstream plastics units, fertiliser and chemical plants, so Haldia became the first petrochemical hub of eastern India. (4) Transport links: Haldia is connected by railway and highway to Kolkata and the mining and industrial belt of Jharkhand and Odisha, and it has a terminal on National Waterway 1 on the Ganga, which links it with the Ganga plain.

Limitations of Kolkata and deeper water at Haldia 1. Bulk cargo, oil jetty or Farakka 1. Refinery, petrochemicals and other industries 1. Rail, road or waterway links 1.

- (b) The hinterland of Haldia, shared with the Kolkata docks, covers West Bengal, Bihar, Jharkhand, parts of Odisha and Chhattisgarh, eastern Uttar Pradesh, Sikkim, Assam and the other north-eastern states: it exports coal, iron ore, steel, tea, jute goods and petroleum products and imports coking coal, crude oil, fertilisers and machinery for them. It extends beyond India because Nepal and Bhutan are landlocked and have no sea coast of their own; under transit arrangements with India their imports and exports pass through the port of Kolkata and Haldia, carried by rail and road through the Siliguri region, and Bangladesh also uses the waterway links.

Indian hinterland described 1. Main cargo of the hinterland 1. Nepal and Bhutan as landlocked countries using the port under transit arrangements 1.

OR

(ii)

- (a) The Eastern corridor runs from Ludhiana in Punjab to Son Nagar in Bihar and the Western corridor from Dadri near Delhi to the Jawaharlal Nehru Port near Mumbai. (1) Faster, cheaper freight: separate tracks only for goods trains allow higher speeds, heavier axle loads, longer trains and, on the Western corridor, double-stack container trains, which cut transit time and the cost of moving coal, steel, cement, food grains and containers. (2) Decongestion of existing lines: freight moves off the crowded Delhi to Howrah and Delhi to Mumbai routes, so more and faster passenger trains can run on them. (3) Shift from road to rail: cheaper, reliable rail freight draws traffic from lorries, which saves diesel, reduces road congestion and lowers carbon emissions. (4) Industrial growth and ports: the corridors link the ports of Gujarat and Maharashtra and the coalfields of the east with the markets of the north, and industrial corridors and logistics parks, such as the Delhi to Mumbai Industrial Corridor, are being developed along them, creating jobs and new towns.

Faster and cheaper freight 1. Decongestion of passenger routes 1. Shift from road to rail 1. Industrial corridors or port connectivity 1.

- (b) (1) Composition of exports: the share of traditional primary exports such as tea, jute, cotton and spices has fallen, while manufactured goods now dominate, especially engineering goods, refined petroleum products, pharmaceuticals, chemicals, gems and jewellery and, increasingly, electronic goods such as mobile phones. (2) Composition of imports: crude oil and petroleum products are the largest import, followed by electronic goods, gold, coal, chemicals and machinery, and the merchandise import bill exceeds exports, giving a large trade deficit that is partly offset by growing exports of services such as software and by remittances. (3) Direction of trade: trade has shifted from Britain and western Europe towards the United States, which is now India's largest export market, China, which is its largest source of

imports, the United Arab Emirates and other Asian countries, and trade agreements with partners such as the UAE and Australia have been signed.

Change in composition of exports 1. Change in composition of imports and the trade deficit 1. Change in direction of trade 1.

Question 12 [7]

- (i) The Green Revolution began in the mid-1960s with high-yielding varieties of wheat, and later rice, together with assured irrigation from canals and tube wells, chemical fertilisers, pesticides, credit and a minimum support price with government procurement, first in Punjab, Haryana and western Uttar Pradesh.

Achievements: (1) wheat production roughly doubled between the mid-1960s and the early 1970s, India ended its dependence on food imports and built buffer stocks for the public distribution system, achieving food security; (2) farm incomes and rural prosperity rose in the region, demand grew for tractors, fertilisers and agro-processing, and employment grew in farming and related trades. Environmental costs: (1) the rice and wheat cycle needs huge quantities of water, and over-pumping by tube wells has lowered the water table sharply in much of Punjab and Haryana, while over-irrigation from canals has caused waterlogging and salinity in some areas; (2) heavy use of fertilisers and pesticides has polluted soil and ground water and reduced soil health, with deficiencies of micronutrients, and the burning of crop stubble after the rice harvest causes severe air pollution in north India. Loss of crop diversity is a further cost.

First achievement explained 1. Second achievement explained 1. First environmental cost explained 1. Second environmental cost explained 1.

- (ii) Jute needs a hot and humid climate, with temperatures of about 24 °C to 35 °C and high humidity during growth; heavy rainfall of about 150 cm to 250 cm, or assured water; and fertile, well-drained alluvial loam, which is exhausted quickly, so it grows best where the soil is renewed by fresh silt each year. It also needs plenty of clean, slow-moving water for retting the stalks and cheap labour for harvesting, retting and stripping the fibre. The delta of West Bengal meets all of these: its alluvium is renewed by the annual floods, it has a hot humid climate with heavy monsoon rain, its many ponds and channels provide water for retting and it has abundant labour; the jute mills of the Hooghly belt are also close by, so West Bengal produces about three quarters of India's jute.

Climate and rainfall conditions 1. Soil renewed by silt, water for retting or labour 1. Reason for concentration in the West Bengal delta 1.

Question 13 [7]

- (i) (1) Tropical climate: the warm, frost-free climate of the Peninsula gives cane with a higher sucrose content and a higher yield per hectare, so more sugar is recovered from each tonne of cane. (2) Longer crushing season: because there is no cold winter, cane can be harvested and crushed over a longer period, often six months or more against about four in the north, so the mills work at full capacity for longer and earn more. (3) Soil and irrigation: the black soil of the Deccan lava region retains moisture, and canals from dams on the Krishna, Godavari and their tributaries, together with wells, give assured water. (4) Modern mills and markets: the mills of the Peninsula are newer and larger, with modern machinery, and they produce by-products such as ethanol and electricity from bagasse; their nearness to ports such as Mumbai helps exports, and the large urban markets of western and southern India are close by. The mills of Uttar Pradesh and Bihar are older and smaller, and the cooler winter there lowers sugar recovery.

Higher sucrose and yield in a tropical climate 1. Longer crushing season 1. Black soil and irrigation 1. Modern mills, by-products, ports or markets 1.

- (ii) The concern is justified: sugarcane stays in the field for twelve to eighteen months and needs far more water than jowar, bajra or pulses, yet much of it is grown in the drought-prone rain-shadow districts of Marathwada and western Maharashtra; the cane takes a large share of canal water and over-pumps ground water, so less is left for drinking and for other crops, and in drought years villages depend on tankers while the mills still need cane. Ways to grow cane with less water: (1) drip irrigation, which delivers water directly to the root zone, together with mulching with cane trash to reduce evaporation, can cut water use substantially while maintaining yields; (2) planting cane in wetter, better-watered basins rather than in drought-prone ones, using shorter-duration and drought-tolerant varieties, and pricing water by volume so that farmers have a

reason to save it.

Concern evaluated with reasons 1. First suitable method 1. Second suitable method 1.