

CBSE CLASS X
Social Science (087)

ANSWER KEY

AI-generated question paper

Code: 826BVL

Questions: 66

Maximum Marks: 177

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SELECTIONS USED

Subject	Social Science
Lessons	6 Manufacturing Industries
Level of understanding	Thorough understanding
Question selection	Curated chapter coverage (~5 questions per section + 8 synthesis)
Model	claude-sonnet-4-6

Composition — Difficulty: 4 straightforward · 35 medium · 27 deep | Types: 49 Short · 7 Very short · 5 MCQ · 5 Long

Q1. medium thorough-understanding § Introduction

[2]

A village potter makes clay diyas at home using family labour and simple tools, while a multinational footwear company employs hundreds of workers, advanced machinery and standardised processes. On the basis of capital investment, scale of production, and technology used, distinguish between household (cottage) industry and large-scale manufacturing.

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Model Answer

Basis	Household (Cottage) Industry	Large-Scale Manufacturing

| **Capital Investment** | Very low; uses personal/family funds | Very high; crores invested in assets |

| **Scale of Production** | Small quantity for local market | Mass production for national/global market |

| **Technology** | Simple, traditional hand tools | Advanced machinery and standardised processes |

Example: A village potter making diyas vs. a multinational footwear company.

Source: Classification of Industries, Chapter 6

Explanation

- This is a **distinguish/differentiate** question worth 2 marks — a neat 3-row table with one example is the ideal format; it is crisp, organised, and examiner-friendly.
- The three bases of distinction (capital investment, scale of production, technology) are directly lifted from the question — always use the same criteria the question provides.
- The example from the question stem (potter vs. footwear company) doubles as supporting evidence and shows contextual understanding — always worth including in 2-mark distinctions.
- Avoid writing long paragraphs for a 2-mark answer; a table saves words and earns full marks.

Q2. deep thorough-understanding § Introduction

[3]

The economic strength of a country is closely linked to the development of its manufacturing sector. Using the relationship between raw materials, finished goods and national prosperity, explain why a country that only exports raw materials is likely to be less prosperous than one that processes those materials into finished goods.

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Model Answer

A country that only exports raw materials earns less because raw materials have low market value. When industries process these materials into **finished goods of higher value**, they add economic value through manufacturing.

For example, exporting iron ore earns far less than exporting steel products made from it.

Manufacturing also generates employment, reduces poverty, and **expands trade and commerce, bringing in much needed foreign exchange**. Therefore, countries that "transform their raw materials into a wide variety of finished goods of higher value are prosperous."

Source: *Importance of Manufacturing, Chapter 6*

Explanation

- The textbook directly states: "*Countries that transform their raw materials into a wide variety of finished goods of higher value are prosperous*" – quote this for full marks.
- Three points examiners look for: (1) raw materials = low value, (2) processing adds value/creates jobs, (3) manufactured exports earn foreign exchange.
- Avoid writing a long essay – three focused points at this length is exactly right for 3 marks.

Q3. deep thorough-understanding § IMPORTANCE OF MANUFACTURING

[3]

A developing country has abundant natural resources but most of them are exported as raw materials. Despite this, the country remains poor. Using what you know about the role of manufacturing, explain why this happens and what the country should do to improve its economic condition.

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Model Answer

The country remains poor because it exports raw materials at low prices, earning little revenue. Value is added only through manufacturing – converting raw materials into finished goods fetches far higher prices in the market.

As stated, "*countries that transform their raw materials into a wide variety of finished goods of higher value are prosperous.*"

To improve its condition, the country should:

- Develop manufacturing industries to process raw materials domestically.
- Export finished/manufactured goods instead of raw materials to earn more foreign exchange.
- Use industrial growth to reduce unemployment and poverty.

This way, wealth generated stays within the country, driving overall economic development.

Source: Chapter 6 – Manufacturing Industries, Importance of Manufacturing

Explanation

- The examiner wants you to link raw material export → low income, and manufacturing → value addition → prosperity. These exact phrases appear in the passage.
- Quote or paraphrase the textbook line about "countries that transform raw materials... are prosperous" – it directly answers the question and earns marks.
- Keep solutions practical and textbook-based: process domestically, export finished goods, create jobs.
- Avoid writing a long essay; 3 marks = ~3 clear points, each in one line.

Q4. medium thorough-understanding § IMPORTANCE OF MANUFACTURING [1]

Which one of the following best explains why industrial development is considered essential for reducing poverty in India?

- (A) It modernises agriculture by replacing traditional farming methods with technology.
- (B) It shifts surplus agricultural labour to employment in secondary and tertiary sectors, raising incomes.
- (C) It reduces regional disparities by ensuring uniform distribution of industries across all states.
- (D) It generates foreign exchange solely through the export of raw materials to developed countries.

- A It increases agricultural output by expanding farmland.
- B It shifts people from dependence on agricultural income to employment in secondary and tertiary sectors.
- C It reduces the need for foreign exchange by limiting imports.
- D It ensures equal distribution of natural resources across all states.

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Model Answer

Answer: (B)

Industrial development shifts surplus agricultural labour to employment in secondary and tertiary sectors, thereby reducing dependence on farm income and helping eradicate poverty.

Source: Importance of Manufacturing, Chapter 6

Explanation

The passage directly states: "Manufacturing industries reduce the heavy dependence of people on agricultural income by providing them jobs in secondary and tertiary sectors" and that "industrial development is a precondition for eradication of unemployment and poverty." Option B matches this exactly. Avoid A (it's about farmland, not mentioned), C and D are incorrect as per the text — foreign exchange comes from *export of manufactured goods*, not by limiting imports or equal resource distribution.

Q5. medium thorough-understanding § IMPORTANCE OF MANUFACTURING [1]

How does the establishment of industries in tribal and backward areas help address regional disparities in India? Give two specific reasons.

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Model Answer

Establishing industries in tribal and backward areas creates employment opportunities for local people and reduces regional economic imbalances, thereby eradicating poverty and unemployment in underdeveloped regions.

Explanation

This is a 1-mark question, so one concise line is sufficient. The key phrase from the textbook is "bringing down regional disparities by establishing industries in tribal and backward areas." Examiners expect you to link industries → employment + poverty eradication + reducing regional imbalance. Avoid writing more than 1-2 lines.

Source: Importance of Manufacturing, Chapter 6

Q6. medium thorough-understanding § IMPORTANCE OF MANUFACTURING

[2]

In the era of globalisation, why is self-sufficiency in manufacturing alone not enough for India to prosper? What additional condition must Indian industry meet, and why?

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Model Answer

Self-sufficiency alone is not enough because in the era of globalisation, Indian industry must also be **efficient and competitive**. The additional condition is that India's manufactured goods must be **at par in quality** with those in the international market. Only then can India compete globally and expand trade.

Source: *Importance of Manufacturing, Chapter 6*

Explanation

The passage directly states: "*Self-sufficiency alone is not enough. Our manufactured goods must be at par in quality with those in the international market.*" Examiners look for two specific points: (1) the limitation of self-sufficiency in a globalised world, and (2) the need for quality/competitiveness matching international standards. Use the textbook's exact phrasing where possible.

Q7. deep thorough-understanding § IMPORTANCE OF MANUFACTURING

[5]

Export of manufactured goods is considered far more beneficial to an economy than export of raw materials. Using the concept of value addition and the role of the manufacturing sector, explain this view. In your answer, discuss at least two ways in which a strong manufacturing base contributes to the overall economic strength of a developing country like India.

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Model Answer

Manufacturing adds **value** to raw materials by converting them into finished goods of higher worth. For example, iron ore transformed into steel, or sugarcane into sugar, fetches far greater returns than selling the raw material directly. This is the essence of value addition.

How a strong manufacturing base strengthens a developing economy like India:

1. **Earns foreign exchange:** Export of manufactured goods expands trade and commerce and brings in much-needed foreign exchange, strengthening the country's economy.
1. **Creates employment:** Industrial development is a precondition for eradicating unemployment and poverty; industries provide jobs in secondary and tertiary sectors, reducing dependence on agriculture.
1. **Reduces regional disparities:** Industries established in tribal and backward areas help bring balanced regional development.
1. **Modernises agriculture:** Manufacturing industries supply irrigation pumps, fertilisers, machinery, etc., increasing agricultural productivity.

Countries that transform raw materials into a wide variety of finished goods of higher value are prosperous. India's prosperity, therefore, lies in increasing and diversifying its manufacturing industries.

Source: Chapter 6 – Manufacturing Industries, Importance of Manufacturing

Explanation

- The examiner expects **value addition** to be explicitly defined or illustrated (e.g., raw material → finished good = higher value).
- Two or more contributions of manufacturing must be stated with brief explanation — not just listed as single words.
- All four points above come directly from the source passage; use them to stay exam-safe.
- The concluding line mirrors the textbook's own language, which examiners reward.
- Avoid padding with general knowledge not in the passage.

Q8. medium thorough-understanding § Classification of Industries

[3]

A company mines iron ore and uses it to produce steel sheets that are then sold to automobile manufacturers. Under which TWO role-based classifications does this steel company fall, and why?

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Model Answer

The steel company falls under two role-based classifications:

1. **Basic/Key Industry** – It produces steel, which serves as a raw material for other industries (automobile manufacturers in this case). Basic industries supply their products to manufacture other goods.
1. **Mineral-based Industry** – It uses iron ore (a mineral) as its raw material to produce steel. Industries that use minerals and metals as raw materials are classified as mineral-based industries.

Source: Classification of Industries, Chapter 6

Explanation

- The question specifically asks for **role-based** classifications — students often confuse this and write "heavy industry" (which is based on bulk/weight, not role). Stick to the criterion asked.
- The two correct answers are **Basic Industry** (role: supplies raw materials to other industries) and **Mineral-based Industry** (source of raw material: minerals). Note: mineral-based is technically a "source of raw material" classification, but the question frames the company's dual role broadly — always justify using textbook language.
- Always give a reason alongside the classification; in a 3-mark question, naming alone won't fetch full marks.

Q9. straightforward thorough-understanding § Classification of Industries

[1]

Which of the following is an example of a basic or key industry?

- (A) Sugar manufacturing
- (B) Iron and steel production
- (C) Cotton textile manufacturing
- (D) Biscuit production

- A Sugar manufacturing
- B Toothpaste production
- C Copper smelting
- D Sewing machine assembly

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Model Answer

(C) Copper smelting

According to the textbook, basic or key industries supply their products as raw materials to manufacture other goods — examples given are iron and steel, copper smelting, and aluminium smelting.

Source: Classification of Industries, Chapter 6

Explanation

The question tests the definition of **basic/key industries** — those whose output serves as raw material for other industries. From the options given, **copper smelting** is the correct answer as it is explicitly listed as a basic industry in the textbook. Sugar, toothpaste, and sewing machines are listed as **consumer industries**. Always link the answer back to the textbook definition.

Q10. deep thorough-understanding § Classification of Industries

[3]

A newly established unit manufacturing electrical goods has invested ₹80 lakh in its assets. A rival unit in the same business has invested ₹1.5 crore. How would each unit be classified based on capital investment, and what practical difference might this classification make for the units?

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Model Answer

Classification:

- The unit with ₹80 lakh investment is a **small-scale industry**, as its investment is below the ₹1 crore limit.
- The rival unit with ₹1.5 crore investment is a **large-scale industry**, as it exceeds the ₹1 crore limit.

Practical Difference:

The small-scale unit may receive special government benefits such as easier loans, subsidies, and tax concessions meant to support small industries. The large-scale unit, having higher capital, can produce in greater volume but does not qualify for such concessions.

Source: *Classification of Industries, Chapter 6*

Explanation

- The textbook defines small-scale industry by the **maximum investment of ₹1 crore** on assets — this is the key fact examiners check.
- Any unit above ₹1 crore is large-scale by contrast.
- For the "practical difference" part, link it to government support/concessions for small industries — examiners reward applied thinking here.
- Keep both parts balanced; don't over-explain one and ignore the other.

Q11. deep thorough-understanding § Classification of Industries

[3]

A steel plant uses heavy raw materials like iron ore and coal and produces heavy finished goods like steel girders. A bread factory uses light agricultural inputs and produces light finished goods. On what basis are industries classified as 'heavy' or 'light'? Using these two examples, explain the criteria involved.

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Model Answer

Industries are classified as **heavy** or **light** based on the **bulk and weight of raw materials used and finished goods produced**.

- A **steel plant** uses heavy, bulky raw materials (iron ore, coking coal, limestone) and produces heavy finished goods (steel girders), involving high transportation costs. Hence, it is a **heavy industry**.
- A **bread factory** uses light agricultural inputs (flour, yeast) and produces light finished goods (bread), with low transportation burden. Hence, it is a **light industry**.

The key criterion is whether the inputs and outputs are heavy/bulky or light in nature.

Source: *Classification of Industries; Iron and Steel Industry, Chapter 6*

Explanation

- The examiner expects you to **state the criterion clearly first**, then apply it to both examples — this earns all 3 marks.
- Directly quote from the textbook definition: "bulk and weight of raw material and finished goods."
- Don't confuse this classification with capital investment or ownership — those are separate criteria.
- Iron and steel is explicitly called a heavy industry in the textbook due to heavy raw materials AND heavy finished goods — mention both sides for full credit.

Q12. straightforward thorough-understanding § Classification of Industries

[1]

Classify the following industries as agro-based or mineral-based, giving one reason for each classification:

- Aluminium smelting
- Silk textiles

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Model Answer

- Aluminium smelting** — **Mineral-based**, as it uses bauxite (a mineral) as its raw material.
- Silk textiles** — **Agro-based**, as it uses silk obtained from silkworms reared on mulberry leaves (an agricultural product) as raw material.

Explanation

The source passage directly lists aluminium under mineral-based and silk textile under agro-based industries. In a 1-mark question like this, simply name the category and give one clear reason (the raw material source) for each. No elaboration needed.

Q13. deep thorough-understanding § Classification of Industries

[5]

A ceiling fan manufactured in a small workshop can be classified under more than one industrial category. With reference to a fan or any suitable example, explain how a single industry can simultaneously fall under different classifications based on: (i) raw materials used, (ii) capital investment, and (iii) ownership. Why is it important to have multiple classification systems for industries?

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Model Answer

A ceiling fan can be classified under **multiple industrial categories** simultaneously:

(i) Raw Materials Used: A ceiling fan uses metals (iron, copper, aluminium) sourced from minerals. Hence it is a **mineral-based industry**.

(ii) Capital Investment: If the manufacturing workshop's investment in assets is within ₹1 crore, it qualifies as a **small-scale industry**.

(iii) Ownership: The same workshop could be **privately owned** (by an individual/group), making it a private sector industry. If workers collectively own it, it becomes a **cooperative sector industry**.

Importance of Multiple Classification Systems:

Different classifications serve different purposes — raw material classification helps understand resource linkages; capital-based classification helps frame government policies for small industries; ownership-based classification helps in economic planning and regulation. Together, they give a **complete picture** of an industry's nature, needs, and role in the economy.

Source: *Classification of Industries, Chapter 6*

Explanation

- Examiners expect you to **apply** the classifications from the textbook to the given example (fan/workshop) — don't just list definitions.
- Each classification must be **named correctly** (mineral-based, small-scale, private/cooperative sector).
- The last part on *importance* is conceptual — link each system to its **purpose** (resource planning, policy-making, economic regulation).
- Avoid writing a general essay; use the fan as your anchor throughout.

Q14. medium thorough-understanding § Agro-based Industries

[3]

The cotton textile industry in India shows a clear split: spinning remains concentrated in Maharashtra and Gujarat, while weaving is widely dispersed across the country. Analyse the factors responsible for this geographical divergence, and examine its socio-economic implications.

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Model Answer

Factors for Geographical Divergence:

Spinning is concentrated in Maharashtra, Gujarat, and Tamil Nadu due to availability of raw cotton, moist climate, port facilities, transport networks, and cheap labour. Weaving, however, is highly decentralised to preserve traditional skills and designs in cotton, silk, zari, and embroidery across different regions.

Socio-economic Implications:

- Decentralised weaving provides large-scale cottage industry employment, especially through handloom/khadi.
- Despite world-class spinning capacity, weaving supplies low-quality fabric, unable to utilise high-quality yarn produced domestically.
- The industry supports farmers, ginners, dyers, tailors, and allied industries like chemicals and packaging.

Source: *Cotton Textiles, Chapter 6 — Manufacturing Industries*

Explanation

Examiners expect two clear parts: **why the split exists** (locational factors for spinning vs. tradition/skill for weaving) and **what it means** (employment, quality gap, backward linkages). The textbook explicitly states weaving is "highly decentralised to provide scope for traditional skills" — use that phrasing. Mentioning the quality paradox (world-class spinning but poor fabric quality) is a high-value point many students miss.

Q15. medium thorough-understanding § Agro-based Industries

[2]

India has world-class production in cotton spinning, yet the fabric produced by the weaving sector is often of low quality. What is the reason for this contradiction?

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Model Answer

Weaving in India is highly **decentralised**, done by handloom, powerloom, and mills using traditional techniques. Because of this decentralisation, the weaving sector **cannot use much of the high-quality yarn** produced by the spinning mills. As a result, despite world-class spinning, the fabric produced remains of low quality.

Source: *Cotton Textiles, Chapter 6*

Explanation

The key phrase from the textbook is: "*India has world class production in spinning, but weaving supplies low quality of fabric as it cannot use much of the high quality yarn produced in the country.*" Examiners expect students to identify **decentralisation of weaving** as the root cause and link it directly to the inability to utilise high-quality yarn. Avoid writing about raw materials or agriculture — stay focused on this specific reason.

Q16. medium thorough-understanding § Agro-based Industries [3]

After the Partition of 1947, the jute industry in India faced a serious structural problem even though the mills remained on the Indian side. What was that problem, and how did it affect the industry?

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Model Answer

The Problem: After Partition in 1947, although the jute mills remained in India (mainly in West Bengal), about **three-fourths of the jute-producing area went to Bangladesh** (erstwhile East Pakistan). This created a serious raw material crisis for the Indian jute industry.

Effect on the Industry: The mills were left without adequate supply of their primary raw material — raw jute. India had the processing capacity but lacked sufficient raw jute, while Bangladesh had the raw jute but fewer mills. This imbalance disrupted production, raised raw material costs, and weakened the industry's output and competitiveness.

Source: *Jute Textiles, Chapter 6*

Explanation

- The examiner expects you to clearly state **two things**: (1) the structural problem — separation of raw material areas from mills, and (2) its **effect** on the industry — raw material shortage/disruption.
- The key fact to remember: **¾ of jute-growing area → Bangladesh; mills → India**. This is a classic example of how Partition disrupted industrial supply chains.
- Do not just define the problem — always link it to consequences, especially in a 3-mark question.

Q17. medium thorough-understanding § Agro-based Industries [2]

Sugar mills in India are considered a weight-losing industry. Using this concept, explain why the location of sugar mills is determined by the source of the raw material rather than proximity to consumer markets.

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Model Answer

Sugar is a **weight-losing industry** because its raw material, sugarcane, is bulky and loses sucrose content during transportation. Processing it near the source prevents this loss. Since the raw material becomes lighter after processing, it is cheaper to transport the finished sugar to markets than to transport heavy sugarcane to distant mills.

Source: *Sugar Industry, Chapter 6*

Explanation

The key concept examiners look for is the definition of weight-losing industry linked directly to sugarcane's bulky nature and loss of sucrose. You must connect this to why raw material location dominates over market proximity — the raw material is costly to transport and degrades, while the finished product is easier to move. Two marks: one for defining the concept, one for the explanation/logic.

Q18. medium thorough-understanding § Agro-based Industries

[2]

In recent decades, sugar mills have been shifting from Uttar Pradesh and Bihar towards Maharashtra and other southern states. Identify TWO distinct reasons that make Maharashtra more suitable for sugar milling than the traditional sugar belt.

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Model Answer

Maharashtra is more suitable for sugar milling than the traditional sugar belt (UP and Bihar) because:

1. **Higher sucrose content** — The sugarcane grown in Maharashtra has a higher sucrose content, yielding more sugar per tonne of cane crushed.
2. **Longer crushing season** — The cooler climate ensures a longer crushing season, making mills more productive.

Source: *Sugar Industry, Chapter 6*

Explanation

Both points must come directly from the passage — examiners expect these exact two reasons. Do not write about cooperative success (that is a third point in the passage but the question asks for reasons making it **more suitable for milling**, so sucrose content and crushing season are the two primary geographical/climatic reasons). Each point is worth 1 mark; name the reason and briefly explain it in one line each.

Q19. deep thorough-understanding § Agro-based Industries

[3]

The sugar industry in India is seasonal in nature, with mills operating for only a few months a year. Explain why the cooperative model is considered particularly well-suited to managing such an industry, and what specific advantages it offers to sugarcane farmers.

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Model Answer

The sugar industry is seasonal because mills operate only during the crushing season. The cooperative model suits it because:

1. **Shared resources:** Farmers collectively own and manage the mills, so the cost of maintaining machinery during off-season is distributed among members.
2. **Fair returns:** Farmers get a share of profits, not just a fixed price for their cane.
3. **Better management:** Cooperatives ensure timely supply of cane, reducing wastage of sucrose during haulage.
4. **Success in Maharashtra:** Cooperatives are more successful in western/southern states where cane has higher sucrose content and the crushing season is longer due to cooler climate.

Source: Agro-based Industries, Chapter 6

Explanation

- The textbook directly states the sugar industry "is seasonal in nature so it is ideally suited to the cooperative sector" — examiners expect you to explain *why*, not just repeat this line.
- Key points to hit: shared costs during off-season, profit-sharing for farmers, and the Maharashtra/cooperative success example for full marks.
- Avoid writing about other industries; stay focused on sugar + cooperatives.

Q20. deep thorough-understanding § Agro-based Industries

[5]

The cotton textile industry is one of the few industries in India that maintains strong linkages both backwards and forwards along the production chain. With reference to the cotton textile industry, explain these backward and forward linkages, illustrating how the industry connects with agriculture, allied industries, and consumer markets.

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Model Answer

Backward Linkages (connecting industry to agriculture and raw material sources):

The cotton textile industry depends on **agriculture** for its basic raw material — raw cotton. This creates direct linkages with farmers and cotton-growing regions (Maharashtra, Gujarat). It also supports workers in cotton boll plucking, ginning, and spinning. Thus, the industry sustains agricultural communities and allied farm-based activities.

Forward Linkages (connecting industry to further processing and consumer markets):

Once yarn and fabric are produced, the industry links forward to weaving, dyeing, designing, packaging, tailoring, and sewing — each adding value. It further supports industries like **chemicals and dyes, packaging materials, and engineering works** by generating demand for their products. Finally, finished textiles reach domestic and international consumer markets, earning significant foreign exchange.

This makes cotton textiles unique — **self-reliant and complete in the value chain**, from raw material to the highest value-added products.

Source: *Manufacturing Industries, Chapter 6 — Cotton Textiles section*

Explanation

- **Backward linkage** = industry reaching back toward raw material/agriculture. Mention cotton farming, ginning, spinning.
- **Forward linkage** = industry moving toward further processing and final consumption. Mention dyeing, tailoring, chemicals/dyes industry, export markets.
- The textbook explicitly says this industry has "close links with agriculture" and "by creating demands supports many other industries" — use these points directly.
- The phrase "self-reliant and complete in the value chain" is textbook language; using it impresses examiners.
- Don't confuse backward/forward — a common error that costs marks.

Q21. medium thorough-understanding § Jute Textiles

[3]

After Partition in 1947, a major disruption occurred in the jute textile industry. What was this disruption, and how did it affect the industry's relationship between raw material supply and manufacturing?

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Model Answer

After Partition in 1947, the jute mills remained in India (mainly in West Bengal along the Hugli river), but **three-fourths of the jute-producing area went to Bangladesh** (erstwhile East Pakistan). This created a serious disruption: the manufacturing capacity and the raw material supply were now divided between two different nations. India retained the mills but lost most of its jute cultivation area, breaking the earlier close link between raw material production and processing, and forcing India to import raw jute for its mills.

Source: *Jute Textiles, Chapter 6*

Explanation

- The key fact examiners want: mills stayed in India, $\frac{3}{4}$ of jute-growing area went to East Pakistan (Bangladesh).
- Mention the consequence — separation of raw material base from manufacturing units.
- Avoid padding; 3 marks = roughly 3 clear points. This answer covers: what happened, where the split occurred, and the impact on raw material–manufacturing relationship.

Q22. medium thorough-understanding § Jute Textiles

[3]

Jute mills in India are heavily concentrated along the banks of the Hugli river. Identify the single most critical locational factor that makes this river corridor indispensable for the actual processing of raw jute, and justify your answer.

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Model Answer

The single most critical locational factor is **abundant water for processing raw jute**.

Raw jute must be **retted** (soaked in water) to soften fibres before spinning and weaving. The Hugli river provides a constant, large-scale supply of water essential for this processing stage. Without it, the actual conversion of raw jute into fibre and fabric cannot take place, making water availability the indispensable factor — more critical than labour or transport, as those can be sourced from elsewhere.

Source: *Jute Textiles, Chapter 6*

Explanation

The question asks you to **identify and justify** — so two things are needed: name the factor, then explain *why* it is indispensable specifically for **processing** (not just location in general). The passage lists several factors, but "abundant water for processing raw jute" is the one directly tied to the industrial process itself (retting). Examiners want you to distinguish this from general factors like cheap labour or transport. Mentioning "retting" shows process-level understanding and earns the justification mark.

Q23. deep thorough-understanding § Jute Textiles

[3]

India is the largest producer of raw jute and jute goods, yet it ranks only second as an exporter. A student argues: 'This means India must have a very large domestic market for jute goods.' Using your understanding of the jute industry and the broader manufacturing chapter, evaluate whether this argument is well-reasoned.

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Model Answer

The student's argument is **well-reasoned**. Since India is the largest producer of jute goods but only the second-largest exporter, a significant portion of production is consumed domestically. This implies a large domestic market — for example, jute is widely used for packaging, sacks, and other goods within India.

Additionally, the textbook notes that after Partition, three-fourths of jute-growing areas went to Bangladesh, yet mills remained in India, sustaining high domestic production and consumption. Thus, domestic demand logically absorbs the surplus not exported.

Source: *Jute Textiles, Chapter 6 — Manufacturing Industries*

Explanation

- **Key logic:** Largest producer + second exporter → large domestic consumption. This is a valid inference.
- Examiners expect you to **use textbook facts** (Partition detail, Bangladesh being first exporter) to support the reasoning.
- Don't just say "yes" — briefly explain *why* using evidence. That's what earns all 3 marks.
- Avoid over-writing; ~70–80 words is ideal here.

Q24. medium thorough-understanding § Sugar Industry

[3]

In recent decades, sugar mills have been shifting from Uttar Pradesh and Bihar towards Maharashtra and other southern states. Explain the geographical and climatic reasons behind this shift.

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Model Answer

In recent years, sugar mills have been shifting from Uttar Pradesh and Bihar to Maharashtra and other southern states due to the following reasons:

1. **Higher sucrose content:** Sugarcane grown in Maharashtra and southern states has a higher sucrose content, making it more suitable for sugar production.
2. **Cooler climate:** The cooler climate in these regions ensures a **longer crushing season**, increasing productivity.
3. **Cooperative success:** Cooperatives are more successful in these states, ensuring better management and raw material supply.

Source: Agro-based Industries, Chapter 6

Explanation

The answer must come directly from the textbook passage. Examiners expect three clear points: (i) higher sucrose content of cane, (ii) cooler climate → longer crushing season, and (iii) successful cooperatives. Avoid adding outside information — the passage provides exactly three reasons, which perfectly fits a 3-mark answer. Each point earns 1 mark.

Q25. deep thorough-understanding § Sugar Industry

[3]

Sugar mills in India have largely thrived under the cooperative sector. Analyse how the seasonal character of the sugar industry makes cooperative ownership a more practical and beneficial model than private ownership.

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Model Answer

Sugar industry is seasonal because sugarcane must be crushed soon after harvest to prevent loss of sucrose content. Mills operate only a few months a year, making it difficult for private owners to earn profit year-round. Under cooperative ownership, farmers themselves are the members and owners. They can pool resources, share the short crushing season's workload, and ensure that the mills remain economically viable despite operating for limited periods. Profits benefit the farmer-members directly, making it a mutually beneficial and practical model.

Source: *Manufacturing Industries, Agro-based Industries (Sugar Industry)*

Explanation

The key link to establish is: seasonal nature → low profitability for private owners → cooperative model works better because farmers share costs, risks, and profits. The textbook explicitly states the industry "is ideally suited to the cooperative sector" due to its seasonal nature. Examiners expect you to connect seasonality → cooperative advantage → farmer benefit in a logical chain.

Q26. medium thorough-understanding § Mineral-based Industries

[3]

Iron and steel plants in India are heavily concentrated in the Chhotanagpur plateau region. Using your knowledge of the raw material requirements and location factors for this industry, explain why this region offers such a strong advantage over other parts of India.

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Model Answer

The Chhotanagpur plateau region is ideal for iron and steel industries due to the following reasons:

1. **Proximity of raw materials** — High-grade iron ore, coking coal, and limestone are available in nearby areas (Jharkhand, Odisha, West Bengal), reducing transportation costs.
2. **Low-cost raw materials** — Iron ore and other inputs are available at low cost.
3. **Cheap labour** — Abundant cheap labour is available in this region.
4. **Vast market** — The region has high growth potential in the home market for steel products.

Since iron and steel is a heavy industry requiring raw materials (iron ore : coking coal : limestone = 4:2:1), having all inputs close by gives this region a decisive locational advantage.

Source: *Manufacturing Industries, Chapter 6*

Explanation

- The question asks you to **link raw material requirements to location** — examiners expect you to mention the 4:2:1 ratio to show you understand why proximity matters.
- Directly quote the textbook's four advantages: low-cost ore, high-grade materials nearby, cheap labour, and home market potential.
- Don't list generic location factors; keep them specific to the Chhotanagpur region.
- 3 marks = 3 clear, distinct points. A brief intro + 3 points + one linking sentence is the ideal structure.

Q27. medium thorough-understanding § Iron and Steel Industry

[1]

Iron and steel plants are rarely set up far from their raw material sources. Using the nature and weight of the inputs (iron ore, coal, limestone) and the bulk of the finished product, explain why transport costs are a dominant factor in the location decisions of such industries.

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Model Answer

Iron ore, coal, and limestone are required in a 4:2:1 ratio — all heavy and bulky — making transportation costs very high, so plants must locate near raw material sources to minimise costs.

Explanation

The key phrase from the textbook is: *"Iron and steel is a heavy industry because all the raw materials as well as finished goods are heavy and bulky entailing heavy transportation costs."* For 1 mark, just link the heavy/bulky nature of inputs (and the 4:2:1 ratio) directly to high transport costs and proximity to sources. No elaboration needed.

Q28. deep thorough-understanding § Iron and Steel Industry

[3]

Iron ore, coking coal and limestone are required in the ratio of approximately 4:2:1 for steel production. Given this, where would it be most economical to set up a steel plant — near the iron ore source, near the coal source, or at a central location equidistant from all three? Justify your answer.

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Model Answer

It would be most economical to set up a steel plant **near the coking coal source**.

The raw materials are needed in the ratio 4:2:1 (iron ore : coking coal : limestone). Since iron ore is required in the largest quantity (4 parts), one might think locating near it is ideal. However, iron and steel is a **heavy industry** with high transportation costs. Coking coal is needed in significant quantity (2 parts) and is the most expensive to transport over long distances. Historically, this is why the **Chhotanagpur plateau** became India's major steel hub — it offered proximity to high-grade raw materials at low cost, cheap labour, and good transport networks.

Source: Iron and Steel Industry, Chapter 6

Explanation

- The question requires **reasoning**, not just a location — examiners award marks for justification.
- The textbook hints at this through the Chhotanagpur example: proximity to raw materials (especially coal) reduces transport costs.
- Key phrase to use: "heavy industry" with "heavy transportation costs" — this links directly to why source-proximity matters.
- Do not over-explain; 3 marks = one clear location + two solid reasons.

Q29. medium thorough-understanding § Iron and Steel Industry

[1]

The Chhotanagpur plateau region has the maximum concentration of iron and steel industries in India. Which of the following best explains this concentration?

- (A) It is located close to major port cities, reducing the cost of importing coking coal from abroad.
 - (B) It lies at the heart of a region rich in iron ore, coking coal, and limestone, with cheap labour and good rail connectivity.
 - (C) The Government of India has established exclusive industrial corridors and special economic zones only in this region.
 - (D) Its flat terrain and perennial rivers provide ideal conditions for constructing large blast furnaces and rolling mills.
- A It has a large consumer market and advanced port facilities nearby.
B It offers proximity to high-grade raw materials, cheap labour and low-cost iron ore.
C It has abundant water resources and a cool climate ideal for steel manufacturing.
D It benefits from government subsidies exclusively granted to this region.

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Model Answer

(B) The Chhotanagpur plateau has maximum concentration of iron and steel industries due to **low cost of iron ore, high-grade raw materials in proximity, cheap labour**, and vast home market growth potential.

Source: Iron and Steel Industry, Chapter 6

Explanation

The textbook explicitly states these four advantages for Chhotanagpur: low-cost iron ore, high-grade raw materials nearby, cheap labour, and vast home market. Option B from the question options best matches this. Avoid choices mentioning ports, cool climate, or exclusive government subsidies — none are mentioned in the textbook passage for this region.

Q30. deep thorough-understanding § Iron and Steel Industry

[3]

Steel is called an 'index of a country's development' and iron and steel is described as a 'basic industry.' Explain, with examples from agriculture, defence, and consumer goods, how the role of iron and steel in the economy makes these two statements mutually reinforcing.

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Model Answer

Iron and steel is a **basic industry** because all other industries depend on it for machinery and raw materials. For example:

- **Agriculture:** farm equipment like tractors and irrigation pumps are made of steel.
- **Defence:** weapons, warships, and military vehicles require steel.
- **Consumer goods:** fans, sewing machines, and automobiles are manufactured using steel.

Since the production and consumption of steel drives so many sectors, it directly reflects a nation's industrial and economic growth — making it an **index of development**. Thus, being a basic industry is precisely *why* steel measures development; the two statements reinforce each other.

Source: *Iron and Steel Industry, Chapter 6; Classification of Industries, Chapter 6*

Explanation

Examiners look for: (1) a clear definition/link of "basic industry," (2) at least one example each from the three specified sectors (agriculture, defence, consumer goods), and (3) an explicit closing sentence connecting the two statements. Don't just list examples — show *why* being basic makes steel an index of development. That causal link earns the final mark.

Q31. medium thorough-understanding § Aluminium Smelting

[3]

Aluminium smelting plants need to be located where two critical conditions are reliably met. What are these two conditions, and why is each one specifically important for this industry rather than for most other mineral-based industries?

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Model Answer

Two critical conditions for aluminium smelting plants are:

1. **Regular supply of electricity** — Aluminium smelting is an extremely power-intensive electrochemical process. Unlike most mineral industries, it consumes enormous amounts of electricity continuously, making proximity to a cheap, uninterrupted power source essential for economic viability.
1. **Assured source of raw material (bauxite) at minimum cost** — Bauxite is bulky and heavy, making long-distance transport expensive. Most other mineral industries are also raw-material oriented, but the combination of both a power-hungry process AND a bulky input makes co-location of both factors uniquely critical here.

Source: Chapter 6, Aluminium Smelting section

Explanation

The textbook explicitly states: "*Regular supply of electricity and an assured source of raw material at minimum cost are the two prime factors for location of the industry.*" Examiners expect both factors named **and** a reason for each. The "why is it specific to aluminium" angle is answered by stressing the electrolytic/energy-intensive nature of smelting (not found in most industries) and the bulkiness of bauxite. Keep reasons brief but precise — one sentence each is enough for 3 marks.

Q32. deep thorough-understanding § Aluminium Smelting

[3]

Aluminium has increasingly replaced metals such as steel, copper, zinc and lead in several industries. Identify the ONE property of aluminium that makes it the most preferred material over steel in aircraft manufacturing. Explain why the same property would be far less decisive when selecting a structural material for building bridges.

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Model Answer

Property: Aluminium is **light** (low density) compared to steel.

Why it matters for aircraft: Every kilogram saved in an aircraft's structure directly reduces fuel consumption and allows a greater payload. Lightness is therefore critical in aircraft manufacturing, where weight is a primary design constraint.

Why it is less decisive for bridges: Bridges are fixed structures that must bear enormous static loads and withstand stress over decades. For such structures, **tensile strength, rigidity and load-bearing capacity** are far more important than weight, making steel the preferred choice despite being heavier.

Source: Manufacturing Industries, Chapter 6 (Aluminium Smelting section)

Explanation

- The passage states aluminium is "**light**" and used to "manufacture aircraft" — directly supporting the answer.
- The key examiner expectation: name the property (lightness), explain *why* it is vital for aircraft, then contrast with bridges where strength/rigidity matters more than weight. Many students name the property but forget the contrast — that contrast is worth the third mark.
- Avoid listing all properties; the question asks for **one** property only.

Q33. deep thorough-understanding § Chemical Industries

[3]

Organic chemical plants in India are located close to oil refineries or petrochemical plants, whereas inorganic chemical plants are widely spread across the country. What explains this difference in locational patterns?

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Model Answer

Organic chemical plants are located near oil refineries or petrochemical plants because their primary raw material is **petroleum/petrochemicals**. Since these raw materials are bulky and expensive to transport, industries must be situated close to their source to reduce costs and ensure steady supply.

Inorganic chemical plants, on the other hand, use a wide variety of raw materials such as sulphuric acid, soda ash, alkalies, and caustic soda, which are produced across the country. These inputs are available widely, so the plants are **not tied to any single location** and can spread across different regions.

Thus, raw material availability determines the locational pattern of both types.

Source: *Chemical Industries, Chapter 6*

Explanation

- The key concept here is **raw material linkage** — organic chemicals depend on petroleum, which is available only near refineries/petrochemical plants; inorganic chemicals use varied, widely available raw materials.
- Examiners expect you to contrast both clearly. Don't just describe one — state the reason for **each** type.
- The phrase "bulky raw materials" or "material index" is relevant: transporting crude petroleum/petrochemicals is costly, so proximity to source is essential for organic plants.

Q34. medium thorough-understanding § Chemical Industries

[3]

The chemical industry is described as its own largest consumer. What does this mean, and how does it reflect the structure of chemical manufacturing?

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Model Answer

The statement means that the chemical industry itself uses a large share of the chemicals it produces as raw materials for further manufacturing.

Basic chemicals undergo processing to produce other chemicals, which are then used in industrial applications, agriculture, or consumer markets. For example, sulphuric acid is used to manufacture fertilizers, synthetic fibres, plastics, paints, and dyes — all of which may be inputs for yet another industry. This chain-like structure, where the output of one chemical process becomes the input of another, makes the industry its own largest consumer.

Source: *Chemical Industries, Chapter 6*

Explanation

- The key phrase from the textbook is: "**Basic chemicals undergo processing to further produce other chemicals.**" Always quote or closely paraphrase this.
- Give a concrete example (sulphuric acid → fertilizers/plastics) to earn full marks — examiners expect application.
- The "chain/inter-linked structure" idea is what earns the third mark. Don't just define; explain *why* this makes it its own largest consumer.

Q35. medium thorough-understanding § Fertilizer Industry

[1]

India is self-sufficient in the production of nitrogenous and phosphatic fertilizers but remains dependent on imports for one key plant nutrient. Identify this nutrient and explain why India cannot produce it domestically.

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Model Answer

Potash (K) is the nutrient India cannot produce domestically, as the country has no reserves of commercially usable potash or potassium compounds in any form.

Explanation

This is a direct one-line fact from the Fertilizer Industry passage. Examiners expect you to name the nutrient (potash/potassium) AND give the reason (no domestic reserves) in the same sentence. Both parts are needed for full marks.

Q36. deep thorough-understanding § Fertilizer Industry

[3]

How did the Green Revolution act as a catalyst for the expansion and geographical spread of the fertilizer industry in India? Explain with suitable arguments.

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Model Answer

The Green Revolution increased the demand for chemical fertilizers to boost agricultural productivity. This rising demand acted as a catalyst for expanding the fertilizer industry across India.

- Industries producing nitrogenous (urea), phosphatic fertilizers and complex N-P-K fertilizers multiplied rapidly.
- Production spread geographically — Gujarat, Tamil Nadu, Uttar Pradesh, Punjab and Kerala now contribute nearly half the national output.
- Other states like Andhra Pradesh, Rajasthan, Maharashtra, Bihar, Assam, West Bengal and Karnataka also emerged as significant producers.

Thus, the agricultural revolution directly drove both the growth and geographical dispersal of the fertilizer industry.

Source: *Fertilizer Industry*, Chapter 6

Explanation

- The key phrase in the passage is "**After the Green Revolution the industry expanded to several other parts of the country**" — examiners expect you to use this directly.
- Name at least **4–5 states** from both groups (major + significant producers) to show geographical spread.
- Mention the **types of fertilizers** (urea, DAP, complex N-P-K) briefly — it shows textbook accuracy.
- Avoid writing about potash imports unless specifically asked; it's a distractor here.

Q37. deep thorough-understanding § Cement Industry [3]

Cement plants in India are typically located close to raw material sources such as limestone, silica, and gypsum. However, several cement plants in coastal states like Gujarat enjoy advantages that go beyond raw material proximity. Explain any two locational factors other than raw material availability that can influence the setting up of an industry. Illustrate with relevant examples from the cement or any other industry.

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Model Answer

Two locational factors other than raw material availability are:

- Market Access:** Industries locate near their markets to reduce transportation costs of finished goods. Cement plants in Gujarat are strategically located to access markets in Gulf countries through coastal ports.
- Cheap Labour:** Availability of skilled and affordable labour influences industrial location. The Chhotanagpur plateau attracted iron and steel industries partly due to cheap labour available in the region.

Source: *Manufacturing Industries, Chapter 6*

Explanation

- The question asks for TWO factors with examples — award yourself marks only if both are clearly stated with an example each.
- Both examples used here come directly from the source passages, which is exactly what examiners expect.
- Other valid factors from the chapter include power supply, transport, and climate — you may use those instead, but always pair with a textbook example.

Q38. medium thorough-understanding § Automobile Industry [3]

The automobile industry in India grew significantly after economic liberalisation. What was the key mechanism through which liberalisation triggered this growth, and why would new vehicle models specifically drive demand rather than just increasing supply?

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Model Answer

After liberalisation, foreign companies were allowed to enter the Indian market, bringing **new and contemporary vehicle models**. These new models stimulated demand because consumers were attracted to modern designs and features they had not seen before — creating fresh desire to purchase. This is demand-pull growth: it is not enough to simply produce more vehicles; consumers must *want* to buy them. New models generated that want, leading to healthy growth in passenger cars, two-wheelers, and three-wheelers.

Source: *Automobile Industry, Chapter 6*

Explanation

- The textbook specifically says "coming in of new and contemporary models **stimulated the demand**" — this is the key phrase examiners expect.
- The distinction between supply and demand is the analytical part of the question (worth the extra marks): new models create desire/aspiration, not just availability.
- Keep the answer focused; don't drift into general benefits of liberalisation.

Q39. deep thorough-understanding § Information Technology and Electronics Industry

[3]

Bengaluru has emerged as the electronic capital of India. What factors related to the nature of the IT and electronics industry make a city — rather than a rural or resource-rich location — the natural hub for such industries? Connect your answer to the locational factors relevant to this industry.

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Model Answer

The IT and electronics industry depends on **skilled labour, research institutions, and advanced infrastructure** rather than raw materials — making cities the ideal location.

1. **Skilled workforce:** Cities like Bengaluru have universities and engineering colleges supplying trained professionals.
2. **Infrastructure:** Reliable power supply, high-speed connectivity, and transport networks are better developed in cities.
3. **Market and linkages:** Urban centres offer banking, business services, and a large consumer market.
4. **Agglomeration benefits:** Concentration of firms in cities like Bengaluru, Hyderabad, and Pune creates clusters that attract further investment and talent.

Unlike raw-material-based industries, IT does not need to locate near mines or forests, so urban advantages dominate.

Source: *Manufacturing Industries, Chapter 6 — Information Technology and Electronics Industry*

Explanation

Examiners expect you to link the **nature of the industry** (knowledge-based, not resource-based) to **locational factors** (skilled labour, infrastructure, urban amenities). Three marks = three clear, distinct points. Avoid repeating the same idea. The textbook specifically names Bengaluru as the electronic capital and lists other urban centres — use this to show the urban pattern is deliberate, not coincidental.

Q40. medium thorough-understanding § Information Technology and Electronics Industry

[1]

Is the electronics industry classified as a 'basic' industry or a 'consumer' industry? Justify your answer with suitable examples from within the electronics sector.

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Model Answer

The electronics industry is both a **basic** (e.g., computers, radars, telecom equipment used in other industries) and a **consumer** industry (e.g., television, transistor sets used directly by consumers).

Explanation

The question expects you to recognise that electronics doesn't fit neatly into one category — it supplies inputs to other industries (basic) AND produces goods for direct consumer use (consumer). Mentioning one example for each role earns full credit. Keep it to one line as it is 1 mark.

Q41. medium thorough-understanding § Industrial Pollution and Environmental Degradation

[3]

Thermal power plants are often grouped alongside factories as sources of industrial pollution. What specific type of water pollution do thermal power plants cause, and how does it harm aquatic ecosystems?

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Model Answer

Thermal power plants cause **thermal pollution** of water. This occurs when hot water from thermal plants is drained directly into rivers and ponds before cooling.

Effect on aquatic ecosystems:

- The rise in water temperature reduces the dissolved oxygen level in water.
- This disturbs the aquatic life, as fish and other organisms cannot survive in low-oxygen, high-temperature conditions.
- It disrupts the ecological balance of rivers and ponds, harming biodiversity.

Source: Industrial Pollution and Environmental Degradation, Chapter 6

Explanation

The examiner expects students to:

1. **Name the type** — "thermal pollution" (1 mark).
2. **Explain the cause** — hot water released before cooling (1 mark).
3. **State the harm** — reduced dissolved oxygen, damage to aquatic life/ecosystem (1 mark).

The textbook directly asks "What would be the effect on aquatic life?" as a thinking question — your answer should address exactly that. Avoid writing about air or land pollution here; stay focused on *water* and *thermal* pollution only.

Q42. medium thorough-understanding § Industrial Pollution and Environmental Degradation

[3]

Industries are said to pollute land indirectly through water. Explain the chain of events by which solid waste dumped on land eventually contaminates groundwater.

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Model Answer

Industries pollute land when solid wastes such as chemicals, industrial effluents, salts, and harmful packaging materials are dumped on land, rendering the soil useless. When rain falls, the water **percolates** through the soil, carrying these pollutants downward with it. This contaminated water seeps deeper into the earth and eventually reaches the **groundwater reserves**, thus contaminating them. In this way, land pollution indirectly leads to groundwater pollution through the action of rainwater.

Source: *Industrial Pollution and Environmental Degradation, Chapter 6*

Explanation

- The key chain is: **solid waste dumped on land** → **rainwater percolates** → **carries pollutants into soil** → **groundwater gets contaminated**.
- The textbook directly states: "*Rain water percolates to the soil carrying the pollutants to the ground and the ground water also gets contaminated.*" Use this line's logic in your answer.
- Mention specific examples of solid wastes (chemicals, salts, glass, effluents) for full marks.
- Avoid writing beyond ~80 words — this is 3 marks, not a long-answer question.

Q43. deep thorough-understanding § Industrial Pollution and Environmental Degradation

[3]

A chemical factory and a tannery both discharge their untreated effluents into the same river, while a nearby iron and steel plant deposits its slag in a designated landfill. Explain why the type and mode of waste disposal adopted by the chemical factory and tannery poses a greater environmental risk compared to the iron and steel plant's practice.

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Model Answer

The chemical factory and tannery discharge **untreated effluents** directly into the river. According to the textbook, tanneries release dyes, detergents, acids, salts, and heavy metals like lead and mercury into water bodies, causing serious water pollution. Every litre of industrial wastewater pollutes eight times the quantity of freshwater. These toxic substances harm aquatic life and contaminate drinking water sources over a wide area.

The iron and steel plant, by contrast, deposits slag in a **designated landfill**. Solid waste confined to a specific site limits the spread of pollutants and is more controllable and manageable.

Thus, untreated liquid effluents discharged into a river spread pollutants widely and irreversibly, posing a far greater environmental risk than contained solid waste disposal.

Source: Industrial Pollution and Environmental Degradation, Chapter 6; Control of Environmental Degradation, Chapter 6

Explanation

- The examiner wants you to contrast **liquid effluent discharge into a river** (widespread, hard to reverse) vs. **solid waste in a landfill** (contained, manageable).
- Quote the key fact: "every litre of waste water pollutes 8× freshwater" — examiners love this statistic.
- Mention specific pollutants from tanneries (heavy metals, acids, dyes) to show textbook knowledge.
- Do not over-explain; 3 marks = ~3 clear points.

Q44. medium thorough-understanding § Industrial Pollution and Environmental Degradation

[1]

Which one of the following industries is correctly matched with a water pollutant it releases?

- (A) Automobile industry — fly ash
(B) Petroleum refinery — dyes and detergents
(C) Electroplating industry — heavy metals like lead and mercury
(D) Brick kilns — acids and salts
- A Automobile industry — fly ash
B Petroleum refinery — dyes and detergents
C Electroplating industry — heavy metals like lead and mercury
D Brick kilns — acids and salts

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Model Answer

(C) Electroplating industry — heavy metals like lead and mercury

Explanation

The textbook explicitly states that electroplating industries release heavy metals like lead and mercury into water bodies. Fly ash is a solid waste (not linked to automobiles); petroleum refineries release acids/salts, not dyes/detergents; brick kilns cause air pollution via smoke, not water pollution with acids/salts.

Source: *Manufacturing Industries*, Chapter 6 — *Industrial Pollution and Environmental Degradation*

Q45. medium thorough-understanding § Industrial Pollution and Environmental Degradation

[3]

The treatment of industrial effluents before releasing them into water bodies is carried out in three stages. Briefly explain what is achieved in each stage.

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Model Answer

Treatment of industrial effluents is carried out in three stages:

- (a) Primary Treatment** – This involves mechanical processes such as screening, grinding, flocculation and sedimentation. It removes large solid particles and suspended impurities from the effluent.
- (b) Secondary Treatment** – This involves biological processes where microorganisms break down dissolved organic matter, reducing biological pollutants in the water.
- (c) Tertiary Treatment** – This involves biological, chemical and physical processes combined. It purifies the water to a high standard, making it safe for recycling and reuse.

Source: *Control of Environmental Degradation*, Chapter 6

Explanation

- The three stages follow a fixed sequence: **mechanical** → **biological** → **biological/chemical/physical**.
- Examiners expect all three stages named correctly with the type of process and what is achieved. One mark per stage.
- Do not add extra information not in the passage — keep it grounded in the source.

Q46. deep thorough-understanding § Industrial Pollution and Environmental Degradation

[2]

Evaluate the effectiveness of the following two measures in controlling air pollution from factories: (i) replacing coal with oil or gas as fuel, and (ii) installing taller chimneys. Which measure addresses the root cause of pollution, and why?

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Model Answer

(i) **Replacing coal with oil or gas** is more effective as it directly reduces smoke and harmful emissions at the source.

(ii) **Taller chimneys** only disperse pollutants over a wider area; they do not reduce pollution.

Measure (i) addresses the **root cause** because it eliminates the burning of coal — the primary source of smoke and pollutant gases like sulphur dioxide and carbon monoxide — rather than merely relocating the problem.

Source: *Control of Environmental Degradation, Chapter 6*

Explanation

- The passage explicitly states: "*Smoke can be reduced by using oil or gas instead of coal in factories*" — use this as your evidence.
- Taller chimneys are **not mentioned** in the passage as a solution; the textbook focuses on fitting electrostatic precipitators, scrubbers, etc. — so taller chimneys only disperse, not reduce, pollution.
- The examiner wants you to distinguish between **treating the symptom** (dispersal via chimneys) vs. **treating the cause** (changing the fuel). Always link back to the source of pollution.

Q47. straightforward thorough-understanding § Industrial Pollution and Environmental Degradation

[1]

Name any two serious physiological health effects caused by industrial noise pollution that go beyond temporary irritation.

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Model Answer

Two serious physiological effects of industrial noise pollution are **hearing impairment** and **increased heart rate and blood pressure**.

Explanation

The passage explicitly states these effects: "Noise pollution...can also cause hearing impairment, increased heart rate and blood pressure among other physiological effects." Examiners expect effects that go *beyond* irritation/anger — so avoid listing "irritation" as one of your two answers.

Q48. medium thorough-understanding § Control of Environmental Degradation

[3]

Industrial discharge of untreated effluents into rivers and lakes creates a serious threat to freshwater availability. Why is it critically important for industries to treat effluents before discharge, rather than relying on natural dilution by the water body?

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Model Answer

Every litre of industrial wastewater pollutes **eight times** the quantity of freshwater, making natural dilution insufficient and unreliable.

Industrial effluents contain harmful substances — dyes, acids, heavy metals like lead and mercury, pesticides, and synthetic chemicals — which contaminate rivers and lakes, making water unfit for use.

Treating effluents before discharge (through primary/mechanical, secondary/biological, and tertiary processes) removes these pollutants at the source. Without treatment, contaminated rainwater also percolates into soil, further polluting groundwater reserves, compounding the threat to freshwater availability.

Source: Industrial Pollution and Environmental Degradation; Control of Environmental Degradation — Chapter 6

Explanation

- **Key stat to remember:** 1 litre waste = 8 litres freshwater polluted — examiners expect this figure.
- Name the **types of pollutants** (heavy metals, acids, dyes) — shows you've read the text.
- Mention all **three stages of treatment** (primary, secondary, tertiary) — likely worth 1 mark on its own.
- Note the **groundwater angle** (percolation) — it shows cause-effect thinking that earns full marks.
- Don't write vague statements like "it is harmful" — be specific and factual.

Q49. medium thorough-understanding § Control of Environmental Degradation

[3]

Industrial effluent treatment is carried out in three phases. What is the essential difference between what is achieved in the primary phase and what is achieved in the secondary phase?

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Model Answer

Primary phase involves **mechanical treatment** — processes like screening, grinding, flocculation, and sedimentation. These physically remove large solids, suspended particles, and settle out heavier impurities from the effluent.

Secondary phase involves **biological treatment** — microorganisms break down organic matter dissolved in the wastewater. This removes contaminants that mechanical processes cannot separate.

Essential difference: Primary treatment removes *physical/solid impurities* through mechanical means, while secondary treatment removes *dissolved organic impurities* through biological processes.

Source: *Control of Environmental Degradation, Chapter 6*

Explanation

- The examiner expects you to name the **method used** in each phase (mechanical vs. biological) and **what it removes/achieves** — these are the two sides of the "essential difference."
- Give examples of primary treatment processes (screening, sedimentation, etc.) to show you know the content.
- Do not just say "physical vs. chemical" — the textbook specifically says secondary = **biological process**, so use that word.
- 3 marks → roughly 3 points: name primary method, name secondary method, state the key contrast.

Q50. deep thorough-understanding § Control of Environmental Degradation

[3]

A factory manager claims that simply diluting hot water from the plant with river water before discharge is sufficient to prevent thermal pollution. Why is this claim flawed, and what should be done instead?

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Model Answer

The claim is flawed because simply diluting hot water does **not** remove the heat — it only spreads the thermal effect across a larger volume of river water. Thermal pollution occurs when hot water is drained into rivers **before cooling**, which harms aquatic life by reducing dissolved oxygen levels.

What should be done instead:

- Hot water and effluents must be **treated before releasing** them into rivers and ponds.
- Industries should adopt **reusing and recycling** of water in successive stages.
- Effluents should undergo **primary, secondary, and tertiary treatment** before discharge.

Source: *Industrial Pollution and Environmental Degradation; Control of Environmental Degradation — Chapter 6*

Explanation

The examiner expects two parts: (1) why dilution alone fails — it doesn't eliminate thermal pollution, just disperses it; and (2) the correct measures from the textbook — proper treatment of hot water/effluents before discharge, reuse/recycling of water, and the three-phase treatment process. Mentioning the harm to aquatic life strengthens the answer. Avoid writing vague general points; always link back to the textbook language.

Q51. medium thorough-understanding § Control of Environmental Degradation

[2]

Explain why reusing and recycling water in two or more successive stages is considered a more sustainable strategy than simply treating and releasing waste water.

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Model Answer

Every litre of waste water discharged pollutes **eight times** the quantity of freshwater. When water is reused and recycled in two or more successive stages, the same water serves multiple purposes, reducing the total volume of fresh water drawn and the volume of polluted effluent released. Simply treating and releasing waste water still consumes fresh water continuously and generates effluent, whereas recycling conserves freshwater resources and minimises discharge, making it more sustainable.

Source: *Control of Environmental Degradation, Chapter 6*

Explanation

- The key fact examiners expect: 1 litre of waste water pollutes 8 times the freshwater — mention this.
- The core logic: reuse/recycle = less fresh water consumed + less effluent discharged; treat-and-release still uses and wastes water continuously.
- Two marks = two distinct points. Keep it concise; no need to list all pollution-control methods.

Q52. deep thorough-understanding § Control of Environmental Degradation

[3]

Thermal power plants generate enormous quantities of fly ash as a byproduct of coal combustion. Explain why ash management is a specific and serious environmental challenge for thermal power corporations, and describe two measures such a corporation can adopt to minimise the environmental impact of ash.

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Model Answer

Ash management is a serious environmental challenge because fly ash from thermal power plants is a major solid waste that pollutes land and water. When dumped in ash ponds, it can leach into soil and contaminate groundwater. Fine ash particles also become airborne, causing air pollution.

Two measures to minimise environmental impact:

1. **Maximising ash utilisation** — ash can be used in construction materials, reducing the quantity requiring disposal.
2. **Ash pond management with ash water recycling** — recycling ash water prevents toxic leachate from contaminating nearby water bodies and soil.

(As adopted by NTPC under its Environment Management System ISO 14001 certification.)

Source: Industrial Pollution and Environmental Degradation; Control of Environmental Degradation, Chapter 6

Explanation

- The passage explicitly lists fly ash as a "major solid waste" and mentions land/water pollution from dumping.
- The NTPC box directly gives the two measures: "maximising ash utilisation" and "ash pond management, ash water recycling system" — use these exact phrases for full marks.
- Examiners expect one clear reason for the challenge + two distinct, named measures. Don't write vague points like "proper disposal" without the specific method.

Q53. medium thorough-understanding § Control of Environmental Degradation

[3]

Switching fuel in factories from coal to oil or gas is recommended as an environmental measure. Identify the specific type of pollution this addresses and explain the mechanism by which the switch achieves the reduction.

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Model Answer

The switch from coal to oil or gas addresses **air pollution**.

Mechanism: Coal combustion releases a high proportion of smoke and particulate matter (solid and liquid particles like dust and soot) along with harmful gases. Oil and gas burn more cleanly, producing significantly less smoke. As stated in the textbook, "smoke can be reduced by using oil or gas instead of coal in factories." This reduces airborne particulates and undesirable gases such as sulphur dioxide and carbon monoxide, thereby reducing air pollution.

Source: *Control of Environmental Degradation, Chapter 6*

Explanation

- Examiners want you to **name the pollution type** (air pollution) — 1 mark.
- Then **explain the mechanism**: coal → more smoke/particulates; oil/gas → less smoke — 2 marks.
- The textbook directly states "smoke can be reduced by using oil or gas instead of coal" — quote or paraphrase this for full marks.
- Do not write about water or noise pollution; stay focused on air pollution only.

Q54. deep thorough-understanding § Control of Environmental Degradation

[5]

Industries are a major source of noise pollution that can cause serious health hazards for workers and nearby residents. Explain the various measures that can be adopted to control industrial noise pollution, distinguishing between measures that target the source of noise and those that protect individuals from its effects. Why is it necessary to adopt both types of measures?

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Model Answer

Measures Targeting the Source of Noise:

- Machinery and equipment should be redesigned to increase energy efficiency and reduce noise.
- Generators should be fitted with **silencers** to cut down noise at the point of origin.
- Noise-absorbing materials should be used in factory walls and ceilings to contain sound within the premises.

Measures Protecting Individuals:

- Workers should use **earplugs and earphones** (personal protective equipment) to prevent hearing damage.
- Residents and workers near noisy industries benefit from noise barriers and proper zoning.

Why Both Are Necessary:

Source-control measures reduce overall noise levels for everyone, including nearby residents. However, they cannot eliminate all noise entirely. Personal protective measures safeguard individual workers from residual noise. Together, they address both collective and individual health hazards — preventing hearing impairment, increased heart rate, blood pressure, and stress-related effects caused by industrial noise pollution.

Source: *Industrial Pollution and Environmental Degradation; Control of Environmental Degradation — Chapter 6*

Explanation

- The textbook explicitly mentions **silencers for generators, redesigning machinery, noise-absorbing materials** (source-side) and **earplugs/earphones** (individual protection). Use these exact terms — examiners look for textbook language.
- The question asks you to **distinguish** between the two types, so keep them clearly separated under headings or labels.
- The "Why both?" part needs a logical sentence linking the two: source measures are incomplete alone; personal measures fill the gap. One or two sentences suffice — don't over-explain.
- Mentioning health effects (hearing impairment, heart rate, blood pressure) from the passage strengthens the justification and shows you've read the chapter.

Q55. medium thorough-understanding § ACTIVITY**[3]**

India is the largest producer of raw jute but the second largest exporter, with Bangladesh leading in exports. Analyse the factors that limit India's export share and explain why India's domestic jute industry still holds strategic significance despite this disadvantage.

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Model Answer**Factors limiting India's export share:**

After Partition (1947), three-fourths of the jute-producing area went to Bangladesh, giving it a raw material advantage and making it the leading exporter. India, despite having the mills, faces a shortage of raw jute, raising production costs and limiting export competitiveness.

Strategic significance of India's jute industry:

India's jute industry is strategically important as it generates significant employment and foreign exchange earnings. The mills, concentrated along the Hugli basin, benefit from cheap labour, water transport, and Kolkata's port and banking facilities, sustaining a large industrial ecosystem.

Source: *Agro-based Industries / Jute Textiles, Chapter 6*

Explanation

- The key contrast — India has mills, Bangladesh has raw material — is the core of this answer. State it clearly.
- Link Partition directly to the raw material disadvantage; this is explicitly in the passage.
- For strategic significance, draw on employment, foreign exchange, and locational advantages from the passage — these mirror the general importance of manufacturing outlined in the chapter.
- Examiners expect both parts addressed; splitting the answer clearly (as above) shows structured thinking and earns full marks.

Q56. straightforward thorough-understanding § ACTIVITY**[1]**

Iron and steel is classified as a heavy industry. What specific feature of its raw materials and finished products justifies this classification?

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Model Answer

Iron and steel is classified as a heavy industry because both its raw materials (iron ore, coking coal, limestone) and finished products are heavy and bulky, resulting in heavy transportation costs.

Source: *Iron and Steel Industry, Chapter 6*

Explanation

The textbook directly states: "*Iron and steel is a heavy industry because all the raw materials as well as finished goods are heavy and bulky entailing heavy transportation costs.*" For 1 mark, reproduce this key idea concisely — mention both raw materials AND finished goods being heavy/bulky. That is the complete justification the examiner expects.

Q57. deep thorough-understanding § ACTIVITY

[3]

A student argues that sugarcane from southern states like Maharashtra is more valuable to the sugar industry than sugarcane from Uttar Pradesh, even though UP has the most mills. Evaluate this argument using the factors that are causing mills to shift towards Maharashtra.

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Model Answer

The student's argument is **partially valid** and well-supported by textbook evidence.

Sugarcane grown in Maharashtra has a **higher sucrose content** compared to UP, making it yield more sugar per tonne — directly increasing raw material quality and industry output. Additionally, Maharashtra's **cooler climate ensures a longer crushing season**, allowing mills to operate for more days, improving productivity. **Cooperatives are also more successful** in Maharashtra, enabling better management.

Although UP has 60% of the mills, these advantages of superior raw material quality, extended season, and cooperative efficiency explain why mills are shifting southward, justifying the student's argument.

Source: Chapter 6, Sugar Industry section

Explanation

The examiner expects **three distinct points** (one per mark) drawn directly from the sugar industry passage: (1) higher sucrose content, (2) cooler climate → longer crushing season, (3) successful cooperatives. Briefly acknowledging UP's dominance before evaluating adds analytical quality. Avoid padding — stick to these three reasons with a one-line evaluative conclusion.

Q58. medium thorough-understanding § ACTIVITY

[3]

The sugar industry in India is described as 'seasonal in nature.' Using this characteristic, explain why the cooperative sector is considered a more appropriate model for running sugar mills than large private enterprises, and what advantages it offers to farmers in this context.

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Model Answer

Sugar industry is seasonal because it operates only during the crushing/harvest season. This makes it unsuitable for large private enterprises, which require year-round profit to justify high fixed costs and large permanent workforces.

The **cooperative sector** is more appropriate because:

- Farmers themselves are members, so they share both ownership and profits.
- Cooperatives can function efficiently even during short operating seasons without the pressure of continuous profit-making.
- Farmers get a fair price for their sugarcane and a share in the mill's earnings.
- This model has proven especially successful in Maharashtra and western states.

Thus, cooperatives protect farmers' interests while making the seasonal industry economically viable.

Source: *Agro-based Industries, Chapter 6*

Explanation

- The key link to establish is: **seasonal nature** → **unsuitable for large private firms** → **suitable for cooperatives**.
- Examiners expect you to explain *why* cooperatives suit seasonal industries (shared ownership, farmer benefits) — not just state that they do.
- Mention of Maharashtra/western states adds value and shows textbook knowledge.
- Avoid writing too much about sugar production statistics; focus on the cooperative model and farmer advantages as the question demands.

Q59. medium thorough-understanding § ACTIVITY

[3]

India produces world-class yarn in spinning but its woven fabric is often of low quality. Identify the underlying reason for this gap and explain why it is a problem for the textile industry as a whole.

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Model Answer

India has world-class production in spinning, but the weaving sector is highly decentralised and operates mostly through handlooms and powerlooms that **cannot use much of the high-quality yarn produced domestically**. As a result, weavers supply low-quality fabric despite having access to superior yarn.

This is a serious problem for the textile industry because it breaks the value chain. India cannot convert its high-quality raw material into high-value finished fabric, which limits export competitiveness, reduces foreign exchange earnings, and prevents the industry from realising its full economic potential in the global market.

Source: *Manufacturing Industries, Cotton Textiles section*

Explanation

- The key textbook line examiners expect: *"India has world class production in spinning, but weaving supplies low quality of fabric as it cannot use much of the high quality yarn produced in the country."*
- Link the consequence to **value chain disruption** and **export/foreign exchange loss** — these are the 3-mark hooks (identify reason + explain problem = 2 points, plus impact = 1 point).
- Don't over-write; about 75 words is ideal here.

Q60. deep thorough-understanding § ACTIVITY

[3]

India produces nitrogenous and phosphatic fertilizers domestically but depends entirely on imports for potash. What does this reveal about India's natural resource base? Explain how this dependency poses a challenge to the growth of the fertilizer industry and food security in India.

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Model Answer

India's lack of any reserves of commercially usable potash or potassium compounds reveals that its natural resource base is **deficient in potassic minerals**, even though it has resources supporting nitrogen and phosphate production.

This total dependence on imports poses two key challenges:

1. **Fertilizer Industry:** The industry cannot achieve full self-sufficiency; any disruption in global supply or rise in international prices raises production costs directly.
2. **Food Security:** Since potash (K) is an essential nutrient for crops, import dependency makes fertilizer supply and crop productivity vulnerable to foreign market fluctuations, threatening stable agricultural output and food security.

Source: *Manufacturing Industries, Chapter 6 (Fertilizer Industry section)*

Explanation

- The question links **resource base** → **industry challenge** → **food security**, so address all three in sequence.
- The key factual anchor is: "*potash is entirely imported as the country does not have any reserves of commercially usable potash or potassium compounds in any form.*" Quote or paraphrase this.
- Examiners award marks for: (1) identifying the resource gap, (2) impact on the fertilizer industry, (3) impact on food security — one point each for 3 marks.
- Do not write about other fertilizers or unrelated industries; stay focused.

Q61. deep thorough-understanding § (whole-chapter synthesis)

[3]

Both the iron and steel industry and the cement industry use heavy, bulky raw materials and depend on efficient transport networks. Yet their locational decisions differ significantly — iron and steel plants are heavily concentrated in the Chhotanagpur plateau region, while cement plants are more widely dispersed across the country. What locational principle does each case illustrate? Why does the same broad constraint — the weight and bulk of raw materials — lead to different geographical outcomes for the two industries?

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Model Answer

Locational Principle:

- **Iron & Steel** illustrates **material-index / raw material orientation** — plants locate near raw material sources to minimise heavy transport costs (iron ore, coking coal, limestone in ratio 4:2:1).
- **Cement** illustrates **dispersed/market + raw material orientation** — plants spread widely across states near local limestone deposits and regional markets.

Different outcomes despite same constraint:

Iron and steel requires *multiple* bulky raw materials concentrated in one region (Chhotanagpur), making co-location near all inputs unavoidable. Cement requires limestone, which is available in many states across India, allowing plants to disperse and serve regional markets efficiently.

Source: Chapter 6 — Manufacturing Industries

Explanation

- Examiners want you to **name the locational principle** for each industry and **explain why** the same constraint (bulk/weight) produces different patterns.
- Key distinction: iron & steel needs several heavy inputs clustered in one belt (Chhotanagpur); cement's primary input (limestone) is geographically widespread, enabling dispersal.
- Avoid over-explaining; two focused points per part is enough for 3 marks.

Q62. medium thorough-understanding § (whole-chapter synthesis)

[3]

Trace the relationship between the cotton textile industry and agriculture in India by explaining: (i) how agriculture supports the cotton textile industry, and (ii) how the cotton textile industry, in turn, supports agriculture and related sectors.

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Model Answer

(i) Agriculture supports the cotton textile industry by providing its primary raw material — raw cotton. The industry's early concentration in Maharashtra and Gujarat was largely due to the availability of raw cotton in these cotton-growing belts.

(ii) The cotton textile industry supports agriculture and related sectors by providing a livelihood to farmers, cotton boll pluckers, and workers in ginning, spinning, weaving, dyeing, and tailoring. By creating demand, it also supports allied industries like chemicals, dyes, packaging materials, and engineering works.

Source: *Agro-based Industries, Chapter 6*

Explanation

- The question has two clear parts — answer **both** with equal balance.
- Examiners look for: raw cotton as input from agriculture (part i), and the reverse linkage — employment to farmers/workers + support to allied industries (part ii).
- Mention specific examples from the textbook (cotton-growing belt, ginning/spinning/weaving workers, chemicals & dyes) to score full marks.
- Avoid padding — at 3 marks, ~70 words is ideal.

Q63. deep thorough-understanding § (whole-chapter synthesis)

[3]

The sugar industry is described as ideally suited to the cooperative sector, whereas jute textile mills are predominantly run as private or public sector enterprises. What specific characteristic of sugarcane cultivation and processing makes the cooperative model most appropriate for the sugar industry? Why does that same characteristic not apply to jute textile mills in the same way?

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Model Answer

The key characteristic making sugar industry ideal for cooperatives is that **sugarcane is a bulky raw material whose sucrose content reduces during haulage**. It must be processed quickly and locally, making farmer-growers and millers interdependent — a naturally cooperative arrangement. Additionally, the industry is **seasonal**, so shared ownership distributes costs and risks efficiently among farmers.

Jute mills, by contrast, depend on **cheap labour, water transport, banking and port infrastructure** concentrated around Hugli — advantages best exploited by organised private/public capital, not seasonal farmer-growers needing local processing.

Source: *Manufacturing Industries, Sugar Industry & Jute Textiles sections, Chapter 6*

Explanation

The examiner expects two things: (1) identify the **specific characteristic** — bulky raw material + sucrose loss + seasonal nature — and link it to cooperative logic; (2) contrast with jute, which relies on centralised infrastructure (Hugli basin, Kolkata port, cheap labour) favouring private/public enterprise. Don't just list facts — show the *logical connection* between the characteristic and the model.

Q64. medium thorough-understanding § (whole-chapter synthesis)

[1]

Which of the following best explains why industrial development is considered a solution to both unemployment and regional disparities in India?

- (A) Industries export manufactured goods, earning foreign exchange that is distributed equally across regions.
- (B) Public sector and joint sector industries can be deliberately established in tribal and backward areas, creating jobs in regions that agriculture alone cannot sustain.
- (C) Manufacturing industries modernise agriculture everywhere, automatically reducing poverty in all regions.
- (D) Consumer industries produce goods that are affordable to people in underdeveloped regions, raising their standard of living directly.

A Industries export manufactured goods, earning foreign exchange that is distributed equally across regions.

B Public sector and joint sector industries can be deliberately established in tribal and backward areas, creating jobs in regions that agriculture alone cannot sustain.

C Manufacturing industries modernise agriculture everywhere, automatically reducing poverty in all regions.

D Consumer industries produce goods that are affordable to people in underdeveloped regions, raising their standard of living directly.

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Model Answer

(B) Public sector and joint sector industries can be deliberately established in tribal and backward areas, creating jobs in regions that agriculture alone cannot sustain.

Explanation

The source passage directly states that industrial development was "aimed at bringing down regional disparities by establishing industries in tribal and backward areas" and is a "precondition for eradication of unemployment and poverty." Option B captures both aspects. Options A, C, and D are either partially true or not directly linked to *both* unemployment and regional disparities as stated in the text.

Q65. medium thorough-understanding § (whole-chapter synthesis)

[5]

Industrial water pollution and industrial air pollution arise from different processes but share a common underlying cause. (i) Identify one industry that contributes to BOTH air and water pollution and explain how it causes each. (ii) Explain one control measure that is specific to air pollution and one that is specific to water pollution.

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Model Answer

(i) Industry contributing to BOTH air and water pollution: Petroleum Refinery

A petroleum refinery causes **air pollution** by emitting sulphur dioxide, carbon monoxide and smoke during the refining of crude oil. It causes **water pollution** by discharging oily effluents, acids, salts and toxic chemicals into nearby rivers and water bodies.

(ii) Control measures:

- **Air pollution (specific):** Fitting smoke stacks with **electrostatic precipitators, scrubbers or fabric filters** reduces particulate matter released into the air. Using oil or gas instead of coal also reduces smoke.
- **Water pollution (specific):** Industrial effluents must be **treated in three phases** before discharge — primary (mechanical: screening, sedimentation), secondary (biological process), and tertiary (biological, chemical and physical recycling of wastewater) — before releasing into rivers or ponds.

Source: Industrial Pollution and Environmental Degradation; Control of Environmental Degradation — Chapter 6

Explanation

- Examiners expect a **named industry** with a clear two-part explanation (air + water) for part (i) — petroleum refinery or paper/pulp industry both work well from the passage.
- For part (ii), the two control measures must be **distinct and correctly matched** to air vs. water — mixing them up loses marks.
- The three-phase effluent treatment is a frequently asked point; name all three phases with their methods.
- Keep answers precise; avoid vague statements like "factories should reduce pollution."

Q66. deep thorough-understanding § (whole-chapter synthesis)

[3]

Aluminium smelting and iron and steel manufacturing are both classified as heavy, mineral-based, basic industries. Despite these similarities, aluminium has emerged as a preferred substitute for steel in several sectors. Using the physical properties and production requirements of both metals, explain why aluminium is preferred over steel in some industries, while steel remains indispensable in others. Illustrate your answer with at least two specific examples from each metal.

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Model Answer

Aluminium vs. Steel — Preferred Uses:

Aluminium is preferred where **lightness and corrosion resistance** matter. Being light and malleable, it is ideal for **aircraft manufacturing** and **electrical wires** (good conductor). It also substitutes copper and zinc in several industries.

Steel remains indispensable where **strength and durability** are critical. It is used in **construction material and engineering machinery**, and is essential for **defence equipment and scientific instruments**, as all heavy and medium industries depend on it for their machinery.

Thus, aluminium suits weight-sensitive sectors, while steel is irreplaceable in load-bearing and heavy-duty applications.

Source: Chapter 6 — Aluminium Smelting; Iron and Steel Industry

Explanation

- Examiners look for **contrast** — don't just describe one metal; compare both.
- Cite at least **two examples each** as the question demands (aircraft, wires for aluminium; construction, defence for steel).
- Tie examples back to **physical properties** (light/corrosion-resistant vs. strong/durable) — this earns the reasoning mark.
- Avoid padding; at 3 marks, ~70–80 words is sufficient.

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