

## 10.1 METALS AND METALLURGY

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### Characteristics of Metals, Nonmetals, and Metalloids

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| 1. Define the term, giving examples: metalloids                          | 1 |
| 2. Distinguish between metals and metalloids, giving an example of each. | 2 |

### Minerals and Ores

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| 3. 'Every ore is a mineral, but every mineral is not an ore.' Give a reason.    | 2 |
| 4. What are the differences between minerals and ores? Give an example of each. |   |

### Alloys and amalgams

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| 5. Define the term, giving an example: amalgam | 1 |
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### Important mineral deposits in Nepal

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| 6. Name any four important ores found in different parts of Nepal. | 1 |
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### Types of metallurgical processes

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| 7. Write a short note on hydrometallurgy.                      | 2.5 |
| 8. What is meant by hydrometallurgy? Give an example of it.    | 2   |
| 9. Differentiate between pyrometallurgy and electrometallurgy. | 2   |
| 10. Give a brief account of electrometallurgy.                 | 3   |

### General principles of the extraction of metal:

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| 11. Define Gangue, giving a proper example. |  |
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#### **1. Crushing and pulverisation:**

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| 12. What is metallurgy? How is metal extracted from its ore?   | 5 |
| 13. How are metals generally extracted from ores and purified? | 5 |

#### **2. Concentration (dressing)**

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| 14. What is meant by concentration in metallurgy? Name any two processes involved in it. | 2 |
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##### **1. Hand picking**

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| 15. What is the basic principle of the gravity separation method for concentrating an ore? What types of ores are concentrated by this method? | 2 |
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##### **2. Froth flotation method**

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| 16. Write a short note on the froth flotation process.                                                                                    | 2.5 |
| 17. Write the basic principle of the froth flotation method for concentrating an ore. What types of ore are concentrated by this process? | 2   |
| 18. Name the process for the concentration of sulphide ore.                                                                               | 1   |

##### **3. Magnetic separation method**

#### 4. Leaching process:

19. Give any two formulas of ore that are applied for the following metallurgical operations. a. Froth flotation b. leaching
20. Differentiate between Gravity separation and Magnetic separation methods. 2.5

### 3. Calcination and roasting

21. Define the term: a) Calcination b) Roasting 2
22. Differentiate/distinguish between Calcination and Roasting. 2.5  
What are the main differences between calcination and roasting? 2
23. Give reason: Sulphide ores are roasted rather than calcined. 1

### 4. Reduction (Extraction)

24. Describe the smelting process in the extraction of metals from their ores. 5
25. Define the term flux. 1
26. What is meant by slag? Give an example of it. 2  
Define slag, giving a proper example. 1
27. Distinguish between flux and slag, giving an example of each. 2
28. What is meant by slag? Why is it important in metallurgy? 2
29. Give a brief account of the smelting process. 2.5
30. Write a short note on the Carbon reduction process. 2.5
31. Give a brief account of carbon reduction. 3
32. Write the chemical reaction involved in the Carbon reduction process.

#### 1. Aluminothermite reduction (Goldschmidt Process)

33. Write a short note on the alumino-thermite process. 3
34. Give a brief account of the alumino-thermite process. 3
35. What is meant by the alumino-thermite process? 2
36. Differentiate between carbon reduction and the thermite process. 2.5
37. Write the chemical reaction involved in the Alumino-Thermite process. 1

#### 2. Electrolytic reduction

38. Give a brief account of Electrometallurgy. 3
39. Differentiate between Carbon reduction and the electrolytic reduction process. 2.5

### 5. Purification/refining

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