

Metals and Alloys

Ancient Indian Metallurgy (IKS)

1. What was the primary metal used in ancient Indian metallurgy?

- (a) Copper
- (b) Iron
- (c) Gold
- (d) Silver

Ans: (a) Copper

2. Which ancient Indian text describes the process of metal extraction?

- (a) Arthashastra
- (b) Charaka Samhita
- (c) Sushruta Samhita
- (d) Rigveda

Ans: (a) Arthashastra

3. What was the significance of the crucible in ancient Indian metallurgy?

- (a) It was used for metal casting
- (b) It was used for metal extraction
- (c) It was used for heating metals
- (d) It was used for storing metals

Ans: (c) It was used for heating metals

4. Which metalworking technique was used in ancient India to create intricate designs?

- (a) Forging
- (b) Casting
- (c) Engraving
- (d) Filigree

Ans: (d) Filigree

Metallurgical Applications

5. What was the primary use of copper in ancient India?

- (a) Coinage
- (b) Jewelry
- (c) Tools and implements
- (d) Decorative items

Ans: (c) Tools and implements

6. Which ancient Indian civilization is known for its advanced metallurgical techniques?

- (a) Indus Valley Civilization
- (b) Vedic Civilization
- (c) Mauryan Empire
- (d) Gupta Empire

Ans: (a) Indus Valley Civilization

7. What was the significance of metalworking in ancient Indian society?
 (a) It was used for decorative purposes (b) It was used for economic purposes
 (c) It was used for military purposes (d) All of the above
 Ans: (d) All of the above
8. Which ancient Indian innovation in metallurgy allowed for the creation of high-quality steel?
 (a) Crucible steel production (b) Quenching and tempering
 (c) Metal casting (d) Filigree
 Ans: (a) Crucible steel production
9. What was the impact of ancient Indian metallurgy on the global metal industry?
 (a) It had a significant impact on the development of metalworking techniques
 (b) It had a limited impact on the development of metalworking techniques
 (c) It had no impact on the development of metalworking techniques
 (d) It's unknown
 Ans: (a) It had a significant impact on the development of metalworking techniques
10. Which ancient Indian text describes the properties and uses of different metals?
 (a) Rasaratna Samuccaya (b) Arthashastra
 (c) Charaka Samhita (d) Sushruta Samhita
 Ans: (a) Rasaratna Samuccaya
11. What was the primary source of copper in ancient India?
 (a) Ores (b) Alloys
 (c) Scraps (d) Imported copper
 Ans: (a) Copper ores
12. Which ancient Indian dynasty is known for its extensive use of iron?
 (a) Mauryan Empire (b) Gupta Empire
 (c) Kushan Empire (d) Chalukya Empire
 Ans: (a) Mauryan Empire
13. What was the significance of metal alloys in ancient Indian metallurgy?
 (a) They were used for decorative purposes
 (b) They were used for economic purposes
 (c) They were used to create stronger metals
 (d) All of the above
 Ans: (c) They were used to create stronger metals
14. Which metalworking technique was used in ancient India to create coins?
 (a) Forging (b) Casting
 (c) Punching (d) Die-striking
 Ans: (d) Die-striking

15. What was the impact of ancient Indian metallurgy on the development of other industries?
- (a) It had a significant impact on the development of other industries
 - (b) It had a limited impact on the development of other industries
 - (c) It had no impact on the development of other industries
 - (d) It's unknown

Ans: (a) It had a significant impact on the development of other industries

16. Which ancient Indian text mentions the use of mercury in metallurgy?
- (a) Rasaratna Samuccaya
 - (b) Arthashastra
 - (c) Charaka Samhita
 - (d) Sushruta Samhita

Ans: (a) Rasaratna Samuccaya

17. What was the primary use of gold in ancient India?
- (a) Coinage
 - (b) Jewelry
 - (c) Decorative items
 - (d) All of the above

Ans: (d) All of the above

18. Which ancient Indian civilization is known for its use of metal alloys?
- (a) Indus Valley Civilization
 - (b) Vedic Civilization
 - (c) Mauryan Empire
 - (d) Gupta Empire

Ans: (a) Indus Valley Civilization

19. What was the significance of metalworking in ancient Indian art?
- (a) It was used to create decorative items
 - (b) It was used to create functional items
 - (c) It was used to create symbolic items
 - (d) All of the above

Ans: (d) All of the above

20. Which metalworking technique was used in ancient India to create intricate metal sculptures?

- (a) Forging
- (b) Casting
- (c) Engraving
- (d) Filigree

Ans: (b) Casting

21. What was the primary source of iron in ancient India?

- (a) Iron ores
- (b) Iron alloys
- (c) Iron scraps
- (d) Imported iron

Ans: (a) Iron ores

22. Which ancient Indian dynasty is known for its advanced metalworking techniques?

- (a) Mauryan Empire
- (b) Gupta Empire
- (c) Kushan Empire
- (d) Chalukya Empire

Ans: (b) Gupta Empire

23. What was the significance of metal alloys in ancient Indian metallurgy?

- (a) They were used to create stronger metals
- (b) They were used to create lighter metals

(c) They were used to create more expensive metals

(d) All of the above

Ans: (a) They were used to create stronger metals

24. Which metalworking technique was used in ancient India to create metal wires?

(a) Forging

(b) Casting

(c) Drawing

(d) Filigree

Ans: (c) Drawing

25. What was the impact of ancient Indian metallurgy on the development of medicine?

(a) It had a significant impact on the development of medical instruments

(b) It had a limited impact on the development of medical instruments

(c) It had no impact on the development of medical instruments

(d) It's unknown

Ans: (a) It had a significant impact on the development of medical instruments

26. Which ancient Indian text describes the process of metal purification?

(a) Rasaratna Samuccaya

(b) Arthashastra

(c) Charaka Samhita

(d) Sushruta Samhita

Ans: (a) Rasaratna Samuccaya

27. What was the primary use of silver in ancient India?

(a) Coinage

(b) Jewelry

(c) Decorative items

(d) All of the above

Ans: (d) All of the above

28. Which ancient Indian civilization is known for its use of metal in agriculture?

(a) Indus Valley Civilization

(b) Vedic Civilization

(c) Mauryan Empire

(d) Gupta Empire

Ans: (a) Indus Valley Civilization

29. What was the significance of metalworking in ancient Indian warfare?

(a) It was used to create swords and armor

(b) It was used to create shields and helmets

(c) It was used to create catapults and other siege engines

(d) All of the above

Ans: (d) All of the above

30. Which metalworking technique was used in ancient India to create complex metal objects?

(a) Forging

(b) Casting

(c) Welding

(d) Soldering

Ans: (b) Casting

31. What was the primary source of tin in ancient India?

(a) Tin ores

(b) Tin alloys

(c) Tin scraps

(d) Imported tin

Ans: (a) Tin ores

32. Which ancient Indian dynasty is known for its extensive use of metal in architecture?
 (a) Mauryan Empire (b) Gupta Empire
 (c) Kushan Empire (d) Pallava Empire

Ans: (a) Mauryan Empire

33. What was the significance of metalworking in ancient Indian trade?
 (a) It was used to create goods for trade (b) It was used to create coins for trade
 (c) It was used to create tools for trade (d) All of the above

Ans: (d) All of the above

34. Which metalworking technique was used in ancient India to create metal statues?
 (a) Forging (b) Casting
 (c) Engraving (d) Filigree

Ans: (b) Casting

35. What was the impact of ancient Indian metallurgy on the development of technology?
 (a) It had a significant impact on the development of technology
 (b) It had a limited impact on the development of technology
 (c) It had no impact on the development of technology
 (d) It's unknown

Ans: (a) It had a significant impact on the development of technology

36. Which ancient Indian text describes the properties of metals?
 (a) Rasaratna Samuccaya (b) Arthashastra
 (c) Charaka Samhita (d) Sushruta Samhita

Ans: (a) Rasaratna Samuccaya

37. What was the primary use of lead in ancient India?
 (a) Coinage (b) Jewelry
 (c) Soldering (d) Shielding

Ans: (c) Soldering

38. Which ancient Indian civilization is known for its use of metal in jewelry?
 (a) Indus Valley Civilization (b) Vedic Civilization
 (c) Mauryan Empire (d) Gupta Empire

Ans: (a) Indus Valley Civilization

39. What was the significance of metalworking in ancient Indian art and architecture?
 (a) It was used to create decorative items
 (b) It was used to create functional items
 (c) It was used to create symbolic items
 (d) All of the above

Ans: (d) All of the above

40. Which metalworking technique was used in ancient India to create intricate metal designs?
 (a) Forging (b) Casting
 (c) Engraving (d) Filigree

Ans: (d) Filigree

41. What was the primary source of copper in ancient India?
 (a) Copper ores
 (b) Copper alloys
 (c) Copper scraps
 (d) Imported copper
- Ans: (a) Copper ores
42. Which ancient Indian dynasty is known for its advanced metalworking techniques?
 (a) Mauryan Empire
 (b) Gupta Empire
 (c) Kushan Empire
 (d) Chalukya Empire
- Ans: (b) Gupta Empire
43. What was the significance of metal alloys in ancient Indian metallurgy?
 (a) They were used to create stronger metals
 (b) They were used to create lighter metals
 (c) They were used to create more expensive metals
 (d) All of the above
- Ans: (a) They were used to create stronger metals
44. Which metalworking technique was used in ancient India to create metal wires?
 (a) Forging
 (b) Casting
 (c) Drawing
 (d) Filigree
- Ans: (c) Drawing
45. What was the primary metal used in ancient Indian metallurgy?
 (a) Copper
 (b) Iron
 (c) Gold
 (d) Silver
- Ans: (a) Copper
46. Which ancient Indian text describes the process of metal extraction?
 (a) Arthashastra
 (b) Charaka Samhita
 (c) Sushruta Samhita
 (d) Rigveda
- Ans: (a) Arthashastra
47. What was the significance of the crucible in ancient Indian metallurgy?
 (a) It was used for metal casting
 (b) It was used for metal extraction
 (c) It was used for heating metals
 (d) It was used for storing metals
- Ans: (c) It was used for heating metals
48. Which metalworking technique was used in ancient India to create intricate designs?
 (a) Forging
 (b) Casting
 (c) Engraving
 (d) Filigree
- Ans: (d) Filigree
49. What was the primary use of copper in ancient India?
 (a) Coinage
 (b) Jewellery
 (c) Tools and implements
 (d) Decorative items
- Ans: (c) Tools and implements
50. What was the impact of ancient Indian metallurgy on the development of technology?
 (a) It had a significant impact on the development of technology
 (b) It had a limited impact on the development of technology

- (c) It had no impact on the development of technology
- (d) It's unknown

Ans: (a) It had a significant impact on the development of technology

Occurrence of Metals: Occurrence of metals in free and combined state. Basic concepts:

Mineral, ore, gangue, flux and slag, metallurgy.

1. Which metals are in their native state?

- (a) Gold, silver, and platinum
- (b) Copper, iron, and zinc
- (c) Aluminum, sodium, and potassium
- (d) Tin, lead, and mercury

Ans: (a) Gold, silver, and platinum

2. What is the primary form in which most metals occur in nature?

- (a) Native state
- (b) Combined state
- (c) Ionic state
- (d) Molecular state

Ans: (b) Combined state

3. What is a mineral?

- (a) A naturally occurring inorganic solid substance
- (b) A type of rock
- (c) A type of metal
- (d) A type of ore

Ans: (a) A naturally occurring inorganic solid substance

4. What is an ore?

- (a) A mineral from which a metal can be extracted profitably
- (b) A type of rock
- (c) A type of metal
- (d) A type of gangue

Ans: (a) A mineral from which a metal can be extracted profitably

5. What is gangue?

- (a) The unwanted mineral impurities in an ore
- (b) The valuable mineral in an ore
- (c) The flux used in metallurgy
- (d) The slag produced in metallurgy

Ans: (a) The unwanted mineral impurities in an ore

6. What is the role of a flux in metallurgy?

- (a) To remove impurities
- (b) To reduce the metal oxide
- (c) To protect the metal from oxidation
- (d) To lower the melting point of the gangue

Ans: (d) To lower the melting point of the gangue

7. What is slag?

- (a) The waste product formed during metallurgy
- (b) The pure metal extracted during metallurgy

(c) The flux used in metallurgy

(d) The ore used in metallurgy

Ans: (a) The waste product formed during metallurgy

8. What is metallurgy?

(a) The process of extracting metals from their ores

(b) The process of refining metals

(c) The process of alloying metals

(d) The process of electroplating metals

Ans: (a) The process of extracting metals from their ores

9. Which of the following is an example of a native metal?

(a) Gold

(b) Copper

(c) Iron

(d) Aluminum

Ans: (a) Gold

10. What is the primary objective of metallurgy?

(a) To extract metals from their ores

(b) To refine metals

(c) To alloy metals

(d) To electroplate metals

Ans: (a) To extract metals from their ores

11. Which of the following is a characteristic of a mineral?

(a) It is a naturally occurring inorganic solid substance

(b) It is a type of rock

(c) It is a type of metal

(d) It is a type of ore

Ans: (a) It is a naturally occurring inorganic solid substance

12. What is the difference between a mineral and an ore?

(a) A mineral is a type of rock, while an ore is a type of metal

(b) A mineral is a naturally occurring inorganic solid substance, while an ore is a mineral from which a metal can be extracted profitably

(c) A mineral is a type of metal, while an ore is a type of rock

(d) A mineral is a type of ore, while an ore is a type of mineral

Ans: (b) A mineral is a naturally occurring inorganic solid substance, while an ore is a mineral from which a metal can be extracted profitably

13. What is the role of a reducing agent in metallurgy?

(a) To oxidize the metal

(b) To reduce the metal oxide

(c) To remove impurities

(d) To protect the metal from oxidation

Ans: (b) To reduce the metal oxide

14. Which of the following is an example of a flux?

(a) Silica

(b) Limestone

(c) Alumina

(d) All of the above

Ans: (d) All of the above

15. What is the purpose of roasting in metallurgy?

- (a) To convert sulfide ores to oxides
- (b) To reduce metal oxides
- (c) To remove impurities
- (d) To protect the metal from oxidation

Ans: (a) To convert sulfide ores to oxides

16. Which of the following metals is extracted using electrolysis?

- (a) Aluminum
- (b) Copper
- (c) Iron
- (d) Zinc

Ans: (a) Aluminum

17. What is the primary use of slag in metallurgy?

- (a) To protect the metal from oxidation
- (b) To remove impurities
- (c) To lower the melting point of the gangue
- (d) To construct roads and buildings

Ans: (d) To construct roads and buildings

18. Which of the following ores is used to extract aluminum?

- (a) Bauxite
- (b) Hematite
- (c) Magnetite
- (d) Siderite

Ans: (a) Bauxite

19. What is the process of extracting metal from its ore called?

- (a) Metallurgy
- (b) Refining
- (c) Smelting
- (d) Roasting

Ans: (a) Metallurgy

20. Which of the following metals is a noble metal?

- (a) Gold
- (b) Silver
- (c) Copper
- (d) Both (a) and (b)

Ans: (d) Both (a) and (b)

21. What is the role of a smelting furnace in metallurgy?

- (a) To reduce metal oxides
- (b) To oxidize metals
- (c) To refine metals
- (d) To alloy metals

Ans: (a) To reduce metal oxides

22. Which of the following is a method of metal extraction?

- (a) Electrolysis
- (b) Smelting
- (c) Roasting
- (d) All of the above

Ans: (d) All of the above

23. What is the purpose of calcination in metallurgy?

- (a) To convert sulfide ores to oxides
- (b) To reduce metal oxides
- (c) To remove volatile impurities
- (d) To protect the metal from oxidation

Ans: (c) To remove volatile impurities

24. Which of the following metals is extracted using the cyanide process?
- (a) Gold
 - (b) Silver
 - (c) Copper
 - (d) Both (a) and (b)

Ans: (d) Both (a) and (b)

25. What is the primary function of a flux in metallurgy?
- (a) To reduce metal oxides
 - (b) To remove impurities
 - (c) To lower the melting point of the gangue
 - (d) To protect the metal from oxidation

Ans: (c) To lower the melting point of the gangue

26. Which of the following ores is used to extract iron?

- (a) Hematite
- (b) Magnetite
- (c) Siderite
- (d) All of the above

Ans: (d) All of the above

27. What is the process of coating a metal with a layer of another metal called?

- (a) Electroplating
- (b) Galvanizing
- (c) Alloying
- (d) Metallizing

Ans: (a) Electroplating

28. Which of the following metals is a transition metal?

- (a) Copper
- (b) Zinc
- (c) Iron
- (d) All of the above

Ans: (d) All of the above

29. What is the primary use of copper in electrical applications?

- (a) Due to its high melting point
- (b) Due to its high electrical conductivity
- (c) Due to its high thermal conductivity
- (d) Due to its high density

Ans: (b) Due to its high electrical conductivity

30. Which of the following is a characteristic of metals?

- (a) They are brittle
- (b) They are malleable
- (c) They are insulators
- (d) They are gases at room temperature

Ans: (b) They are malleable

31. What is the process of heating a metal in the presence of oxygen called?

- (a) Oxidation
- (b) Reduction
- (c) Calcination
- (d) Roasting

Ans: (a) Oxidation

32. What is the primary purpose of alloying metals?

- (a) To increase their melting point
- (b) To decrease their density

- (c) To improve their strength and properties
- (d) To reduce their cost

Ans: (c) To improve their strength and properties

33. Which of the following metals is highly reactive?

- (a) Sodium
- (b) Potassium
- (c) Calcium
- (d) All of the above

Ans: (d) All of the above

34. What is the process of extracting metal from its ore using electricity called?

- (a) Electrolysis
- (b) Smelting
- (c) Roasting
- (d) Calcination

Ans: (a) Electrolysis

32. What is the primary purpose of alloying metals?

- (a) To increase their melting point
- (b) To decrease their density
- (c) To improve their strength and properties
- (d) To reduce their cost

Ans: (c) To improve their strength and properties

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- (a) Sodium
- (b) Potassium
- (c) Calcium
- (d) All of the above

Ans: (d) All of the above

34. What is the process of extracting metal from its ore using electricity called?

- (a) Electrolysis
- (b) Smelting
- (c) Roasting
- (d) Calcination

Ans: (a) Electrolysis

35. What is the significance of corrosion in metals?

- (a) It increases the strength of metals
- (b) It decreases the strength of metals
- (c) It has no effect on metals
- (d) It improves the appearance of metals

Ans: (b) It decreases the strength of metals

36. Which of the following methods is used to prevent corrosion?

- (a) Galvanizing
- (b) Electroplating
- (c) Painting
- (d) All of the above

Ans: (d) All of the above

37. What is the primary use of zinc in metallurgy?

- (a) To extract other metals
- (b) To protect iron from corrosion
- (c) To improve the strength of metals
- (d) To reduce the melting point of metals

Ans: (b) To protect iron from corrosion

38. What is the primary application of metallurgy in industry?
- (a) Electronics
 - (b) Construction
 - (c) Manufacturing
 - (d) All of the above

Ans: (d) All of the above

39. Which of the following is a benefit of metallurgy?
- (a) Improved material properties
 - (b) Increased efficiency
 - (c) Reduced costs
 - (d) All of the above

Ans: (d) All of the above

40. What is the role of metallurgists in industry?
- (a) To design new materials
 - (b) To improve existing materials
 - (c) To develop new manufacturing processes
 - (d) All of the above

Ans: (d) All of the above

41. What is the significance of recycling metals?
- (a) To conserve natural resources
 - (b) To reduce waste
 - (c) To decrease energy consumption
 - (d) All of the above

Ans: (d) All of the above

42. Which of the following metals is commonly used in aircraft construction?
- (a) Aluminum
 - (b) Titanium
 - (c) Steel
 - (d) Both (a) and (b)

Ans: (d) Both (a) and (b)

43. What is the primary use of tin in metallurgy?
- (a) To protect steel from corrosion
 - (b) To improve the strength of metals
 - (c) To reduce the melting point of metals
 - (d) To increase the conductivity of metals

Ans: (a) To protect steel from corrosion

44. Which of the following is a characteristic of ferrous metals?
- (a) They contain iron
 - (b) They are non-magnetic
 - (c) They are highly resistant to corrosion
 - (d) They are lightweight

Ans: (a) They contain iron

45. What is the significance of metallurgy in modern technology?
- (a) It provides materials for construction
 - (b) It enables the development of new technologies
 - (c) It improves the efficiency of manufacturing processes
 - (d) All of the above

Ans: (d) All of the above

46. Which of the following metals is used in nuclear reactors?
 (a) Uranium (b) Thorium
 (c) Zirconium (d) All of the above

Ans: (d) All of the above

47. What is the primary use of lead in industry?
 (a) Batteries (b) Radiation shielding
 (c) Alloys (d) All of the above

Ans: (d) All of the above

48. Which of the following is a benefit of advanced metallurgy?
 (a) Improved material properties (b) Increased sustainability
 (c) Enhanced performance (d) All of the above

Ans: (d) All of the above

49. What is the role of metallurgy in environmental sustainability?
 (a) To reduce waste (b) To conserve resources
 (c) To develop sustainable materials (d) All of the above

Ans: (d) All of the above

50. What is the significance of metallurgy in modern industry?
 (a) It provides materials for construction
 (b) It enables the development of new technologies
 (c) It improves the efficiency of manufacturing processes
 (d) All of the above

Ans: (d) All of the above

Metallurgy: Extraction processes of metal from ore Concentration : Gravity separation, electromagnetic separation, froth floatation, calcination and roasting, Reduction : Smelting, aluminothermic process, Refining, poling, electrorefining.

1. Which method is used for the concentration of oxide ores?
 (a) Gravity separation (b) Froth floatation
 (c) Electromagnetic separation (d) Leaching

Ans: (a) Gravity separation

2. Froth floatation process is suitable for the concentration of:
 (a) Oxide ores (b) Sulphide ores
 (c) Halide ores (d) Carbonate ores

Ans: (b) Sulphide ores

3. In electromagnetic separation, the method is based on difference in:
 (a) Density of ores (b) Magnetic properties
 (c) Solubility (d) Conductivity

Ans: (b) Magnetic properties

4. Which ore is concentrated by froth floatation?
 (a) Bauxite (b) Haematite
 (c) Galena (d) Magnetite

Ans: (c) Galena

5 Gravity separation is based on difference in:

- (a) Colour of ores
- (b) Density of ores
- (c) Conductivity of ores
- (d) Magnetic property

Ans: (b) Density of ores

6. The process used for concentration of tinstone (SnO_2) is:

- (a) Electromagnetic separation
- (b) Froth flotation
- (c) Leaching
- (d) Liquation

Ans: (a) Electromagnetic separation

7. Which one is not a method of concentration of ores?

- (a) Gravity separation
- (b) Roasting
- (c) Electromagnetic separation
- (d) Froth flotation

Ans: (b) Roasting

8. Collectors like pine oil are used in froth flotation to:

- (a) Enhance wettability of ore particles
- (b) Form stable froth
- (c) Decrease froth
- (d) Remove gangue

Ans: (a) Enhance wettability of ore particles

9. The gangue particles in froth flotation become:

- (a) Wetted by water
- (b) Wetted by oil
- (c) Magnetic
- (d) Heavier

Ans: (a) Wetted by water

10. The method used for removal of magnetic impurities from cassiterite is:

- (a) Gravity separation
- (b) Magnetic separation
- (c) Leaching
- (d) Froth flotation

Ans: (b) Magnetic separation

11. Calcination involves:

- (a) Heating in limited supply of air
- (b) Heating in excess of air
- (c) Melting the ore
- (d) Electrolysis

Ans: (b) Heating in limited supply of air

12. Roasting is carried out in:

- (a) Absence of air
- (b) Limited air
- (c) Excess of air
- (d) Vacuum

Ans: (c) Excess of air

13. Which of the following ores is concentrated by calcination?

- (a) Carbonate ores
- (b) Sulphide ores
- (c) Oxide ores
- (d) All of these

Ans: (a) Carbonate ores

14. Roasting converts sulphide ores into:

- (a) Oxides
- (b) Carbonates
- (c) Sulphates
- (d) Chlorides

Ans: (a) Oxides

15. During calcination, CO_2 is released from:

- (a) Carbonates
- (c) Oxides

- (b) Sulphides
- (d) Halides

Ans: (a) Carbonates

16. Which process is used in the extraction of zinc from zinc blende?

- (a) Roasting
- (c) Smelting

- (b) Calcination
- (d) Electrorefining

Ans: (a) Roasting

17. In roasting, impurities like sulphur and arsenic are removed as:

- (a) SO_2 and As_2O_3
- (c) SO_2 and As_2S_5

- (b) SO_3 and As_2S_3
- (d) SO_3 and As_2O_5

Ans: (a) SO_2 and As_2O_3

18. Which furnace is used for roasting?

- (a) Blast furnace
- (c) Cupola furnace

- (b) Reverberatory furnace
- (d) Muffle furnace

Ans: (b) Reverberatory furnace

19. Which ore is concentrated by roasting?

- (a) ZnS
- (c) Fe_2O_3

- (b) CaCO_3
- (d) Al_2O_3

Ans: (a) ZnS

20. Roasting of ZnS produces:

- (a) ZnCO_3
- (c) ZnCl_2

- (b) ZnO
- (d) Zn

Ans: (b) ZnO

21. Smelting is the process of:

- (a) Heating the ore in presence of reducing agent
- (b) Heating in absence of air
- (c) Melting only
- (d) Dissolving in acid

Ans: (a) Heating the ore in presence of reducing agent

22. The furnace used for smelting iron ore is:

- (a) Blast furnace
- (c) Reverberatory furnace

- (b) Cupola furnace
- (d) Muffle furnace

Ans: (a) Blast furnace

23. Aluminothermic process is used for extraction of:

- (a) Highly electropositive metals
- (b) Highly electropositive non-metals
- (c) Less electropositive metals
- (d) Halogens

Ans: (c) Less electropositive metals

24. In aluminothermic process, aluminium acts as:
- (a) Oxidising agent
 - (b) Reducing agent
 - (c) Catalyst
 - (d) Solvent

Ans: (b) Reducing agent

25. Thermite process is another name for:

- (a) Electrolysis
- (b) Roasting
- (c) Aluminothermic process
- (d) Calcination

Ans: (c) Aluminothermic process

26. Which reaction is used in welding of railway tracks?

- (a) Aluminothermic process
- (b) Electrolysis
- (c) Smelting
- (d) Poling

Ans: (a) Aluminothermic process

27. In blast furnace, limestone acts as:

- (a) Flux
- (b) Ore
- (c) Reducing agent
- (d) Fuel

Ans: (a) Flux

28. During smelting of iron, slag is formed by combination of:

- (a) SiO_2 and CaO
- (b) Fe and O_2
- (c) CO and Fe_2O_3
- (d) CaCO_3 and CO_2

Ans: (a) SiO_2 and CaO

29. Which gas is used as a reducing agent in blast furnace?

- (a) O_2
- (b) CO
- (c) CO_2
- (d) H_2

Ans: (b) CO

30. Copper is extracted from cuprous oxide by:

- (a) Self reduction
- (b) Electrolysis
- (c) Smelting
- (d) Leaching

Ans: (a) Self reduction

31. Refining of impure metal by using electrolysis is called:

- (a) Liquation
- (b) Electrorefining
- (c) Zone refining
- (d) Poling

Ans: (b) Electrorefining

32. In electrorefining, impure metal acts as:

- (a) Anode
- (b) Cathode
- (c) Electrolyte
- (d) Flux

Ans: (a) Anode

33. Poling is a refining method used for:

- (a) Copper and tin
- (b) Zinc and iron
- (c) Silver and gold
- (d) Sodium and potassium

Ans: (a) Copper and tin

34. In poling, wooden poles are used to remove:

- (a) Sulphide impurities (b) Oxide impurities
(c) Halide impurities (d) Carbonate impurities

Ans: (b) Oxide impurities

35. Which method is used to refine blister copper?

- (a) Liquation (b) Electrorefining
(c) Poling (d) Zone refining

Ans: (b) Electrorefining

36. Zone refining is used for:

- (a) Highly pure semiconductors (b) Iron and steel
(c) Zinc extraction (d) Tin refining

Ans: (a) Highly pure semiconductors

37. Electrolyte used in electrorefining of copper is:

- (a) $\text{CuSO}_4 + \text{H}_2\text{SO}_4$ (b) NaCl solution
(c) ZnSO_4 solution (d) FeCl_3 solution

Ans: (a) $\text{CuSO}_4 + \text{H}_2\text{SO}_4$

38. In electrolytic refining of copper, pure copper is obtained at:

- (a) Anode (b) Cathode
(c) Electrolyte (d) Flux

Ans: (b) Cathode

39. Which refining technique is used for producing silicon of high purity?

- (a) Electrorefining (b) Zone refining
(c) Poling (d) Liquation

Ans: (b) Zone refining

40. During electrorefining of copper, anode mud contains:

- (a) Gold and silver (b) Copper and zinc
(c) Iron and nickel (d) Tin and lead

Ans: (a) Gold and silver

Mechanical properties of metals :Hardness, ductility,malleability, tensile strength, toughness, machinability,weldability, forging, soldering, brazing, castability.

1. The ability of a metal to be drawn into wires is called:

- (a) Hardness (b) Ductility
(c) Malleability (d) Toughness

Ans: (b) Ductility

2. The property of a material to withstand permanent deformation without breaking is:

- (a) Ductility (b) Toughness
(c) Elasticity (d) Plasticity

Ans: (b) Toughness

3. The ability of a metal to be hammered or rolled into thin sheets is:
- (a) Malleability
 - (b) Ductility
 - (c) Brittleness
 - (d) Hardness

Ans: (a) Malleability

4. Resistance of a material to indentation or scratching is known as:
- (a) Hardness
 - (b) Ductility
 - (c) Strength
 - (d) Stiffness

Ans: (a) Hardness

5. The property which allows a metal to regain its shape after deformation is:
- (a) Ductility
 - (b) Plasticity
 - (c) Elasticity
 - (d) Malleability

Ans: (b) Elasticity

6. The ability of a metal to be easily cut or shaped in a machine tool is:
- (a) Castability
 - (b) Machinability
 - (c) Formability
 - (d) Weldability

Ans: (b) Machinability

7. The ability of a metal to be joined by welding is known as:
- (a) Ductility
 - (b) Weldability
 - (c) Forgeability
 - (d) Malleability

Ans: (b) Weldability

8. The resistance of a metal to fracture when stressed is:
- (a) Strength
 - (b) Toughness
 - (c) Ductility
 - (d) Elasticity

Ans: (b) Toughness

9. The measure of a metal's ability to resist deformation under tensile load is:
- (a) Yield strength
 - (b) Ultimate tensile strength
 - (c) Shear strength
 - (d) Hardness

Ans: (b) Ultimate tensile strength

10. The ability of a material to be cast into desired shape is called:
- (a) Machinability
 - (b) Castability
 - (c) Malleability
 - (d) Formability

Ans: (b) Castability

11. The process of joining metals by heating them to a high temperature and allowing them to fuse is:
- (a) Soldering
 - (b) Brazing
 - (c) Welding
 - (d) Riveting

Ans: (c) Welding

12. The process of joining metals using a filler metal having a melting point below 450°C is:
- (a) Brazing
 - (b) Soldering
 - (c) Welding
 - (d) Forge welding

Ans: (b) Soldering

13. The process of joining metals using a filler metal having a melting point above 450°C but below the base metal is:
- (a) Soldering
 - (b) Brazing
 - (c) Welding
 - (d) Casting

Ans: (b) Brazing

14. The ability of a metal to be forged or shaped under compressive forces is:
- (a) Forgeability
 - (b) Malleability
 - (c) Ductility
 - (d) Toughness

Ans: (a) Forgeability

15. The hardness of a metal is commonly tested using:
- (a) Brinell test
 - (b) Izod test
 - (c) Impact test
 - (d) Creep test

Ans: (a) Brinell test

16. A ductile material shows:
- (a) High elongation before fracture
 - (b) No elongation
 - (c) Brittle fracture
 - (d) Elastic fracture

Ans: (a) High elongation before fracture

17. Malleable materials are generally:
- (a) Brittle
 - (b) Hard and tough
 - (c) Soft and ductile
 - (d) Porous

Ans: (c) Soft and ductile

18. The unit of tensile strength is:
- (a) N/m
 - (b) N/m²
 - (c) N
 - (d) N/mm²

Ans: (d) N/mm²

19. The property opposite to brittleness is:
- (a) Malleability
 - (b) Ductility
 - (c) Elasticity
 - (d) Toughness

Ans: (b) Ductility

20. The ability of a metal to absorb energy before fracture is:
- (a) Resilience
 - (b) Toughness
 - (c) Hardness
 - (d) Plasticity

Ans: (b) Toughness

21. The property which allows a metal to deform permanently without fracture is:
- (a) Elasticity
 - (b) Plasticity
 - (c) Toughness
 - (d) Ductility

Ans: (b) Plasticity

22. The ability of a metal to be hardened by heat treatment is known as:
- (a) Tempering
 - (b) Hardening
 - (c) Hardenability
 - (d) Toughness

Ans: (c) Hardenability

- Metals and Alloys
23. A metal which breaks suddenly without plastic deformation is said to be:
- (a) Ductile
 - (b) Malleable
 - (c) Brittle
 - (d) Hard

Ans: (c) Brittle

24. The common test for ductility is:

- (a) Bending test
- (b) Tensile test
- (c) Impact test
- (d) Hardness test

Ans: (b) Tensile test

25. The material property important for cold working process is:

- (a) Malleability
- (b) Ductility
- (c) Brittleness
- (d) Hardness

Ans: (a) Malleability

26. Which of the following processes uses flux?

- (a) Welding
- (b) Brazing
- (c) Soldering
- (d) All of these

Ans: (d) All of these

27. The filler metal in brazing is usually an alloy of:

- (a) Lead and tin
- (b) Copper and zinc
- (c) Aluminum and tin
- (d) Iron and carbon

Ans: (b) Copper and zinc

28. The property of a metal that allows it to be welded without cracks is:

- (a) Machinability
- (b) Weldability
- (c) Malleability
- (d) Hardness

Ans: (b) Weldability

29. The main cause of poor castability in metals is:

- (a) High melting point
- (b) High viscosity
- (c) High thermal conductivity
- (d) All of these

Ans: (d) All of these

30. The ability to withstand deformation under slow load is:

- (a) Creep strength
- (b) Fatigue strength
- (c) Tensile strength
- (d) Hardness

Ans: (a) Creep strength

31. Solder commonly used in joining electrical components is an alloy of:

- (a) Tin and copper
- (b) Tin and lead
- (c) Zinc and lead
- (d) Iron and tin

Ans: (b) Tin and lead

32. The Brinell hardness test uses which type of indenter?

- (a) Steel ball
- (b) Diamond cone
- (c) Steel cone
- (d) Tungsten carbide ball

Ans: (d) Tungsten carbide ball

33. The Izod test measures:

- (a) Hardness
- (c) Impact strength

- (b) Ductility
- (d) Elasticity

Ans: (c) Impact strength

34. Castability of metal increases with:

- (a) High fluidity
- (c) High viscosity

- (b) High melting point
- (d) High oxidation

Ans: (a) High fluidity

35. A soft and ductile material that is easy to machine is said to have good:

- (a) Weldability
- (c) Machinability

- (b) Castability
- (d) Hardness

Ans: (c) Machinability

36. The main purpose of flux in soldering is to:

- (a) Prevent oxidation
- (c) Increase melting point

- (b) Improve strength
- (d) Act as adhesive

Ans: (a) Prevent oxidation

37. When a metal is hammered, its property to deform without fracture is called:

- (a) Ductility
- (c) Malleability

- (b) Toughness
- (d) Elasticity

Ans: (c) Malleability

38. The joint obtained by brazing is:

- (a) Stronger than welded joint
- (b) Weaker than soldered joint
- (c) Stronger than soldered but weaker than welded
- (d) Equal to welded joint

Ans: (c) Stronger than soldered but weaker than welded

39. Forgeability of a metal decreases with:

- (a) Decrease in temperature
- (c) Increase in ductility

- (b) Increase in temperature
- (d) Increase in malleability

Ans: (a) Decrease in temperature

40. A test used to determine the yield point of a metal is:

- (a) Tensile test
- (c) Shear test

- (b) Compression test
- (d) Hardness test

Ans: (a) Tensile test

41. The mechanical property that describes the metal's resistance to permanent deformation is:

- (a) Strength
- (c) Plasticity

- (b) Elasticity
- (d) Ductility

Ans: (a) Strength

42. Malleability of a metal increases with:

- (a) Decrease in temperature
- (c) Cold working

- (b) Increase in temperature
- (d) None of these

Ans: (b) Increase in temperature

43. Which of the following is a non-ferrous metal?

- (a) Steel
- (c) Cast iron

- (b) Aluminum
- (d) Wrought iron

Ans: (b) Aluminum

44. The material property required for drawing operation is:

- (a) Malleability
- (c) Toughness

- (b) Ductility
- (d) Elasticity

Ans: (b) Ductility

45. The process of forging is carried out under:

- (a) Compressive forces
- (c) Shear forces

- (b) Tensile forces
- (d) Torsional forces

Ans: (a) Compressive forces

46. The mechanical property related to cutting tools is:

- (a) Hardness
- (c) Malleability

- (b) Ductility
- (d) Elasticity

Ans: (a) Hardness

47. Which property helps metal to resist sudden shocks?

- (a) Hardness
- (c) Elasticity

- (b) Ductility
- (d) Toughness

Ans: (a) Toughness

48. The property of metal due to which it can be beaten into thin sheets is:

- (a) Ductility
- (c) Toughness

- (b) Malleability
- (d) Plasticity

Ans: (b) Malleability

49. The mechanical property of a material to absorb energy within elastic limit is:

- (a) Resilience
- (c) Plasticity

- (b) Toughness
- (d) Creep

Ans: (a) Resilience

50. The ability of metal to withstand repeated or cyclic stresses is called:

- (a) Creep
- (c) Ductility

- (b) Fatigue strength
- (d) Hardness

Ans: (b) Fatigue strength

Alloys: Purposes of making alloys with examples.

1. An alloy is a mixture of _____.

- (a) Metals only
- (b) Metal and non-metal

(c) Two or more elements, at least one of which is a metal

(d) Non-metals only

Ans: (c) Two or more elements, at least one of which is a metal

2. The main purpose of making alloys is to _____.

(a) Increase cost

(b) Improve mechanical and chemical properties

(c) Reduce hardness

(d) Make metals impure

Ans: (b) Improve mechanical and chemical properties

3. Bronze is an alloy of _____.

(a) Iron and carbon

(b) Copper and zinc

(c) Copper and tin

(d) Nickel and chromium

Ans: (a) Copper and tin

4. Brass is an alloy of _____.

(a) Copper and tin

(b) Zinc and lead

(c) Copper and zinc

(d) Iron and nickel

Ans: (b) Copper and zinc

5. Stainless steel is an alloy of iron, chromium and _____.

(a) Nickel

(b) Carbon

(c) Zinc

(d) Copper

Ans: (a) Nickel

6. The property improved by adding chromium and nickel to steel is _____.

(a) Magnetic property

(b) Corrosion resistance

(c) Ductility

(d) Machinability

Ans: (b) Corrosion resistance

7. The alloy of lead and tin used in soldering is called _____.

(a) Pewter

(b) Solder

(c) Gun metal

(d) Bronze

Ans: (b) Solder

8. The alloy used in making aircraft bodies is _____.

(a) Duralumin

(b) Bronze

(c) Brass

(d) Steel

Ans: (a) Duralumin

9. Duralumin is composed of aluminum and _____.

(a) Copper, manganese, magnesium

(b) Iron and zinc

(c) Tin and lead

(d) Nickel and chromium

Ans: (a) Copper, manganese, magnesium

10. The alloy used in making coins and medals is _____.

- (a) Brass
- (c) Steel

- (b) Bronze
- (d) German silver

Ans: (b) Bronze

11. The main purpose of adding carbon to iron is to make _____.

- (a) Cast iron or steel
- (c) Bronze

- (b) Duralumin
- (d) Pewter

Ans: (a) Cast iron or steel

12. An alloy of mercury with another metal is known as _____.

- (a) Amalgam
- (c) Mixture

- (b) Solution
- (d) Solid solution

Ans: (a) Amalgam

13. The alloy used in dental fillings is _____.

- (a) Solder
- (c) Gun metal

- (b) Dental amalgam
- (d) Pewter

Ans: (b) Dental amalgam

14. Nichrome is used for making heating elements because it has _____.

- (a) High resistivity
- (c) Magnetic property

- (b) Low melting point
- (d) Shiny surface

Ans: (a) High resistivity

15. Nichrome is an alloy of nickel, chromium and _____.

- (a) Iron
- (c) Copper

- (b) Tin
- (d) Zinc

Ans: (a) Iron

16. German silver contains no _____.

- (a) Copper
- (c) Zinc

- (b) Nickel
- (d) Silver

Ans: (d) Silver

17. Bell metal is an alloy of _____.

- (a) Copper and tin
- (c) Aluminum and magnesium

- (b) Iron and carbon
- (d) Lead and tin

Ans: (a) Copper and tin

18. The alloy used for making bearings is _____.

- (a) Babbitt metal
- (c) Brass

- (b) Bronze
- (d) Steel

Ans: (a) Babbitt metal

19. The addition of tin to copper increases _____.

- (a) Hardness
- (c) Ductility

- (b) Malleability
- (d) Brittleness

Ans: (a) Hardness

20. The alloy that is magnetic in nature is _____
(a) Alnico (b) Brass
(c) Bronze (d) Duralumin

Ans: (a) Alnico

21. Alnico is an alloy of aluminum, nickel and _____
(a) Cobalt (b) Iron
(c) Zinc (d) Tin

Ans: (a) Cobalt

22. The main purpose of making Alnico alloy is to produce _____
(a) Strong permanent magnets (b) Cutting tools
(c) Conductors (d) Lubricants

Ans: (a) Strong permanent magnets

23. The alloy Monel metal is composed of _____
(a) Nickel and copper (b) Copper and zinc
(c) Iron and carbon (d) Lead and tin

Ans: (a) Nickel and copper

24. The main purpose of alloying aluminum is to _____
(a) Reduce weight and increase strength (b) Reduce corrosion resistance
(c) Increase brittleness (d) Increase density

Ans: (a) Reduce weight and increase strength

25. The alloy of lead and tin that is used for joining electrical wires is _____
(a) Pewter (b) Solder
(c) Brass (d) Bronze

Ans: (b) Solder

26. Steel is an alloy of iron and _____
(a) Tin (b) Zinc
(c) Carbon (d) Copper

Ans: (c) Carbon

27. Stainless steel does not rust because of the presence of _____
(a) Carbon (b) Chromium
(c) Zinc (d) Manganese

Ans: (b) Chromium

28. Bronze is harder than copper because of the addition of _____
(a) Zinc (b) Tin
(c) Lead (d) Nickel

Ans: (b) Tin

29. The alloy used for making musical instruments is _____
(a) Brass (b) Bronze
(c) Gun metal (d) Duralumin

Ans: (a) Brass

30. The main purpose of alloying iron with carbon is to _____.
- (a) Increase hardness and strength
(b) Reduce weight
(c) Make it brittle
(d) Increase electrical conductivity

Ans: (a) Increase hardness and strength

31. The alloy used for making electrical resistors is _____.
- (a) Nichrome
(b) Duralumin
(c) Bronze
(d) Brass

Ans: (a) Nichrome

32. The alloy used in making cutlery is _____.
- (a) Stainless steel
(b) Brass
(c) Bronze
(d) German silver

Ans: (a) Stainless steel

33. Pewter is an alloy of _____.
- (a) Tin and lead
(b) Zinc and copper
(c) Tin and copper
(d) Iron and carbon

Ans: (a) Tin and lead

34. The purpose of adding zinc to copper in brass is to _____.
- (a) Improve strength and corrosion resistance
(b) Reduce hardness
(c) Increase brittleness
(d) Increase melting point

Ans: (a) Improve strength and corrosion resistance

35. Which alloy is used in making propellers?
- (a) Monel metal
(b) Brass
(c) Bronze
(d) German silver

Ans: (a) Monel metal

36. White metal is used for _____.
- (a) Bearings
(b) Coins
(c) Soldering
(d) Magnets

Ans: (a) Bearings

37. The alloy of aluminum used for making utensils is _____.
- (a) Hindalium
(b) Alnico
(c) Duralumin
(d) German silver

Ans: (a) Hindalium

38. The melting point of an alloy is usually _____ than its constituent metals.
- (a) Higher
(b) Lower
(c) Same
(d) Unpredictable

Ans: (b) Lower

39. Alloys are generally _____ than pure metals.
- (a) Weaker
(b) Softer
(c) Harder and stronger
(d) Less resistant to corrosion

Ans: (c) Harder and stronger

40. The property of a metal improved by alloying with tin is _____.
- (a) Fluidity and corrosion resistance (b) Density
(c) Hardness only (d) Ductility only

Ans: (a) Fluidity and corrosion resistance

41. Invar alloy is used for making measuring instruments because it has _____.
- (a) Low coefficient of expansion (b) High melting point
(c) High density (d) Magnetic property

Ans: (a) Low coefficient of expansion

42. Invar is an alloy of nickel and _____.
- (a) Iron (b) Zinc
(c) Chromium (d) Cobalt

Ans: (a) Iron

43. Gun metal is an alloy of _____.
- (a) Iron and zinc (b) Iron, tin and copper
(c) Copper and nickel (d) Copper, tin and zinc

Ans: (a) Copper, tin and zinc

44. The alloy used in making turbine blades is _____.
- (a) Nichrome (b) Inconel
(c) Duralumin (d) Monel metal

Ans: (b) Inconel

45. The major purpose of alloying lead is to _____.
- (a) Improve strength and hardness (b) Reduce weight
(c) Increase melting point (d) Increase magnetism

Ans: (a) Improve strength and hardness

46. Alloying improves the _____ of metals.
- (a) Corrosion resistance (b) Strength
(c) Hardness (d) All of the above

Ans: (d) All of the above

47. An alloy used for making coins and medals:
- (a) Bronze (b) Brass
(c) German silver (d) Pewter

Ans: (a) Bronze

48. Soldering alloy melts at _____.
- (a) High temperature (b) Low temperature
(c) Same as metals joined (d) None of these

Ans: (b) Low temperature

49. Alloying iron with chromium produces:
- (a) Stainless steel (b) Cast iron
(c) Wrought iron (d) Carbon steel

Ans: (a) Stainless steel

- Q1. The primary advantage of making alloys is to _____.
- Improve desired properties and eliminate undesirable ones
 - Make metals more impure
 - Decrease strength
 - Increase cost

Ans: (a) Improve desired properties and eliminate undesirable ones

Preparation methods of alloys: Fusion, compression.

1. The process of making an alloy by melting the component metals together is called _____.

- Compression method
- Fusion method
- Displacement method
- Reduction method

Ans: (b) Fusion method

2. The process of preparing alloys without melting, by pressing finely divided metals together, is known as _____.

- Compression method
- Fusion method
- Casting method
- Electrolysis

Ans: (a) Compression method

3. Fusion method is suitable for metals having _____.

- Low melting points
- Very high melting points
- Nonmetallic nature
- Low density

Ans: (a) Low melting points

4. Compression method is used for metals having _____.

- High melting points
- Low melting points
- Volatile nature
- None of these

Ans: (a) High melting points

5. In the fusion method, the metals are melted in _____.

- Air atmosphere
- Suitable furnace or crucible
- Vacuum
- Wooden vessel

Ans: (b) Suitable furnace or crucible

6. The molten mixture of metals in the fusion method is allowed to cool to form a _____.

- Solid solution or alloy
- Liquid mixture
- Gas
- Suspension

Ans: (a) Solid solution or alloy

7. The fusion method is also known as the _____ method.

- Melting
- Heating
- Powder
- Chemical

Ans: (a) Melting

8. The compression method is also known as the _____ method.
 (a) Powder metallurgy method (b) Melting method
 (c) Casting method (d) Electroplating method

Ans: (a) Powder metallurgy method

9. The fusion method is generally used for preparing alloys like _____
 (a) Brass and bronze (b) Tungsten steel
 (c) Cemented carbides (d) All of the above

Ans: (a) Brass and bronze

10. The compression method is suitable for metals like _____
 (a) Iron (b) Tungsten
 (c) Copper (d) Zinc

Ans: (b) Tungsten

11. In the fusion method, homogeneous mixing of metals is achieved by _____
 (a) Mechanical stirring (b) Electrical heating
 (c) Melting (d) Pressure

Ans: (c) Melting

12. The first step in the compression method is _____
 (a) Melting (b) Powdering the metals
 (c) Electrolysis (d) Casting

Ans: (b) Powdering the metals

13. The powdered metals in compression method are compacted under _____
 (a) High temperature (b) High pressure
 (c) Low pressure (d) Vacuum

Ans: (b) High pressure

14. After compression, the alloy is made dense by _____
 (a) Sintering (b) Cooling
 (c) Melting (d) Stirring

Ans: (a) Sintering

15. Sintering in alloy preparation is done at a temperature _____
 (a) Equal to melting point (b) Above the melting point
 (c) Below the melting point (d) Room temperature

Ans: (a) Below the melting point

16. The main advantage of compression method is _____
 (a) Can form alloys of high melting metals (b) Saves energy
 (c) Produces gaseous products (d) No need of furnace

Ans: (a) Can form alloys of high melting metals

17. An example of alloy made by the fusion method is _____
 (a) Brass (b) Tungsten steel
 (c) Cemented carbide (d) Sintered bronze

Ans: (a) Brass

18. An example of alloy made by compression method is _____.
- (a) Sintered bronze
(b) Brass
(c) Bronze
(d) Duralumin
- Ans: (a) Sintered bronze
19. The powdered metal mixture is heated below its melting point in _____.
- (a) Casting process
(b) Compression method
(c) Smelting process
(d) Fusion method
- Ans: (b) Compression method
20. The main purpose of alloying by fusion method is to _____.
- (a) Improve properties by uniform mixing
(b) Increase brittleness
(c) Produce compounds
(d) Reduce conductivity
- Ans: (a) Improve properties by uniform mixing
21. The main purpose of alloying by compression method is to _____.
- (a) Prepare alloys of high melting metals
(b) Reduce hardness
(c) Make material
(d) Requires high temperature
- Ans: (a) Expensive and time-consuming
27. Fusion process involves _____ transformation.
- (a) Solid $\rightarrow$ Liquid $\rightarrow$ Solid
(b) Liquid $\rightarrow$ Gas $\rightarrow$ Solid
(c) Solid $\rightarrow$ Gas $\rightarrow$ Solid
(d) None
- Ans: (a) Solid $\rightarrow$ Liquid $\rightarrow$ Solid
28. Compression process involves _____ transformation.
- (a) Solid $\rightarrow$ Solid (via sintering)
(b) Solid $\rightarrow$ Liquid
(c) Liquid $\rightarrow$ Solid
(d) Gas $\rightarrow$ Solid
- Ans: (a) Solid $\rightarrow$ Solid (via sintering)
29. Powder metallurgy is another name for _____.
- (a) Compression method
(b) Fusion method
(c) Electroplating
(d) Extraction
- Ans: (a) Compression method
30. Brass and bronze are prepared by _____ method.
- (a) Fusion
(b) Compression
(c) Smelting
(d) Roasting
- Ans: (a) Fusion
31. Tungsten carbide alloy is prepared by _____ method.
- (a) Compression
(b) Fusion
(c) Melting
(d) Electrolysis
- Ans: (a) Compression
32. Fusion method involves _____ bonding between metals.
- (a) Metallic
(b) Covalent
(c) Ionic
(d) Van der Waals
- Ans: (a) Metallic

33. Which of the following cannot be prepared by fusion method?

- (a) Tungsten steel
(c) Brass

- (b) Bronze
(d) Solder

Ans: (a) Tungsten steel

34. In compression method, powdered metal is pressed into desired shapes in a

- (a) Die
(c) Crucible

- (b) Furnace
(d) Beaker

Ans: (a) Die

35. The sintering temperature is generally _____ % of the melting point.

- (a) 70–90%
(c) 30–40%

- (b) 10–20%
(d) 100%

Ans: (a) 70–90%

36. Fusion method produces alloys that are _____.

- (a) Homogeneous
(c) Amorphous

- (b) Heterogeneous
(d) Nonmetallic

Ans: (a) Homogeneous

37. Compression method produces alloys that are generally _____.

- (a) Porous and strong
(c) Weak and brittle

- (b) Transparent
(d) Liquid

Ans: (a) Porous and strong

38. The temperature required in fusion method depends on _____.

- (a) Melting points of metals
(c) Size of furnace

- (b) Density
(d) Purity

Ans: (a) Melting points of metals

39. Fusion method requires _____ to prevent oxidation of metals.

- (a) Flux or inert atmosphere
(c) Water cooling

- (b) High vacuum
(d) Chemical catalyst

Ans: (a) Flux or inert atmosphere

40. Example of flux used in fusion method is _____.

- (a) Borax
(c) Iron oxide

- (b) Sulfur
(d) Graphite

Ans: (a) Borax

41. The alloy of tungsten and cobalt for cutting tools is made by _____.

- (a) Compression method
(c) Melting method

- (b) Fusion method
(d) Casting

Ans: (a) Compression method

42. The cooling rate in the fusion method affects the _____ of alloy.

- (a) Grain size and strength
(c) Color

- (b) Density
(d) Weight

Ans: (a) Grain size and strength

43. Alloys made by compression are often called _____ alloys.
 (a) Sintered (b) Molten
 (c) Liquid (d) Solidified

Ans: (a) Sintered

44. Alloy steels are mostly made by _____.

- (a) Fusion (b) Compression
 (c) Electrolysis (d) Smelting

Ans: (a) Fusion

45. Which method is cost-effective for bulk alloy production?

- (a) Fusion method (b) Compression method
 (c) Both equally (d) None

Ans: (a) Fusion method

46. The fusion method cannot be used for _____.

- (a) Refractory metals (b) Copper alloys
 (c) Lead alloys (d) Zinc alloys

Ans: (a) Refractory metals

47. Compression method helps in obtaining alloys with _____ grain structure.

- (a) Fine and compact (b) Coarse
 (c) Non-uniform (d) Weak

Ans: (a) Fine and compact

48. During sintering, particles bond together due to _____.

- (a) Atomic diffusion (b) Melting
 (c) Freezing (d) Cooling

Ans: (a) Atomic diffusion

49. Compression method is most useful in _____ industry.

- (a) Aerospace and tool making (b) Textile
 (c) Food (d) Agriculture

Ans: (a) Aerospace and tool making

50. In summary, fusion method is based on _____, and compression method is based on _____.

- (a) Melting & pressure sintering (b) Heating & cooling
 (c) Casting & cutting (d) Coating & bonding

Ans: (a) Melting & pressure sintering

Classification of alloys: Ferrous and non-ferrous alloys
Ferrous alloys: Composition, properties and applications of low carbon, medium carbon, high carbon steels.
Non-ferrous alloy: Composition, properties and applications of Brass, Bronze, Duralumin, Tinman Solder, Woods metal.

1. Ferrous alloys contain mainly which element?

- (a) Copper (b) Iron
 (c) Zinc (d) Tin

Ans: (b) Iron

2. The main constituent of steel is _____.
(a) Iron and carbon
(b) Iron and copper
(c) Iron and tin
(d) Iron and aluminium

Ans: (a) Iron and carbon

3. Low carbon steel contains carbon up to _____.
(a) 1.5%
(b) 0.5%
(c) 0.75%
(d) 0.25%

Ans: (a) 0.25%

4. Medium carbon steel contains carbon between _____.
(a) 0.25%–0.6%
(b) 0.6%–1.2%
(c) 1.2%–2.0%
(d) 0.01%–0.1%

Ans: (a) 0.25%–0.6%

5. High carbon steel contains carbon between _____.
(a) 0.6–1.5%
(b) 1.5–2.0%
(c) 0.1–0.25%
(d) 2.0–3.0%

Ans: (a) 0.6–1.5%

6. Low carbon steel is also known as _____.
(a) Mild steel
(b) Tool steel
(c) Cast iron
(d) Alloy steel

Ans: (a) Mild steel

7. The hardness of steel increases with an increase in _____.
(a) Carbon content
(b) Silicon content
(c) Aluminium content
(d) Sulphur content

Ans: (a) Carbon content

8. Low carbon steel is mainly used for _____.
(a) Wires and sheets
(b) Cutting tools
(c) Dies
(d) Springs

Ans: (a) Wires and sheets

9. Medium carbon steel is suitable for making _____.
(a) Machine parts and axles
(b) Rivets
(c) Razor blades
(d) Solder wire

Ans: (a) Machine parts and axles

10. High carbon steel is used for making _____.
(a) Tools, drills, and chisels
(b) Pipes
(c) Railway lines
(d) Sheets

Ans: (a) Tools, drills, and chisels

11. High carbon steel has high _____.
(a) Hardness and strength
(b) Ductility
(c) Malleability
(d) Electrical conductivity

Ans: (a) Hardness and strength

12. Low carbon steel is easy to _____.
 (a) Weld and machine (b) Harden
 (c) Temper (d) Cast
 Ans: (a) Weld and machine
13. As the carbon content increases, steel becomes _____.
 (a) Harder and less ductile (b) Softer and more ductile
 (c) More malleable (d) Better conductor
 Ans: (a) Harder and less ductile
14. The main alloying element in cast iron is _____.
 (a) Carbon (b) Zinc
 (c) Lead (d) Nickel
 Ans: (a) Carbon
15. High carbon steels are generally used in _____ industries.
 (a) Tool making (b) Food
 (c) Textile (d) Plastic
 Ans: (a) Tool making
16. Steel can be hardened by _____.
 (a) Heating and quenching (b) Cooling slowly
 (c) Hammering (d) Polishing
 Ans: (a) Heating and quenching
17. Low carbon steel is preferred where _____ is required.
 (a) Toughness and ductility (b) Hardness
 (c) Brittleness (d) Non-magnetic property
 Ans: (a) Toughness and ductility
18. Ferrous alloys are magnetic due to the presence of _____.
 (a) Iron (b) Nickel
 (c) Cobalt (d) Carbon
 Ans: (a) Iron
19. Medium carbon steel is stronger than low carbon steel but _____.
 (a) Less ductile (b) More ductile
 (c) Less hard (d) More malleable
 Ans: (a) Less ductile
20. Stainless steel contains iron, carbon, and _____.
 (a) Chromium and nickel (b) Copper and zinc
 (c) Tin and lead (d) Aluminium and silver
 Ans: (a) Chromium and nickel
21. Non-ferrous alloys do not contain _____ as a major constituent.
 (a) Iron (b) Copper
 (c) Aluminium (d) Zinc
 Ans: (a) Iron

22. Brass is an alloy of _____.
- (a) Tin and lead
 - (c) Zinc and aluminium

- (b) Copper and tin
- (d) Copper and zinc

Ans: (a) Copper and zinc

23. Bronze is an alloy of _____.
- (a) Lead and tin
 - (c) Iron and carbon

- (b) Copper and zinc
- (d) Copper and tin

Ans: (a) Copper and tin

24. Duralumin is an alloy of _____.
- (a) Aluminium, copper, manganese, and magnesium
 - (b) Aluminium and zinc
 - (c) Iron and aluminium
 - (d) Copper and lead

Ans: (a) Aluminium, copper, manganese, and magnesium

25. Solder is an alloy of _____.
- (a) Copper and zinc
 - (c) Zinc and tin

- (b) Lead and tin
- (d) Lead and copper

Ans: (a) Lead and tin

26. Wood's metal is an alloy of _____.
- (a) Bismuth, lead, tin, and
 - (c) Iron and carbon

- (b) Copper and zinc
- (d) Nickel and chromium

Ans: (a) Bismuth, lead, tin, and cadmium

27. Brass is used for _____.
- (a) Electrical fittings and decorative items
 - (c) Structural beams

- (b) Cutting tools
- (d) Pipes for acids

Ans: (a) Electrical fittings and decorative items

28. Bronze is used for _____.
- (a) Bearings and medals
 - (c) Car bodies

- (b) Cables
- (d) Cutting tools

Ans: (a) Bearings and medals

29. Duralumin is mainly used in _____.
- (a) Aircraft and automotive parts
 - (c) Bearings

- (b) Electrical cables
- (d) Decoration

Ans: (a) Aircraft and automotive parts

30. Solder is used in _____.
- (a) Joining metal pieces
 - (c) Polishing metals

- (b) Making tools
- (d) Strengthening steel

Ans: (a) Joining metal pieces

31. Wood's metal melts at a _____ temperature.

- (a) Low
- (b) High
- (c) Moderate
- (d) Variable

Ans: (a) Low

32. Non-ferrous alloys are usually _____ resistant.

- (a) Corrosion
- (b) Magnetic
- (c) Brittle
- (d) Weak

Ans: (a) Corrosion

33. The colour of brass is _____.

- (a) Yellow
- (b) White
- (c) Silver
- (d) Gray

Ans: (a) Yellow

34. The colour of bronze is _____.

- (a) Brownish
- (b) Silver
- (c) Black
- (d) Gray

Ans: (a) Brownish

35. The main advantage of non-ferrous alloys over ferrous alloys is _____.

- (a) Resistance to rust and light weight
- (b) Magnetic property
- (c) Hardness
- (d) Cost

Ans: (a) Resistance to rust and light weight

36. Tinman's solder is used in _____.

- (a) Electrical and plumbing joints
- (b) Tool making
- (c) Gears
- (d) Bearings

Ans: (a) Electrical and plumbing joints

37. The melting point of Wood's metal is approximately _____.

- (a) 70°C
- (b) 500°C
- (c) 200°C
- (d) 1000°C

Ans: (a) 70°C

38. Bronze is harder than _____.

- (a) Copper
- (b) Iron
- (c) Lead
- (d) Tin

Ans: (a) Copper

39. Brass resists _____.

- (a) Tarnishing and corrosion
- (b) Oxidation
- (c) Acid attack
- (d) Magnetic fields

Ans: (a) Tarnishing and corrosion

40. Duralumin becomes stronger after _____.

- (a) Heat treatment and aging
- (b) Cooling
- (c) Hammering
- (d) Polishing

Ans: (a) Heat treatment and aging

41. Which alloy is light in weight and high in strength?

- (a) Duralumin
(c) Solder

- (b) Bronze
(d) Brass

Ans: (a) Duralumin

42. Non-ferrous alloys are preferred in _____ industries.

- (a) Electrical and aerospace
(c) Textile

- (b) Mining
(d) Agriculture

Ans: (a) Electrical and aerospace

43. Which alloy is used for fusible plugs in boilers?

- (a) Wood's metal
(c) Brass

- (b) Bronze
(d) Solder

Ans: (a) Wood's metal

44. Which alloy is used for making coins and medals?

- (a) Bronze
(c) Solder

- (b) Brass
(d) Duralumin

Ans: (a) Bronze

45. Low carbon steel is mostly used for _____.

- (a) Wires, bolts, and sheets
(c) Springs

- (b) Drill bits
(d) Cutting tools

Ans: (a) Wires, bolts, and sheets

46. Medium carbon steel has better _____ than mild steel.

- (a) Strength and hardness
(c) Ductility

- (b) Malleability
(d) Corrosion resistance

Ans: (a) Strength and hardness

47. High carbon steel loses ductility due to _____.

- (a) Excess carbon content
(c) Oxidation

- (b) Low temperature
(d) Alloying

Ans: (a) Excess carbon content

48. Bronze does not contain _____.

- (a) Zinc
(c) Copper

- (b) Tin
(d) None

Ans: (a) Zinc

49. Ferrous alloys are generally _____ than non-ferrous alloys.

- (a) Stronger and cheaper
(c) Softer

- (b) Lighter
(d) More corrosion resistant

Ans: (a) Stronger and cheaper

50. Alloys are generally made to _____.

- (a) Improve strength, hardness, and corrosion resistance
(b) Increase brittleness
(c) Reduce strength
(d) Increase density only

Ans: (a) Improve strength, hardness, and corrosion resistance