

## **Fundamental Units**

1. The fundamental unit of length in the SI system is \_\_\_\_\_.  
Answer: meter (m)
2. The fundamental unit of mass in the CGS system is \_\_\_\_\_.  
Answer: gram (g)
3. The fundamental unit of time in all systems is \_\_\_\_\_.  
Answer: second (s)
4. The fundamental unit of temperature in the FPS system is \_\_\_\_\_.  
Answer: degree Fahrenheit ( $^{\circ}\text{F}$ )
5. The SI unit of temperature is measured in \_\_\_\_\_.  
Answer: Kelvin (K)
6. In the MKS system, the unit of mass is \_\_\_\_\_.  
Answer: kilogram (kg)
7. The FPS unit of length is measured in \_\_\_\_\_.  
Answer: foot (ft)

## **Derived Units**

8. The SI unit of area is \_\_\_\_\_.  
Answer: square meter ( $\text{m}^2$ )
9. The CGS unit of volume is \_\_\_\_\_.  
Answer: cubic centimeter ( $\text{cm}^3$ )
10. The SI derived unit of density is \_\_\_\_\_.  
Answer: kilogram per cubic meter ( $\text{kg}/\text{m}^3$ )
11. The CGS unit of velocity is \_\_\_\_\_.  
Answer: centimeters per second (cm/s)
12. The SI unit of acceleration is \_\_\_\_\_.  
Answer: meters per second squared ( $\text{m}/\text{s}^2$ )
13. The FPS unit of force is \_\_\_\_\_.  
Answer: pound-force (lbf)

14. The SI unit of work and energy is \_\_\_\_\_.

Answer: joule (J)

15. The unit of power in the CGS system is \_\_\_\_\_.

Answer: erg per second (erg/s)

### **Unit Conversions (Fill in numerical values)**

16. 1 meter = \_\_\_\_\_ centimeters in the CGS system.

Answer: 100

17. 1 kilogram = \_\_\_\_\_ grams in the CGS system.

Answer: 1000

18. 1 foot = \_\_\_\_\_ inches in the FPS system.

Answer: 12

19. 1 joule = \_\_\_\_\_ newton-meter in the SI system.

Answer: 1

20. 1 horsepower = \_\_\_\_\_ watts in the SI system.

Answer: 746

### **Simple Formula Fill-in**

21. Velocity (v) = \_\_\_\_\_ / time.

Answer: distance

22. Force (F) = mass  $\times$  \_\_\_\_\_.

Answer: acceleration

23. Work done (W) = Force  $\times$  \_\_\_\_\_.

Answer: displacement

24. Power (P) = Work done / \_\_\_\_\_.

Answer: time

25. Density ( $\rho$ ) = mass / \_\_\_\_\_.

Answer: volume

### **Classification of Engineering Materials**

1. Engineering materials are broadly classified into \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

Answer: metals, polymers, ceramics, composites

### **Mechanical Properties**

2. The ability of a material to return to its original shape after removing the load is called \_\_\_\_\_.

Answer: elasticity

3. The permanent deformation of a material under load is called \_\_\_\_\_.

Answer: plasticity

4. The property of a material that allows it to be hammered or rolled into thin sheets is called \_\_\_\_\_.

Answer: malleability

5. The ability of a material to be drawn into wires is called \_\_\_\_\_.

Answer: ductility

6. Materials that break without significant deformation are called \_\_\_\_\_.

Answer: brittle

7. The maximum stress a material can withstand without failure is called its \_\_\_\_\_.

Answer: strength

8. The ability of a material to absorb energy before fracture is called \_\_\_\_\_.

Answer: toughness

9. The resistance of a material to indentation or scratching is called \_\_\_\_\_.

Answer: hardness

10. The stiffness of a material is a measure of its resistance to \_\_\_\_\_.

Answer: deformation

11. The energy absorbed by a material in the elastic range is called \_\_\_\_\_.

Answer: resilience

12. The slow, time-dependent deformation of a material under constant load is called \_\_\_\_\_.

Answer: creep

13. The ability of a material to withstand repeated loading without failure is called \_\_\_\_\_.

Answer: fatigue

14. The ease with which a material can be machined is called \_\_\_\_\_.

Answer: machinability

### **Thermal Properties**

15. The property that defines how well a material conducts heat is called \_\_\_\_\_.

Answer: thermal conductivity

16. The amount of heat required to raise the temperature of a unit mass of a material by one degree is called \_\_\_\_\_.

Answer: specific heat

17. The increase in length or volume of a material due to temperature rise is called \_\_\_\_\_.

Answer: thermal expansion

18. The rate at which heat spreads through a material is called thermal \_\_\_\_\_.

Answer: diffusivity

19. Failure due to repeated thermal cycling is called thermal \_\_\_\_\_.

Answer: fatigue

20. Sudden failure due to rapid temperature change is known as thermal \_\_\_\_\_.

Answer: shock

21. The temperature at which a solid becomes liquid is called its \_\_\_\_\_.

Answer: melting point

### **Electrical Properties**

22. The property of a material that opposes the flow of electric current is called \_\_\_\_\_.

Answer: resistivity

23. The ability of a material to conduct electric current is called \_\_\_\_\_.

Answer: conductivity

24. The maximum electric field a material can withstand without breakdown is called \_\_\_\_\_ strength.

Answer: dielectric

25. The change in resistance of a material with temperature is described by the temperature coefficient of \_\_\_\_\_.

Answer: resistance

### **Chemical Properties**

26. The reaction of a material with oxygen is commonly referred to as \_\_\_\_\_.

Answer: oxidation

27. When a material reacts with water, it often leads to \_\_\_\_\_.

Answer: corrosion

28. Reaction with acids can lead to material degradation known as \_\_\_\_\_.

Answer: acid corrosion

29. Materials can also react with bases causing \_\_\_\_\_ corrosion.

Answer: alkaline

### **Magnetic Properties**

30. Materials that are repelled by magnetic fields are called \_\_\_\_\_ materials.

Answer: diamagnetic

31. Materials that are weakly attracted to magnetic fields and do not retain magnetism are called \_\_\_\_\_ materials.

Answer: paramagnetic

32. Materials that can be permanently magnetized are called \_\_\_\_\_ materials.

Answer: ferromagnetic

33. The measure of how easily a material can be magnetized is called magnetic \_\_\_\_\_.

Answer: permeability

34. The amount of magnetic flux through a given area is called magnetic flux \_\_\_\_\_.

Answer: density

35. The strength of the magnetic field is called magnetic field \_\_\_\_\_.

Answer: strength

36. The magnetic moment of a material is a measure of its \_\_\_\_\_.

Answer: magnetic strength or dipole moment

37. The magnetic moment per unit volume of a material is called \_\_\_\_\_.

Answer: magnetization

38. The degree to which a material can be magnetized in response to an applied magnetic field is called magnetic \_\_\_\_\_.

Answer: susceptibility

### Cast Iron

1. The three main types of cast iron are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

Answer: Grey, White, Malleable

2. Grey cast iron is known for its excellent \_\_\_\_\_ and \_\_\_\_\_.

Answer: machinability, damping capacity

3. White cast iron is very \_\_\_\_\_ and hard due to the presence of \_\_\_\_\_ carbides.

Answer: hard, iron

4. Malleable cast iron is produced by heat treating \_\_\_\_\_ cast iron.

Answer: white

5. Cast iron generally contains \_\_\_\_\_ to \_\_\_\_\_% carbon.

Answer: 2.5, 4

6. One common application of grey cast iron is in \_\_\_\_\_ parts like engine blocks and machine bases.

Answer: engine

### Steel

7. Plain carbon steel is classified based on carbon content into \_\_\_\_\_, mild, medium, and high carbon steel.

Answer: low

8. Low carbon steel contains approximately \_\_\_\_\_ to \_\_\_\_\_% carbon.

Answer: 0.15, 0.25

9. Mild steel typically contains about \_\_\_\_\_% carbon.

Answer: 0.25

10. Medium carbon steel contains \_\_\_\_\_ to \_\_\_\_\_% carbon.

Answer: 0.25, 0.65

11. High carbon steel contains \_\_\_\_\_ to \_\_\_\_\_% carbon.

Answer: 0.65, 1.5

12. Mild steel is known for its good \_\_\_\_\_ and ductility but relatively low strength.

Answer: weldability

13. High carbon steel is very \_\_\_\_\_ and is used in cutting tools and springs.

Answer: hard

### Alloy Steel

14. Alloy steels are steels to which elements such as \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ have been added to improve properties.

Answer: chromium, nickel, tungsten

15. Tool steels are known for their high \_\_\_\_\_ and wear resistance.

Answer: hardness

16. Tungsten steel contains tungsten which increases its \_\_\_\_\_ temperature.

Answer: melting

17. Stainless steel contains a minimum of about \_\_\_\_\_% chromium, which provides corrosion resistance.

Answer: 11

18. High-speed steel is used for cutting tools because it retains hardness at \_\_\_\_\_ temperatures.

Answer: high

19. Alloy steels are commonly used in applications requiring high \_\_\_\_\_, toughness, and wear resistance.

Answer: strength

Here are Fill in the Blanks questions with answers based on Non-Ferrous Materials, Non-Metals, and Nickel-Based Alloys:

### Non-Ferrous Materials

#### # Aluminum and Aluminum Alloys

1. \_\_\_\_\_ is a lightweight metal widely used in aircraft and automotive industries.

Answer: Aluminum

2. \_\_\_\_\_ is an aluminum alloy containing copper, magnesium, and manganese, known for its high strength.

Answer: Duralumin

3. \_\_\_\_\_ alloy contains aluminum, copper, and magnesium, and is used in high-temperature applications.

Answer: Y-Alloy

4. \_\_\_\_\_ is an important lightweight metal used for alloys and structural components.

Answer: Magnesium

5. \_\_\_\_\_ is an aluminum-based alloy known for its good mechanical properties and corrosion resistance.

Answer: Hindalium

#### # Copper and Copper Alloys

6. \_\_\_\_\_ is a copper-zinc alloy commonly used in decorative and mechanical applications.

Answer: Brass

7. \_\_\_\_\_ is a copper-tin alloy known for its strength and corrosion resistance.

Answer: Bronze

8. \_\_\_\_\_ is a copper-based alloy used in marine applications for its resistance to corrosion.

Answer: Gun Metal

9. \_\_\_\_\_ is a soft metal used in pipes and batteries.

Answer: Lead

10. \_\_\_\_\_ is a metal used as a coating to prevent corrosion and in alloys.

Answer: Tin

11. Bearing metals typically contain \_\_\_\_\_ for good wear resistance and low friction.

Answer: tin or lead

12. Zinc-based alloy called \_\_\_\_\_ is used for making coins and decorative items.

Answer: German silver

13. \_\_\_\_\_ is a zinc-based alloy used in soldering to join metal parts.

Answer: Solder

### **Non-Metals**

#### **Polymers**

14. \_\_\_\_\_ polymers can be melted and reshaped multiple times, e.g., PE, PVC, and Nylon.

Answer: Thermoplastic

15. \_\_\_\_\_ polymers are set permanently after curing and cannot be remelted, e.g., Bakelite and Epoxy.

Answer: Thermosetting

16. \_\_\_\_\_ polymers break down naturally in the environment and are eco-friendly.

Answer: Biodegradable

### **Ceramics**

17. Oxide ceramics commonly include \_\_\_\_\_ and \_\_\_\_\_.

Answer: alumina, zirconia

18. Carbide ceramics are extremely \_\_\_\_\_ and used for cutting tools.

Answer: hard

19. Ceramics are known for their high \_\_\_\_\_ resistance and brittleness.

Answer: heat

### **Composites**

20. GFRP stands for \_\_\_\_\_ fiber reinforced polymer.

Answer: glass

21. CFRP stands for \_\_\_\_\_ fiber reinforced polymer.

Answer: carbon

22. Composites combine properties of different materials to improve \_\_\_\_\_ and strength.

Answer: toughness

23. Composites are widely used in aerospace, automotive, and \_\_\_\_\_ industries.

Answer: sports equipment

### **Nickel Based Alloys**

24. \_\_\_\_\_ is a nickel-based alloy known for its resistance to oxidation and corrosion at high temperatures.

Answer: Inconel

25. \_\_\_\_\_ is a corrosion-resistant nickel-copper alloy used in marine environments.

Answer: Monel

Here are Fill in the Blanks questions with answers based on Carpentry Practice and Fitting Practice:

### Carpentry Practice

1. Carpentry is the process of working with \_\_\_\_\_ to create structures or components.

Answer: wood

2. The tool used for marking lines on wood is called a \_\_\_\_\_.

Answer: marking gauge

3. A \_\_\_\_\_ saw is used for cutting along the grain of the wood.

Answer: rip

4. The common joint used in carpentry to join two wooden members at 90° is called a \_\_\_\_\_ joint.

Answer: mortise and tenon

5. \_\_\_\_\_ is a finishing process in carpentry where a smooth surface is achieved using sandpaper.

Answer: Sanding

6. The tool used to smooth or shape wood surfaces is called a \_\_\_\_\_.

Answer: plane

7. The measuring tool commonly used in carpentry to check right angles is the \_\_\_\_\_ square.

Answer: try

8. \_\_\_\_\_ joints are used in box or frame construction due to their strength and ease of assembly.

Answer: Dovetail

9. The process of temporarily joining two wooden pieces using glue or nails is called \_\_\_\_\_ assembly.

Answer: temporary

10. \_\_\_\_\_ is the process of removing unwanted wood using chisels and mallet.

Answer: Chiseling

### **Fitting Practice**

1. Fitting is a metalworking process involving filing, sawing, drilling, and assembling of \_\_\_\_\_ components.

Answer: metal

2. The tool used to remove small amounts of material and make surfaces smooth is called a \_\_\_\_\_.

Answer: file

3. The tool used to hold a workpiece securely during fitting operations is the \_\_\_\_\_ vice.

Answer: bench

4. A \_\_\_\_\_ file has teeth on both faces and is commonly used for filing flat surfaces.

Answer: flat

5. The tool used to make holes in metal is a \_\_\_\_\_.

Answer: drill

6. A \_\_\_\_\_ is used to cut internal threads in a hole.

Answer: tap

7. A \_\_\_\_\_ is used to cut external threads on rods or pipes.

Answer: die

8. The cutting tool used to separate metal pieces is a \_\_\_\_\_ saw.

Answer: hacksaw

9. \_\_\_\_\_ is the operation of removing burrs or sharp edges after cutting or filing.

Answer: Deburring

10. The process of checking dimensions and flatness in fitting is called \_\_\_\_\_.

Answer: inspection

### **Kinematic Link or Element**

1. A body or a combination of bodies that transmit motion is called a \_\_\_\_\_.

Answer: kinematic link

2. A link having one degree of freedom is known as a lower pair or \_\_\_\_\_ link.

Answer: binary

3. A link that connects three other links is called a \_\_\_\_\_ link.

Answer: ternary

4. A link that connects four other links is called a \_\_\_\_\_ link.

Answer: quaternary

### **Kinematic Pair – Types**

5. When two links are in contact and the relative motion is completely or partially constrained, they form a \_\_\_\_\_.

Answer: kinematic pair

6. A pair with surface or area contact and relative motion is called a \_\_\_\_\_ pair (e.g., shaft rotating in a bearing).

Answer: lower

7. A pair with point or line contact is called a \_\_\_\_\_ pair (e.g., cam and follower).

Answer: higher

8. A kinematic pair that allows only rotational motion is called a revolute or \_\_\_\_\_ pair.

Answer: turning

9. A pair that allows only sliding motion is called a \_\_\_\_\_ pair.

Answer: sliding

### **Types of Constrained Motion**

10. When motion between elements can occur in more than one direction, it is called \_\_\_\_\_ motion.

Answer: completely constrained

11. If the motion depends on external forces, it is known as \_\_\_\_\_ constrained motion.

Answer: incompletely

12. A door hinge is an example of \_\_\_\_\_ constrained motion.

Answer: completely

## **Kinematic Chain, Mechanism, Structure**

13. A combination of kinematic pairs that provides a definite motion is called a \_\_\_\_\_.

Answer: kinematic chain

14. A structure becomes a mechanism when one of its links is fixed.

Answer: mechanism

15. A kinematic chain in which none of the links is fixed is called a \_\_\_\_\_.

Answer: structure

16. A machine is a mechanism designed to transmit or modify force and motion.

Answer: force

## **Inversions of Kinematic Chains**

17. Different mechanisms obtained by fixing different links in a kinematic chain are called its \_\_\_\_\_.

Answer: inversions

## **Four Bar Chain**

18. The simplest and most common kinematic chain is the \_\_\_\_\_ chain.

Answer: four-bar

19. A four-bar mechanism consists of four links and four \_\_\_\_\_.

Answer: turning pairs

## **Beam Engine**

20. The beam engine is an example of an inversion of the \_\_\_\_\_ crank chain.

Answer: four-bar

## **Single Slider Crank Chain**

1. A single slider crank chain consists of three turning pairs and one \_\_\_\_\_ pair.

Answer: sliding

2. The single slider crank mechanism is commonly used in \_\_\_\_\_ engines.

Answer: internal combustion

3. The inversion of a single slider crank chain where the crank is fixed is called a \_\_\_\_\_ mechanism.

Answer: reciprocating engine

### **Crank and Slotted Lever Mechanism**

4. The crank and slotted lever mechanism is an inversion of the \_\_\_\_\_ slider crank chain.

Answer: single

5. The crank and slotted lever mechanism is used in shaping machines to achieve a \_\_\_\_\_ return motion.

Answer: quick

### **Quick Return Motion Mechanism**

6. In a quick return mechanism, the time taken for the return stroke is \_\_\_\_\_ than the forward stroke.

Answer: less

7. A common application of quick return mechanism is in \_\_\_\_\_ machines.

Answer: shaper

8. Quick return mechanism increases the \_\_\_\_\_ of the machine by reducing idle time.

Answer: productivity

### **Double Slider Crank Chain**

9. A double slider crank chain consists of two turning pairs and two \_\_\_\_\_ pairs.

Answer: sliding

10. The inversion of the double slider crank chain used in converting rotary motion into oscillating motion is the \_\_\_\_\_ mechanism.

Answer: scotch yoke

### **Scotch Yoke Mechanism**

11. The Scotch yoke mechanism is used to convert rotary motion into \_\_\_\_\_ motion.

Answer: reciprocating

12. In the Scotch yoke mechanism, the slider moves in a \_\_\_\_\_ line.

Answer: straight

## **Pantograph**

13. A pantograph is a mechanical linkage based on \_\_\_\_\_ bar mechanism.

Answer: four

14. Pantograph is used to copy or scale up/down \_\_\_\_\_.

Answer: drawings

15. Pantographs are also used in electric trains to collect \_\_\_\_\_ from overhead lines.

Answer: current

## **Transmission System**

1. A transmission system is used to transmit \_\_\_\_\_ from the power source to the machine.

Answer: power

2. Transmission systems are broadly classified as mechanical, electrical, and \_\_\_\_\_ systems.

Answer: hydraulic

## **Belt Drives**

3. Belt drives transmit power between two shafts using a \_\_\_\_\_.

Answer: belt

4. The two main types of belt drives are \_\_\_\_\_ belt drive and \_\_\_\_\_ belt drive.

Answer: open, cross

5. In an open belt drive, both pulleys rotate in the \_\_\_\_\_ direction.

Answer: same

6. In a cross belt drive, the pulleys rotate in \_\_\_\_\_ directions.

Answer: opposite

7. The length of the belt in an open belt drive is longer/shorter than in a cross belt drive for the same pulley centers?

Answer: shorter

8. Velocity ratio in belt drives is the ratio of the speed of the driver to the speed of the \_\_\_\_\_.

Answer: driven

9. Slip in belt drives results in a slight reduction in \_\_\_\_\_ transmitted.

Answer: speed

10. Creep occurs due to the elastic nature of the belt and leads to unequal belt \_\_\_\_\_.

Answer: tension

11. Common materials used for belts are leather, rubber, canvas, and \_\_\_\_\_.

Answer: fabric

12. Flat belts are used for transmitting power over \_\_\_\_\_ distances.

Answer: long

13. V-belts are suitable for transmitting higher power over \_\_\_\_\_ distances.

Answer: short

### **Rope Drives**

14. Rope drives are used when a \_\_\_\_\_ amount of power is to be transmitted over long distances.

Answer: large

15. Common applications of rope drives include \_\_\_\_\_, elevators, and mine hoists.

Answer: cranes

16. Rope drives generally use multiple ropes to increase \_\_\_\_\_ capacity.

Answer: load/power

### **Chain Drives**

17. Chain drives consist of a continuous chain running over \_\_\_\_\_.

Answer: sprockets

18. Chain drives are used where positive (non-slip) transmission of motion is required, such as in \_\_\_\_\_.

Answer: bicycles or motorcycles

19. Chain drives are preferred over belts where \_\_\_\_\_ motion is required.

Answer: accurate

### **Velocity Ratio, Slip, Power**

20. Velocity Ratio (V.R.) = Diameter of Driven Pulley / Diameter of \_\_\_\_\_ Pulley.

Answer: Driver

21. Power transmitted by a belt =  $(T_1 - T_2) \times$  \_\_\_\_\_  $\times$  velocity.

Answer:  $\pi$  (pi) or effective tension

22. In belt drives,  $T_1$  represents the tension in the \_\_\_\_\_ side.

Answer: tight

23. In belt drives,  $T_2$  represents the tension in the \_\_\_\_\_ side.

Answer: slack

24. Number of ropes required to transmit power = Total Power / Power per \_\_\_\_\_.

Answer: rope

### Gear Drives

25. A gear drive is a positive drive system used to transmit motion between shafts using \_\_\_\_\_.

Answer: gears

26. Gears are classified as spur, helical, bevel, worm, and \_\_\_\_\_ gears.

Answer: rack and pinion

27. In spur gears, the teeth are cut parallel to the \_\_\_\_\_ of the gear.

Answer: axis

28. The distance between similar points on adjacent teeth is called the \_\_\_\_\_ of the gear.

Answer: pitch

29. The ratio of the speeds of the driver and driven gears is called the \_\_\_\_\_ ratio.

Answer: velocity

### Gear Trains

30. A gear train is a combination of two or more gears used to transmit motion between \_\_\_\_\_ shafts.

Answer: non-adjacent

31. A gear train with only one gear between the driver and the driven gear is called a \_\_\_\_\_ gear train.

Answer: simple

32. When two or more gears are mounted on the same shaft, it is called a \_\_\_\_\_ gear train.

Answer: compound

33. A reverted gear train is one where the input and output shafts are \_\_\_\_\_.

Answer: co-axial

34. An epicyclic gear train has one or more gears rotating about a \_\_\_\_\_ gear.

Answer: central (sun)

### **Applications & Workshop Use**

35. Belt drives are used in machines like lathe, flour mill, and \_\_\_\_\_.

Answer: washing machines

36. Gear drives are used in machines like lathe, drilling machines, and \_\_\_\_\_.

Answer: gearboxes

37. Velocity ratio of gear drives in machines helps determine their operating \_\_\_\_\_.

Answer: speed

### **Classification of Metal Joining Processes**

1. Metal joining processes are classified as \_\_\_\_\_ and \_\_\_\_\_ joining methods.

Answer: temporary, permanent

2. Temporary joining methods include the use of \_\_\_\_\_, bolts, and screws.

Answer: rivets

3. Permanent joining methods include processes like \_\_\_\_\_, brazing, and soldering.

Answer: welding

### **Fasteners**

4. A \_\_\_\_\_ is a mechanical fastener used to permanently join two metal plates by deforming its tail.

Answer: rivet

5. A \_\_\_\_\_ is a threaded fastener that requires a nut to secure two or more components.

Answer: bolt

6. The \_\_\_\_\_ is a type of nut commonly used with bolts to provide secure clamping.

Answer: hex nut

7. Fasteners can be made from steel, brass, aluminum, and even \_\_\_\_\_ materials for specific applications.

Answer: plastic

### Welding

8. Welding is a permanent joining process that involves the application of \_\_\_\_\_ to melt and join metals.

Answer: heat

9. Welding processes are mainly classified into \_\_\_\_\_ welding and \_\_\_\_\_ welding.

Answer: fusion, pressure

10. Arc welding is a \_\_\_\_\_ welding process that uses an electric arc to melt metals.

Answer: fusion

11. In arc welding, the arc is struck between the workpiece and the \_\_\_\_\_.

Answer: electrode

12. Arc welding electrodes can be either consumable or \_\_\_\_\_.

Answer: non-consumable

13. \_\_\_\_\_ arc welding uses a tungsten electrode that does not melt during welding.

Answer: TIG (Tungsten Inert Gas)

14. TIG welding is also called \_\_\_\_\_.

Answer: GTAW (Gas Tungsten Arc Welding)

15. \_\_\_\_\_ arc welding uses a wire electrode that melts and forms the weld pool.

Answer: MIG (Metal Inert Gas)

16. MIG welding is also referred to as \_\_\_\_\_.

Answer: GMAW (Gas Metal Arc Welding)

17. A major advantage of MIG welding is high \_\_\_\_\_ and cleaner welds.

Answer: deposition rate

18. Common welding defects include porosity, \_\_\_\_\_, undercut, slag inclusion, and incomplete penetration.

Answer: cracks

19. Welding equipment includes a power source, holder, grounding clamp, and \_\_\_\_\_.

Answer: electrode

### **Soldering and Brazing**

20. Soldering is a metal joining process using a filler metal that melts below \_\_\_\_\_ °C.

Answer: 450

21. Brazing uses a filler metal with a melting point above 450°C but below the melting point of the \_\_\_\_\_.

Answer: base metal

22. Soldering and brazing do not melt the \_\_\_\_\_ materials.

Answer: base

23. Common soldering fillers are made of \_\_\_\_\_ and lead.

Answer: tin

24. Heating methods for soldering include soldering irons, torches, and \_\_\_\_\_ soldering.

Answer: electric

25. Brazing is widely used in joining copper tubes, \_\_\_\_\_ parts, and dissimilar metals.

Answer: HVAC (or refrigeration)

### **Gas Welding**

26. Gas welding is a fusion welding process that uses a gas flame from the combustion of \_\_\_\_\_ and oxygen.

Answer: acetylene

27. The most commonly used gas welding process is \_\_\_\_\_ welding.

Answer: oxy-acetylene

28. Oxy-acetylene flame temperature can reach up to about \_\_\_\_\_ °C.

Answer: 3200

29. In CO<sub>2</sub> welding, \_\_\_\_\_ gas is used as a shielding gas instead of inert gas.

Answer: carbon dioxide

30. The three types of gas welding flames are neutral, \_\_\_\_\_, and \_\_\_\_\_.

Answer: oxidizing, carburizing (or reducing)

31. A neutral flame has a balanced mix of oxygen and acetylene and is used for welding most \_\_\_\_\_ metals.

Answer: ferrous

32. An oxidizing flame has more \_\_\_\_\_ and is used for welding brass or bronze.

Answer: oxygen

33. A carburizing flame has more \_\_\_\_\_ and is used for welding lead or high-carbon steels.

Answer: acetylene