Talent & Olympiad

General Science - 8th

Materials: Metals and Non-metals

- How many electrons are generally present in metals in their valence shell?
 (a) 1, 2 or 3
 (b) 7, 8 or 9
 (c) 10, 11 or 12
 (d) 20, 30 or 40
- How many electrons are present in non- metals in their outermost shell?
 (a) 1, 2 or 3
 (b) 8, 9 or 10
 (c) 10, 20 or 30
 (d) 4, 5, 6 or 7
- To which category do antimony and arsenic belong?
 (a) Metals
 (b) Metalloids
 (c) Non-metals
 (d) Minerals
- **4.** Identify the metal that replaces magnesium from its salt.
 - (a) Ca (b) *Al* (c) Zn (d) Fe
- Aluminium foil is used for wrapping food. On which property is it used?
 (a) Density
 (b) Malleability
 (c) Ductility
 (d) Strength
- 6. Identify the non-metal which exhibits yellow colour.
 (a) Silicon
 (b) Phosphorus
 (c) ulphur
 (d) Carbon
- 7. Which of the following are the properties of non-metals?

(i) They have low densities(ii) They have low melting points(iii) They are poor conductors of electricity

(a) Only (i) and (ii)	(b) Only (ii) and (iii)
(c) Only (i) and (iii)	(d) (i), (ii) and (iii)

- **8.** Which of the following non-metals exists in liquid state at room temperature?
 - (a) Chlorine(b) Nitrogen(c) Bromine(d) Hydrogen
- **9.** Identify the metal that does NOT react with *HCl*
 - (a) Ag (b) Mg
 - (c) M (d) Fe
- **10.** Which metal reacts vigorously with *HCl* to produce salt and hydrogen?
 - (a) Na
 - (b) Zn
 - (c) Sn
 - (d) Pb
- **11.** When non-metals combine with oxygen, what do they produce?
 - (a) Acidic oxides (b) Basic oxides
 - (c) Amphoteric oxides (d) Salts

12.	Identify the oxide of a non-metal which is neutral. (a) SO ₂ (b) NO ₂		
	(c) $P_2 O_3$	(d) <i>CO</i>	
13.	Phosphorus combines (a) One (c) Three	with oxygen to form oxides. How many types of oxides are formed by it? (b) Two (d) Four	
14.	Which of the following (a) Sulphur dioxide (c) Sulphur trioxide	g dissolves in water to form sulphuric acid? (b) Sulphur (d) Copper sulphate	
15.	Which of the following (a) Sodium chloride (c) Potassium iodide	g compounds is used to make photographic films? (b) Silver bromide (d) Copper chloride	
16.	Which material is used (a) Sulphur (c) Graphite	l for making crucibles? (b) Silicon (d) Phosphorus	
17.	Which non-metal is us (a) Sulphur (c) Carbon	ed in the treatment of rubber during the process of vulcani - sation? (b) Phosphorus (d) Chlorine	
18.	Which of the following (a) Mercury (c) Lithium	g is called a noble metal? (b) Gold (d) Caesium	
19.	Identify the metal whic (a) Na (c) AZ	ch is soft. (b) Pb (d) Cu	
20.	Why is tungsten used as a filament in electric bulbs? (a) It is sonorous. (b) It is metallic. (c) It has a high melting point. (d) It has high density.		
21.	Which of the following (a) Cd (c) Pb	g is NOT a heavy metal? (b) Hg (d) K	
22.	Which of the following substances will prevent corrosion of metals? (a) Nitrogen (b) Hydrogen (c) Oxygen (d) Carbon		
23.	Which of the following (a) Zinc (b) Copper	g metals in their molten state cause galvanisation of an iron article?	

- (c) Carbon (d) Gold

- **24.** Arrange the given metals in the descending order of their reactivity.
 - (a) Aluminium, copper, potassium
 - (b) Sodium, iron, copper
 - (c) Silver, zinc, calcium
 - (d) Magnesium, copper, sodium
- **25.** When a little aluminium powder is added to dilute sulphuric acid, the produces(s) formed in the reaction is (a) sulphur dioxide.
 - (b) aluminium sulphate.
 - (c) hydrogen.
 - (d) Both (B) and (C)
- **26.** Which of the following statements is true of the given chemical reactions?

 $ZnO + C \rightarrow Zn + CO$ $2Fe_{3}O_{3} + 3C \rightarrow 6Fe + 3CO_{2}$

- (a) Carbon is reduced.
- (b) Carbon is oxidised.
- (c) Metal oxide is reduced to metal.
- (d) Metal oxide is oxidised.
- **27.** Why is gold mixed with copper?
 - (a) To make gold soft
 - (b) To make gold hard
 - (c) To make gold more yellowish
 - (d) To give gold a lustre
- **28.** Which of the following statements is correct?
 - (a) All metals are ductile.
 - (b) All non metals are ductile.
 - (c) Generally, metals are ductile.
 - (d) Some non metals are ductile.
- **29.** Study the reaction given below.

$$X + YSO_4 \rightarrow Y + XSO_4$$

What are X and T?	
(a) Al,Mg	(b) <i>Zn,Cu</i>
(c) <i>Ag</i> , <i>K</i>	(d) <i>H</i> , <i>Al</i>

- **30.** Which of the following is NOT a general property of metals?
 - (a) Ductility(b) Malleability
 - (c) Bad conductor of electricity
 - (d) Sonorous nature
- **31.** Which of the following is a chemical displacement reaction? (a) $2Al + Fe_2O_3 \xrightarrow{heat} Al_2O_3 + 2Fe + Heat$
 - (b) $2Na + Cl_2 \rightarrow 2NaCl$
 - (c) $P_2O_5 + 3H_2O \longrightarrow 2H_3PO_4$
 - (d) $2PbS + 3O_2 \xrightarrow{heat} PbO + 3SO_2$

- 32. Which of the following statements is NOT true of sodium and potassium?
 - (a) Both are metals.
 - (b) Both are hard.
 - (c) Both are solids at room temperature.
 - (d) Both react with oxygen to form oxides.
- 33. Identify the true statement from the following.
 - (a) Metals have fixed melting points whereas non-metals do not.
 - (b) All metals are malleable.
 - (c) The hardest substance known is a non-metal.
 - (d) Tungsten is a bad conductor of heat and electricity.
- 34. Which of the following metals does NOT produce hydrogen gas when added to acid?
 - (a) Potassium (b) Gold (c) Zinc
 - (d) Magnesium
- 35. Metal 'X' reacts very slowly with water but reacts vigorously with steam. Identify metal X
 - (a) Magnesium (b) Silver
 - (d) Potassium (c) Copper

Answers With Solutions

(a) Metals generally have 1, 2 or 3 electrons in their outermost orbit or valence shell.
 e.g., (i) Sodium - (Na) - 2, 8, 1
 (ii) Magnesium (Mg) - 2, 8, 2
 (iii) Aluminium - (A/) - 2, 8, 3.
 The number of valence electrons in sodium, magnesium and aluminium metals are 1, 2 and 3 respectively.

- (d) Non-metals generally contain 4,5,6,7 or 8 electrons in their outermost orbit or shell.
 (i) Carbon 2, 4
 (ii) Nitrogen 2.5
 (iii) Oxygen 2, 6
 (iv) Fluorine 2, 7
 The number of valence electrons in carbon, nitrogen, oxygen and fluorine are 4, 5, 6, 7 respectively.
- (b) Elements which show the properties of both the metals and non-metals are called metalloids.e.g., antimony and arsenic
- 4. (a) Calcium is more reactive than magnesium. Hence, Mg can be replaced from its salt by calcium.
- **5.** (b) Aluminium foil is prepared by beating it into sheets, i.e., property of malleability. Hence, aluminium foil is used for the given application.
- **6.** (c) Sulphur is yellow in colour.
- 7. (d) Non-metals have low densities, low melting points and are poor conductors of electricity.
- **8.** (c) Bromine is the only non-metal which exists in liquid state at room temperature.
- **9.** (a) Copper, Mercury, Silver and Gold are less reactive than hydrogen. Hence, they cannot displace hydrogen from the compounds like dilute acids, water, etc.
- **10.** (a) Among the given metals, sodium is a highly reactive metal, so it reacts vigorously to form salt and hydrogen. $2Na + 2HCl \rightarrow 2NaCl + H_2 \uparrow$
- **11.** (a) Non-metals form two types of oxides, they can be acidic or neutral oxides.
- **12.** (d) Some oxides of non-metals are neutral. e.g., CO.

- 13. (b) Phosphorus combines with oxygen and forms two oxides phosphorus trioxide and phosphorus pentoxide.
- 14. (c) Acidic oxides dissolve in water and form acids. Sulphur trioxide (SO_3) reacts with water and produces sulphuric acid (H_2SO_4) $SO_3 + H_2O \rightarrow H_2SO_4$
- **15.** (b) Silver bromide, a compound of silver is used to make photographic films. When light falls on the film, it sets up a reaction which changes silver bromide to silver
- **16.** (c) Crucibles are used in the laboratory to perform high temperature reactions. They should resist high heating (they should not break). For this purpose, a mixture of graphite (an allotrope of carbon) and clay is used to make crucibles.
- **17.** (a) Sulphur is used in the process of vulcanisation. Rubber when treated with sulphur becomes harder than ordinary rubber, so it is used to make tyres.
- **18.** (b) Gold, silver and platinum do not combine readily with other elements to form compounds, so they are called noble metals.
- **19.** (a) Sodium has less density, hence it is soft and can be cut even with a knife.
- **20.** (c) Metal tungsten is used as a filament in electric bulbs because it has a high melting point.
- **21.** (d) 'K' is not a heavy metal. It is a light metal.
- **22.** (a) The supply of nitrogen to a corrosive metal will prevent its corrosion.
- **23.** (a) When an iron article is dipped in molten zinc, it is galvanised.
- 24. (b) The descending order of reactivity of metals is as follows: Na > Ca > Mg > Al > Zn > Fe > Sn > Pb[H] Cu > Hg > Ag > Au > PtBy using this, we can say that in the given options, only Na > Fe > Cu is the correct order.
- **25.** (d) In the reaction of aluminium powder with dil. H_2SO_4 , the products formed are aluminium sulphate and hydrogen gas.

 $2Al + (dil.) 3H_2 SO_4 \rightarrow Al_2 (SO_4)_3 + 3H_2$

- **26.** (c) Metal oxides are reduced to metals.
- **27.** (b) Gold is mixed with copper to make it hard.
- **28.** (c) Generally, metals are ductile.
- **29.** (b) $Zn + CuSO_4 \rightarrow Cu + ZnSO_4$. Hence, X is zinc and Y is copper.
- **30.** (c) All metals are good conductors of electricity, whereas insulators are bad conductors of electricity.
- **31.** (a) When aluminium powder is heated with iron oxide, an exothermic reaction takes place with the formation of aluminium oxide and iron metal.
- **32.** (b) Sodium and potassium are metals. They are soft and can be cut with a knife.
- **33.** (c) The hardest substance known is diamond. Diamond is an alfotrope of carbon i.e., a non-metal.
- **34.** (b) Gold being less reactive than hydrogen is placed below hydrogen in reactivity series. It cannot produce hydrogen gas on reaction with acids,
- **35.** (a) The reactivity of the metals given in the options is as follows: K > Mg > Cu > Ag. Magnesium reacts vigorously with steam but slowly with water. Hence, X is magnesium.