

Science

Answers

2019-2020

Time Allowed: 3 hours

Maximum Marks: 80

Section A

1. No charged particles/ions

2. All are metalloids/Shows the properties of metals and non-metals

OR

Properties of elements are a periodic function of their atomic number

3. (a) Cells which convert solar energy to electrical energy/electricity

(b) Voltage -0.5 to $1V$

Electricity $-0.7W$

(c) India receives great amount of solar energy throughout the year.

(d) Advantages: No moving parts/require little maintenance /work quite satisfactorily without any focusing device/can be set up in remote and inaccessible areas. (Any Two)

4. (a) Thyroid stimulating hormone.

(b) It stimulates/regulates thyroid gland to produce thyroid hormone or thyroxine.

(c) Because high and low TSH level may increase the chances of miscarriage.

(d) Proper medication is required.

5. **Correct Answer: C**

6. Correct Answer: B

7. Correct Answer: A

8. Correct Answer: D

OR

Correct Answer: D

9. Correct Answer: B

10. Correct Answer: B

11. Correct Answer: C

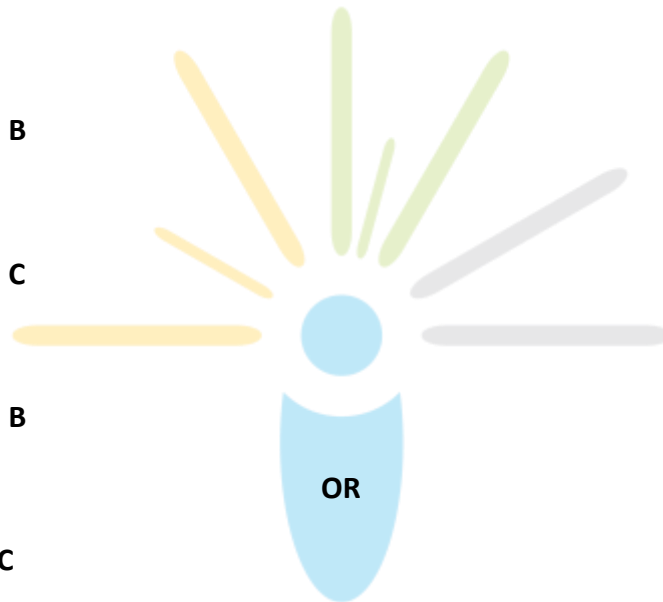
12. Correct Answer: B

OR

Correct Answer: C

13. Correct Answer: D

14. Correct Answer: B



Section B

15. (a) 'M' is $\frac{\text{magnesium}}{Mg}$

'N' is $\frac{\text{Magnesium oxide}}{MgO}$

(b) $2Mg + O_2 \rightarrow 2MgO$

(c) 'M' undergoes oxidation because oxygen is added to it/Loss of 2 electrons

16. (a) Anode-Oxygen

Cathode-Hydrogen

(b) Because one molecule of water contains two atoms of hydrogen and one atom of oxygen/ $2H_2O \rightarrow 2H_2 + O_2$

(c) Electrolysis of water will not take place

OR

(a) Chemical Name – Sodium Carbonate decahydrate

Common Name – Washing Soda

Chemical Formula - $Na_2CO_3 \cdot 10H_2O$

(b) $NaCl + H_2O + CO_2 + NH_3 \rightarrow NH_4Cl + NaHCO_3$

$2NaHCO_3 \xrightarrow{\text{Heat}} Na_2CO_3 + H_2O + CO_2$

$Na_2CO_3 + 10H_2O \rightarrow Na_2CO_3 \cdot 10H_2O$

(c) It helps in removing permanent hardness./It forms insoluble *Ca* or *Mg* salts in the form of scum

17. (a) *Li, K*

(b) *Mg*

(c) *C*

(d) K

(e) S

(f) AI

18.

- Trophic level – Each step or level of a food chain forms a trophic level
- Grass → Insect → Frog → Snake/Hawk/Correct Diagram (any other)
- Because it moves progressively through the various trophic levels and is no longer available to the previous level from producers to consumers.

OR

(i) Aquatic

(ii) Abiotic

(iii) Air/Water/Soil/Temperature /Non-living

(iv) Living organism/plants and animals

(v) Definition – All the interacting organisms in an area together with the non living constituents of the environment form an ecosystem /interaction between biotic and abiotic components.

19. (a) Exchange of gases.

(b) Because amount of oxygen dissolved in water is fairly low as compared to the air

(c) (i) Pyruvate

(ii) Carbon dioxide

20. (a) Because Tallness is the dominant trait

(b) The recessive character is expressed in the F_2 generation when two copies of the recessive trait are present together/ (tt) .

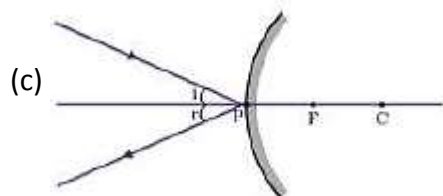
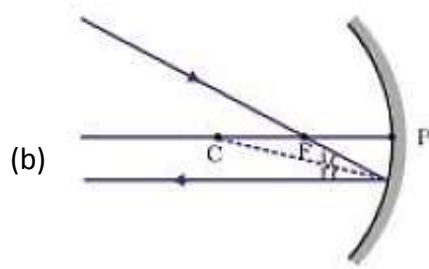
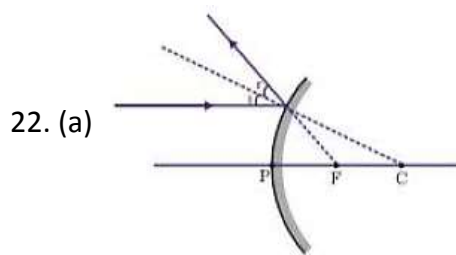
(c) In the F_2 progeny, the dominant character is also expressed along with the recessive character in ratio of 3:1 respectively.

21. (a)

- Secretions from seminal vesicle.
- $22+X$ and $22+Y$

(b) (i) Female– XX

(ii) Male– XY



(Note: Deduct $\frac{1}{2}$ marks overall if no arrows are shown)

23. (a) (i) Momentary deflection in the needle of the galvanometer to the left/right.

(ii) Momentary deflection in the needle of the galvanometer but in the opposite direction.

(iii) No deflection

(b) Electromagnetic induction.

(c) Motion of a magnet with respect to coil induces an electric current in the coil which lasts so long as the motion is taking place/change in magnetic field around a coil produces an induced current in it.

24. (a) Myopia/Short sightedness

(b) Concave/Diverging lens.

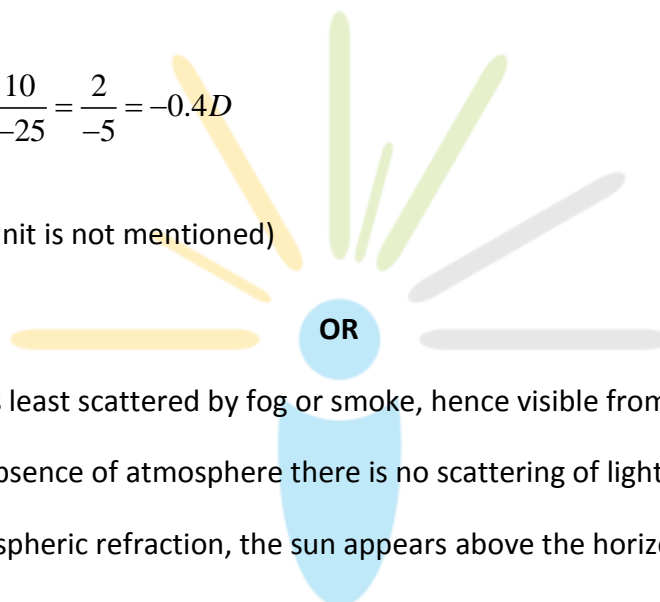
(c)

- Excessive curvature of eye lens
- elongation of eye ball

$$(d) P(D) = \frac{1}{f(m)}$$

$$P(D) = \frac{1}{-2.5(m)} = \frac{10}{-25} = \frac{2}{-5} = -0.4D$$

(Deduct $\frac{1}{2}$ mark if unit is not mentioned)



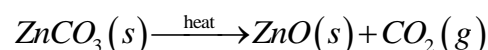
(a) The Red colour is least scattered by fog or smoke, hence visible from a long distance.

(b) Because in the absence of atmosphere there is no scattering of light.

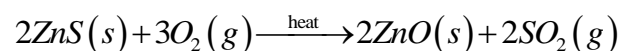
(c) Because of atmospheric refraction, the sun appears above the horizon even after actual sunset.

Section C

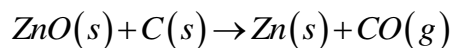
25. For ore $X \rightarrow$ Calcination/Heating in limited supply of air/absence of air.



For Ore $Y \rightarrow$ Roasting/Heating in excess of air.



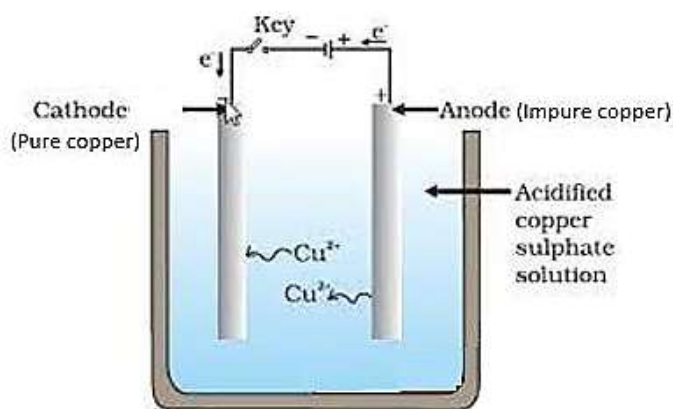
The metal oxide is reduced by using suitable reducing agent such as carbon.



(Note – Any other example can be taken)

OR

(a) Figure



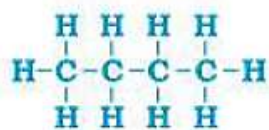
- Impure copper is made the anode and thin strip of pure copper is made the cathode.
- A solution of acidified copper sulphate is taken as electrolyte (Note: Labelled diagram is to be awarded full marks)

On passing the current the pure metal from the anode dissolves into the electrolyte and equivalent amount of pure metal is deposited on the cathode.

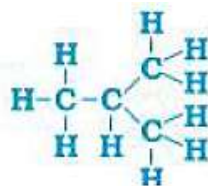
(b)

- By filling the gaps with molten iron formed in the reaction of Fe_2O_3 with aluminum powder.
- Thermit process/reaction
- $\text{Fe}_2\text{O}_3(s) + 2\text{Al}(s) \rightarrow 2\text{Fe}(l) + \text{Al}_2\text{O}_3(s) + \text{Heat}$

26. (a) When two or more organic compounds have same molecular formula but different structural formula, then the compounds are called isomers and this phenomenon is called isomerism



Butane



Iso-Butane

(b) Because 'X' is an unsaturated carbon compound

(c) Oxidising agent.

27. (a) Because ventricles have to pump blood to various distant organs of the body

(b) Because their energy requirement is low

(c) In aquatic vertebrates the blood goes only once through the heart during one cycle while in terrestrial vertebrates it goes through the heart two times during each cycle.

(d) Because transpirational pull is greater during day time.

(e) To prevent the backflow of the blood/blood flows only in one direction

28. (a)

- A → Ureter
- B → Seminal Vesicle
- C → Urethra
- D → Vas deferens

(b) Testosterone:

Role

- Regulates the formation of sperms
- Changes in appearance of boys at the time of puberty.

(c) Function of 'B'

- Providing nutrition and transportation to sperms.

Function of 'C'

- Serves as a common passage to both sperms and urine.

OR

(a)

- Regeneration—the lost body part can be regenerated.
- Budding—a complete small individual develops on the parent body during favourable conditions.
- Spore Formation—Spores are covered with thick wall that helps to overcome unfavourable conditions.

(b) Buds produced in the notches along the leaf margins develop into new plants.

(c) Advantages:

- Propagation of flowerless plants.
 - Genetically similar to the parent plant.
 - Plants raised by vegetative propagation bear flowers and fruits earlier than those produced from seeds.
- (Any two)

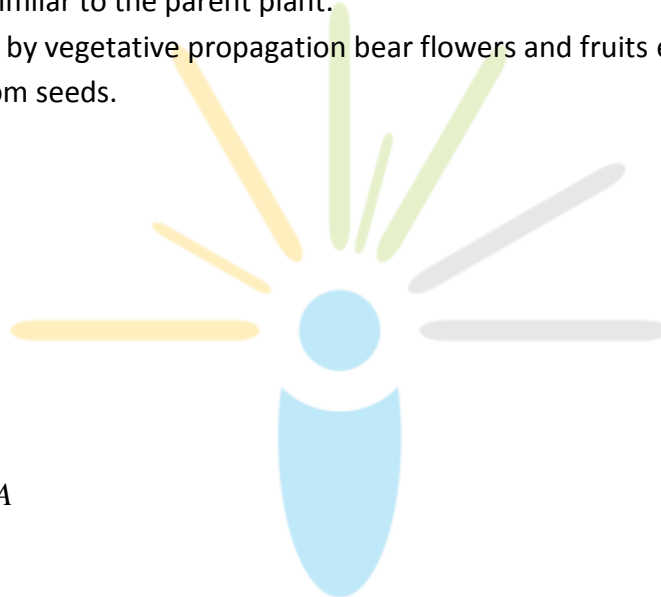
29. (a) $I_1 = \frac{P_1}{V}$

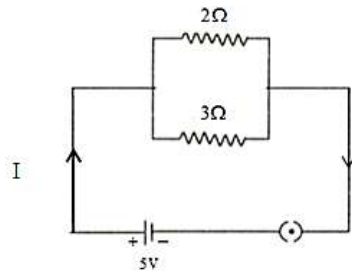
$$I_1 = \frac{100W}{220V} = \frac{10}{22} A$$

$$I_2 = \frac{P_2}{V} = \frac{10}{220} = \frac{1}{22} A$$

$$I = I_1 + I_2$$

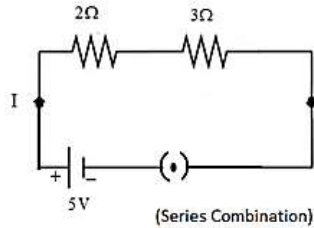
$$= \left(\frac{10}{22} + \frac{1}{22} \right) A = \frac{11}{22} A = 0.5A$$





(Parallel Combination)

(b) (i)



(Series Combination)

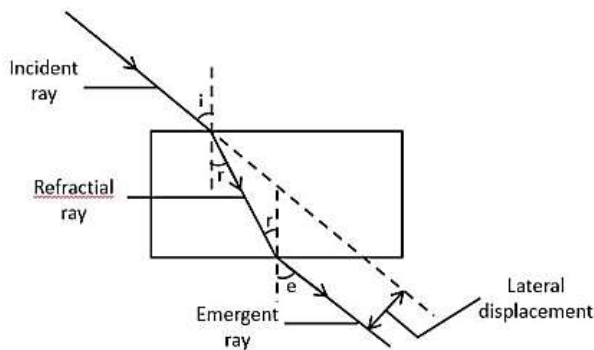
(ii) Net $R = R_1 + R_2 = 2 + 3 = 5\Omega$

$$I = \frac{V}{R_{net}} = \frac{5}{5} = 1A$$

\therefore Voltage across 3Ω resistor:

$$\therefore V = 1 \times 3 = 3V$$

30. (a)



(Note –Deduct $\frac{1}{2}$ mark if arrows are not shown)

$$(b) n_{ga} = \frac{\text{Speed of light in air}}{\text{Speed of light in glass}} = \frac{3 \times 10^8}{2 \times 10^8} = \frac{3}{2} = 1.5$$

$$(c) f(m) = \frac{1}{P(D)}$$

$$f = \frac{1}{p} = \frac{1}{-2.5D} = \frac{-10}{25D} = -0.4 \text{ m}$$

(Note –Deduct $\frac{1}{2}$ marks if unit is not mentioned)

OR

(a) $f(m) = \frac{1}{P(D)}$

$$f = \frac{1}{-2.5D} = \frac{-10}{25D} = -0.4 \text{ m} = -40 \text{ cm}$$

$$f = -40 \text{ cm} \quad v = -10 \text{ cm} \quad u = ?$$

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

$$\frac{1}{-10 \text{ cm}} - \frac{1}{u} = \frac{1}{-40 \text{ cm}}$$

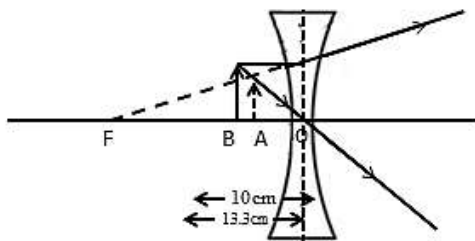
$$-\frac{1}{u} = \frac{1}{-40} + \frac{1}{10}$$

$$= \frac{-1+4}{40} = \frac{3}{40}$$

$$\therefore u = -\frac{40}{3} = -13.3 \text{ cm}$$



(b) Since the power is –ve, the lens used is concave/diverging



$$OA = v = -10 \text{ cm} ; OB = u = -13.3 \text{ cm} ; OF = f = -40 \text{ cm}$$