SET – 1

Subject Code: 086

MARKING SCHEME

COMMON PRE-BOARD EXAMINATION 2017-2018

SCIENCE - CLASS X

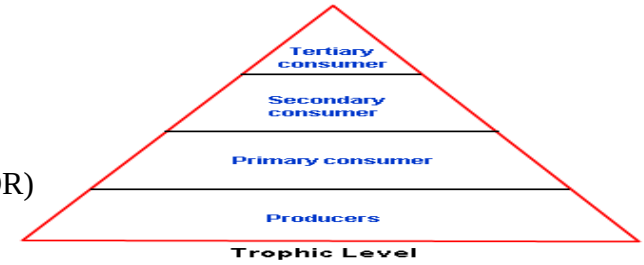
General Instructions:

a. *The marking scheme provides guidelines to reduce subjectivity and maintain uniformity. The answer given in the marking scheme is best suggested answers.*
b. *Marking be done as per the instructions provided in the marking scheme. (It should not be done according to once own interpretation or any other consideration.*
c. *Alternative methods be accepted. Proportional marks be awarded.*
d. *If a question attempted twice and the candidate has not crossed any answer, only first attempt be evaluated and 'EXTRA' be return with the second attempt.*
e. *In case where no answers are given or answers are found wrong in this marking scheme, correct answers may be found and used for evaluation purpose.*

1. a) C_3H_6 (½ + ½)

   b) C_5H_{12}

2. Producers (1)
   Primary carnivores
   Secondary carnivores (OR)
   Tertiary carnivores

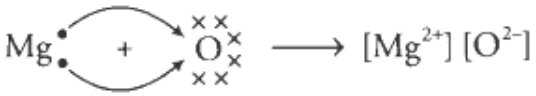


3. Absolute refractive index of the medium is = $\frac{\text{Velocity of light in vacuum}}{\text{Velocity of light in medium}}$ (1)

$v = \frac{c}{n} = \frac{3X10^8}{\frac{4}{3}} = 2.25X10^8 m/s$ (1)

4. $Mg_{[2,8,2]} \longrightarrow Mg^{2+}_{[2,8]} + 2e^-$ (½)

$O_{[2,6]} + 2e^- \longrightarrow O^{2-}_{[2,8]}$ (½)



(1)

$Mg^{2+} + O^{2-} \longrightarrow MgO$

5. a) Oxidation reaction (½ x 4 =2)

b) Double displacement and Precipitation reaction

c) Combination reaction

d) Displacement reaction

6. a) Refer NCERT book Figure 6.1 (2)

(b) Desert plants open up their stomata during night and take in CO_2. Stomata remain close during the day time to prevent the loss of water by transpiration. They store the CO_2 in their cells until the sun comes out and they can carry on with photosynthesis during the day time. (1)

7. (a) A- Receptor (½)
B - Sensory neuron (½)
C - Motor neuron (½)
D - Effector (½)

(b) B - Carries impulse from receptor to spinal cord (½)
D - Responds to stimulus (½)

8. a) The locals benefitted from forest products. (1 x 3= 3)

b) The wild life and nature were conserved.

c) The quality of air and soil was preserved.

9. Sunlight reaches the Earth's atmosphere and is scattered in all directions by the gases and the particles in the air. Blue light is scattered more than the other colours because it has the shorter wavelength. This is why the sky appears blue to an observer from the surface of the earth. (2)

For an astronaut staying in the international space station orbiting the Earth, the colour of the sky will be black because the light reaching it does not scatter. (1)

10. P_1= 60W P_2= 800W

E_1= 60X6 E_2=800X6

=360Wh or =0.36kWh =4800Wh or =4.8kWh (1)

Total energy consumed $E = E_1+E_2$

=0.36 +4.8

=5.16kWh (1)

Energy consumed in 30 days = 5.16 x 30

= 154.8 kWh (1)

11. a) Criteria for selecting a good fuel:

i) Would do a large amount of work per unit volume or mass

ii) be easily accessible

iii) be easy to store and transport (any two) (1)

b) Burning of fuels releases gases like CO_2, SO_2, NO_2. These causes air pollution. With rain, these pollutants fall as acid rain and causes soil pollution. (2)

12. Calcium sulphate hemihydrates (½)

It is prepared by heating gypsum at 373 K. (½)

$$CaSO_4 \cdot 2H_2O \xrightarrow{373K} CaSO_4 \cdot ½\ H_2O + 3/2H_2O$$ (1)

Uses : 1. Used to prepare black board chalks. (½ x 2 = 1)

2. Used by doctors for plastering fractured bones.

OR

a) H^+/ H_3O^+ and OH^- respectively. $(_{1/2+1/2})$

b) Hydrochloric acid will be a stronger acid, because it produces more H^+ ions. $(_{1/2 + 1/2})$

c) Concentration of H^+ decreases with increase in dilution. (1)

13. a) E (½)

b) D (½)

c) B (½)

d) D is bigger in size because atomic radius decreases from left to right along a period due to increase in nuclear charge. (1)

e) Noble gases. (½)

14. Fossils are dead remains of animals and plants from remote past. Fossils are formed when dead organisms are not completely decomposed. The organisms may get trapped in resins of tree, lava of volcanoes or hot mud, which when hardens retain the animal parts thus forming fossils. (2)

(a) Relative method: By estimating the age of the layer of earth's crust where the fossil is found. Fossils near the surface are recent and those in the deeper layers are more ancient. (½)

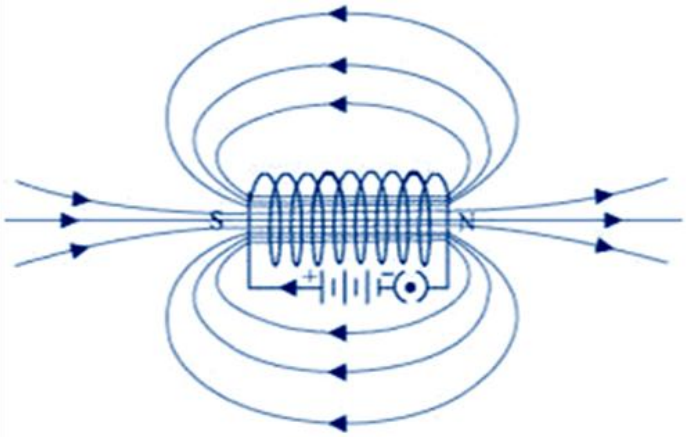
(b) Radio - carbon dating method: By detecting the ratios of different isotopes of carbon in the fossils. (½)

OR

Structures which have a common basic structure but perform different functions are (1)

called homologous structures. e.g... fore limbs of reptiles, amphibians and mammals.
For example: The forelimbs of frog and dog are homologous structure, as they are (1)
comprised of similar bones which are humerus, radio-ulna, carpal and metacarpals.
The forelimbs of frog are adapted for jumping movement, while the forelimbs of dog
are adapted for walking and running.
Yes, they have common ancestor but variously modified to carry out different activities. (1)
It is necessary that homologous structures always have a common ancestor.

15. A solenoid is a long coil of circular loops of insulated copper wire. (1)



(2)

OR

a) As the magnet is moved closer to coil AB, the flux linked with the coil changes. This set up induced current in the coil as shown by deflection in the galvanometer (1)

b) i) The direction of induced current in the coil AB is reversed and the galvanometer shows a deflection to the left. (1+1=2)

ii) The galvanometer will show deflection to the right side and the left side continuously showing the current is induced continuously but changes its direction.

16. a) Sodium (1 x 5=5)

b) Lead

c) Copper

d) Carbon, Aluminium, Magnesium, Calcium (any one)

e) Hydrogen, hydrogen gas burns with a pop sound when a lighted splint is shown above the mouth of the test tube.

17. a) X – Ethanol (C_2H_5OH)

Y – Ethanoic acid (CH_3COOH)

Z – Ethyl Ethanoate (Ester) ($C_2H_5COOCH_{3)}$ (2)

$CH_3COOH + NaHCO_3 \longrightarrow CH_3COONa + CO_2 + H_2O$ (1)

$C_2H_5OH + CH_3COOH \xrightarrow{\text{con. } H_2SO_4} C_2H_5COOCH_3 + H_2O$ (1)

b) 1. It is used as a solvent.

2. It is used in tonics and cough syrups.

3. It is used in wine, beer and whisky. (any two) (1)

OR

a) Homologous series is a family of organic compounds having the same functional group and can be represented by the same general formula. (1)

(i) Each successive members differ by $-CH_2$ group or a mass of 14 atomic mass units. (1/2)

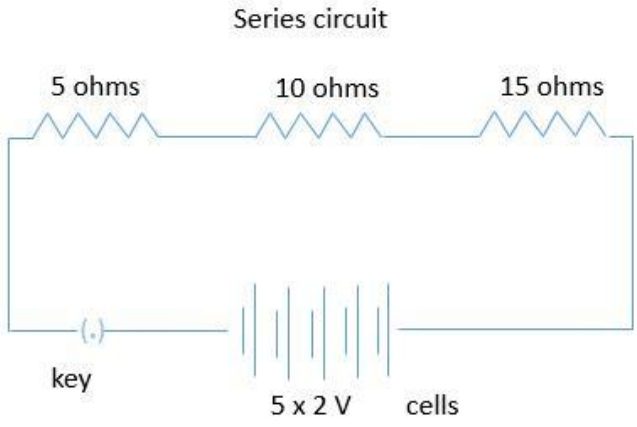
(ii) Similarity of chemical properties due to same functional group. (1/2)

b) We observe that the purple colour of alkaline potassium permanganate disappears and ethanol has been changed to carboxylic acid. (1)

$CH_3CH_2OH \xrightarrow{KMnO4 + \text{heat}} CH_3COOH$ (1)

c) Ethanoic acid reacts with sodium bi-carbonate to produce CO_2 gas with rapid effervescence while ethanol shows no reaction. (1/2 + 1/2)

18. a)



(2)

Applied potential difference

V=5 x 2 = 10V

Total resistance

R= 5+10+15 = 30 Ohm (1)

Current, I = $\frac{V}{R}$ = $\frac{10}{30}$ = 0.33A (1)

b) R = $\frac{V}{I}$ = $\frac{2}{0.1}$ = 20 Ohm (1)

19. (a) Refer NCERT Book pg.no110 (figure- 6.13) (1)

(i) Kidney (½ x 4 = 2)
(ii) Urinary bladder
(iii) Ureter
(iv) Urethra

(b) (i) Filtration : Nitrogenous waste such as urea or uric acid are removed from blood.
(ii) Reabsorption :Glucose, amino acids , salts and major amount of water are selectively reabsorbed. (1 x 2 = 2)

OR

The major part of the process of digestion of food takes place in the small intestine. The digested food is taken up by the walls of the intestine. The inner lining of the small intestine contains numerous finger like projections called villi. The villi increased the surface area for absorption . each villus is covered by a single layer of epithelium and contains blood vessels and lymph vessel. The food diffuses through the epithelium into the blood vessels. Glucose, amino acids, minerals and vitamins are absorbed in the blood vessels of the villi; the fatty acids and glycerol and absorbed by lacteals, which are carried to lymph vessels to the point where the lymph vessels empty into the blood stream. (5)

20. (a) Absolutely not. (3)

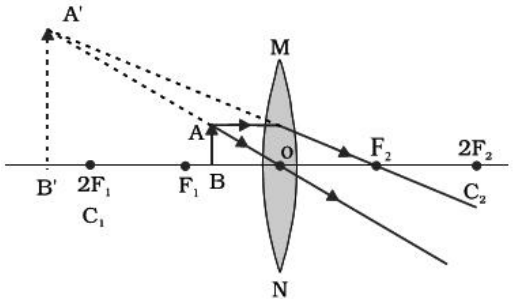
i) Hint: Human approach/behaviour.(explanatory)
ii) One should be aware about the mode of transmission of disease, danger of sharing needles etc.
Associated Value : The learners will understand that only a generous and improved mindset of society can help the people to fight HIV/AIDS related problems.

(b) Gonorrhoea, Herpes, AIDS (any two) (1)

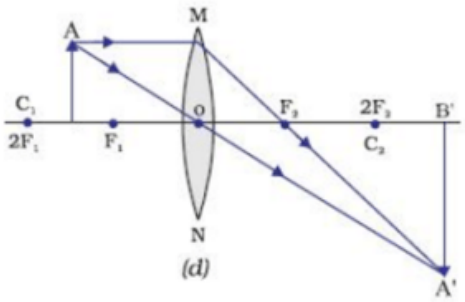
Ways to prevents STDs: (any two) (1)

1. Use of condoms or other physical barriers.
2. Avoiding sexual contacts with unknown partners.
3. Avoid sharing towels or underclothing.
4. Get a vaccination for hepatitis B. This is a series of three shots.

21. a) (1)



Convex lens form magnified erect image when object is placed between F_1 and optical centre O. Image formed is virtual, erect and enlarged and on the same side of the lens as the object. (1/2)



(1)

Convex lens form magnified inverted image when object is placed between F_1 and $2F_1$.

Image formed is real inverted and enlarged at infinity. (1/2)

b) f= +10cm

u = - 20cm

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

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

⇨ v = -6.67cm

m = $\frac{h'}{h} = \frac{v}{u}$

h=4cm

⇨ h' = $\frac{-6.67}{-20}$ x 4 = 1.33cm

Image is diminished (2)

SECTION –B

22. Pale green (½)

After heating, pale green changes to reddish brown. (½)

$2FeSO_{4\,(S)} \xrightarrow{\text{heat}} Fe_2O_{3\,(S)} + SO_{2\,(g)} + SO_{3\,(g)}$ (1)

23. The role of common salt is to favour the precipitation of soap. (1)

Glycerol is the by-product of saponification. (1)

24. (a) Water should be taken in the beaker and KOH solution in the flask (1)

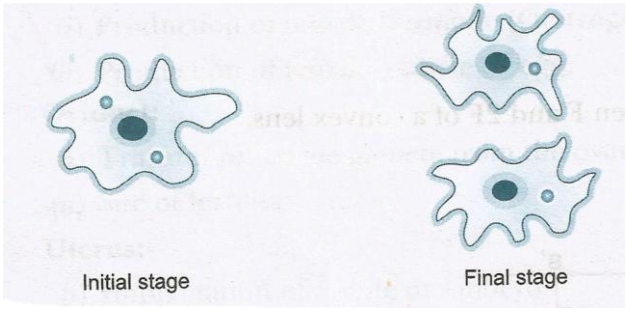
(b) 1.Keep the conical flask airtight.

2. Fix the shorter end of the glass tube in such a way that it does not touch the seeds.

3. Use freshly prepared KOH solution. (any two) (1/2 x 2=1)

25. (a) Asexual reproduction - Binary fission (1)

(b)



(1)

26. Equivalent resistance in series $(R_S) = R + R = 2R$

Equivalent resistance in parallel $(\frac{1}{RP}) = \frac{1}{R} + \frac{1}{R} = \frac{2}{R}$ (1)

$$R_P = \frac{R}{2}$$

$$\text{So, } R_S - R_P = 2R - \frac{R}{2}$$

$$= \frac{3R}{2}$$ (1)

27. a) Beyond $2F_1$ (1)

b) Greater (1)

OR

Screen is moved slightly away from the lens

Given: Height of the object (h_1) = 4cm

Object distance (u) = -12cm

Image distance (v) =24cm

Height of the Image (h_2) = ?

Magnification m $= \frac{h2}{h1} = \frac{v}{u}$

$= \frac{h2}{4} = \frac{24}{-12}$

h_2 = -8cm (1)

Image will be 2 times magnified. The negative sign shows the image is inverted. (1)