



DELHI PUBLIC SCHOOL :: SURAT
SUBJECT : SCIENCE AND TECHNOLOGY
SUMMATIVE ASSESMENT- II
2011-2012

ANSWER KEY

1. a. Blue colour of the sky [½]
 b. Red colour of the sun during sunrise or sunset [½]
2. ketone and Butanone.
3. The process of increase in the concentration of non-biodegradable substances per unit weight of the organism as it moves along the food chain is called biological magnification.
4. Differences:

BIODEGRADABLE		NON-BIODEGRADABLE	
1.	Broken down into simpler forms by the action of enzymes.	1.	Broken down into simpler forms by physical processes.
2.	Remain in the environment for a short period of time.	2.	Persistent in the environment for a long period of time.
	Eg. Cowdung, vegetable peels, etc.		Eg. Plastic, DDT, etc.

5. Here, the radius of curvature, $R = 2f = 2m$

$$\therefore f = 1m$$

Given that, $u = -10m$ [½]

We know that for convex mirror, $1/f = 1/v + 1/u$ [½]

$$\therefore 1/1 = 1/v - 1/10$$
 [½]

$$\therefore v = 10/11 = 0.91m$$

Thus, the image of the car is formed 0.91m behind the convex mirror. [½]

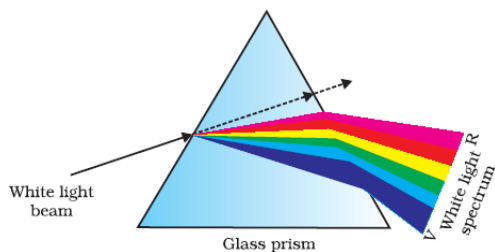
6. Accommodation or power of accommodation of human eye is the ability of the eye to observe distinctly the objects situated at widely different distances from the eye. [1]

This property is due to the action of ciliary muscles holding the eye lens.

For observing distant objects, eye is in relaxed state, i.e. eye lens is thin. [½]

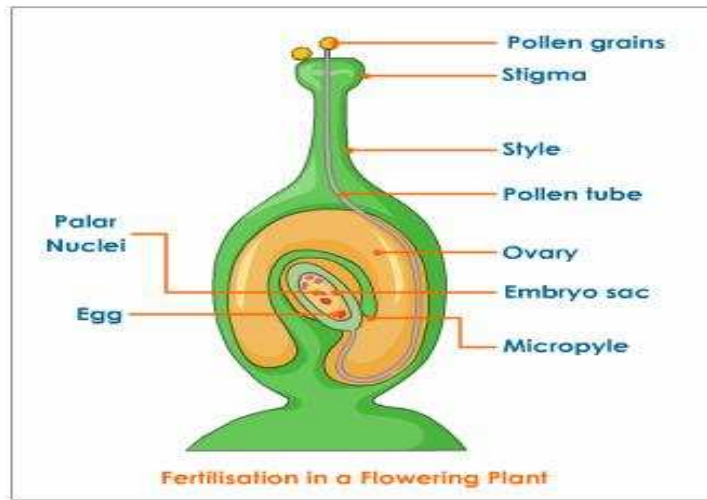
For observing nearby objects, eye is in a state of tension, i.e. eye lens is thick [½]

7.



8. Dobroneier's was able to identify only three triads while the number of the elements known at that time was quite large. Therefore, his arrangement could not draw much attention and was not so successful.
9. All the elements in a group have the following characteristics:
- All elements in a group show the same number of valence electrons, hence show similar properties.
 - As we move top to bottom in a group the atomic radius goes on increasing and there is a slight gradation in properties.
10. Reuse is better because recycling needs extra energy. Example: The glass container in which we get jam, pickles etc. can be reused at home to keep kitchen stuff but if it goes for recycling then a lot of energy and money is spent on recycling it and getting a new bottle.
11. The resources which are naturally occurring and can be obtained from earth for the use of fulfilling the needs of our life are called natural resources. Two factors which work against an equitable distribution of these resources are: materialization and energisation.

12. Figure 8.8 Germination of pollen on stigma.

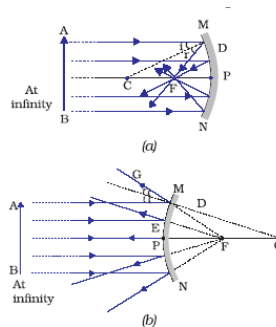


13. Answers

- a) DNA- They carry the blue print of the organism from the parents to the offspring. It encodes proteins that decide the structure and behaviour of the organism.
- b) Puberty- Hormonal changes which lead to physical, physiological and behavioural changes and development of secondary sexual characters. These changes prepare a person for a healthy reproductive life.

14.

[1½ + 1½]



15. a). Principal axis: The principal axis of a spherical mirror is the straight line passing through the centre of curvature C and pole P of the spherical mirror, produced on both sides.

[1]

b). Aperture: The aperture of a spherical mirror is the diameter of the reflecting surface of the mirror. [1]

c). Pole: The pole of a spherical mirror is the centre of the mirror. [1]

16. a). The two main causes of a person developing far – sightedness are:

- i. decrease in length of the eyeball, as if distance of retina from the eye lens has decreased [½]
- ii. increase in focal length of the eye lens, when the eye is fully relaxed. [½]

This defect can be corrected by using a convex lens of suitable focal length or power. [½]

b). Here, for the hypermetropic eye,

$$u = -25\text{cm}$$
$$v = -50\text{cm}$$

We know that, $1/f = 1/v - 1/u$ [½]

$$\therefore 1/f = 1/(-50\text{cm}) - 1/(-25\text{cm})$$
$$= 1/25 - 1/50 = 1/50$$

$$\therefore f = 50\text{cm} = 0.5\text{m} \quad [½]$$

$$\text{And } P = 1/f = 2\text{D} \quad [½]$$

17. A) Carbons form large number of compounds due to its property of catenation, i.e. self linking, isomerism compounds with same molecular formula but different structural formula and tetra valency.

B) Hard water contains carbonates and sulphate salts of magnesium or calcium which reacts with the sodium ions of soap molecules to form a compound which is insoluble in water. Hence soaps form scum with hard water.

C) Synthetic detergent is non biodegradable, it remains in the water thereby causing water pollution.

18. a) W & Z b) W & X c) X

19. Male gametes: anther of stamen

Female gametes: ovary of pistil or carpel

Radicle: gives rise to root system

Plumule: gives rise to shoot system

20. Analogous organs are the organs that have dissimilar origin and structural plan but perform similar function. Eg. Wings of birds and bats, etc.
Homologous organs are the organs that have similar origin and structural plan but perform different function. Eg. Limbs of frogs and lizards, etc.

21. Fossils are impressions or preserved traces of organisms.
Relative method: Fossils which are found closer to the surface are more recent than the fossils found in the deepest layer.
Radio element dating: By the ratio of different isotopes of the same element in fossil materials.

22. Answers:

a) Acquired traits

b) Acquired traits do not change the DNA or genes of the germ cells and are therefore not inherited by offsprings.

23. a) Since lens is convex, therefore f is positive.

Given, $u = -20\text{cm}$, $f = +12\text{cm}$, $h = 3\text{cm}$, $v = ?$, $h' = ?$

From the lens formula, $1/v - 1/u = 1/f$ [½]

$$\therefore 1/v - 1/(-20) = 1/12$$

$$\therefore 1/v = 1/12 - 1/20 = /30$$

$$\therefore v = 30\text{cm} \quad [½]$$

Since v is positive, the image is located on the other side of the lens.

$$m = v/u = +30/-20 = -1.5 \quad [½]$$

since m is negative and greater than 1, the image is real, inverted and larger than the object.

$$m = h'/h$$

$$\therefore -1.5 = h'/3 \quad [½]$$

$$\therefore h' = -4.5\text{cm}$$

Thus the image is 30cm from the convex lens, located on the other side of the object. It is real, inverted and 4.5cm high. [½]

b). Given $u = -45\text{cm}$,

$$v = +90\text{cm}$$

From the lens formula, $1/f = 1/v - 1/u$ [1/2]

$$\therefore 1/f = 1/90 - 1/(-45) = 1/30$$
 [1/2]

$$\therefore f = +30\text{cm}$$
 [1/2]

The positive sign shows that the lens is a converging (convex) lens of focal length

$$f = 30\text{cm.}$$
 [1/2]

OR

a) Here, $r = -0.4\text{m}$

$$\therefore f = -0.2\text{m}$$

$$u = -0.8\text{m and } h = 0.2\text{m}$$

We know that $1/f = 1/v + 1/u$ [1/2]

$$\therefore 1/(-0.2) = 1/v + 1/(-0.8)$$

$$\therefore v = -0.267\text{m}$$

Hence a real image is formed at 0.267m in front of the mirror. [1/2]

Also, $m = h'/h = -v/u$

$$\therefore h' = 0.2 \times (-(-0.267))/(-0.8) = -0.067\text{m}$$
 [1/2]

The size of the image is 0.067m long. The minus sign here shows the image is formed below the principal axis. [1/2]

b). The refractive index of water be η_w

Velocity of light in vacuum is $c = 3 \times 10^8 \text{ m/s}$

Velocity of light in water is $v_1 = 2.25 \times 10^8 \text{ m/s}$ [1/2]

We know that, $\eta_w = c/v_1$ [1/2]

$$= 3 \times 10^8 \text{ m/s} / 2.25 \times 10^8 \text{ m/s}$$
 [1/2]

$$= 1.33$$
 [1/2]

Thus the refractive index of water is 1.33.

c). Let the velocity of pulse 1 passing through η_1 be v_1 ,

that of pulse 2 passing through η_2 be v_2

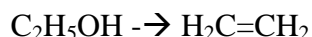
and that of pulse 3 passing through η_3 be v_3 .

From the given values we know that, $\eta_2 < \eta_3 < \eta_1$. [½]

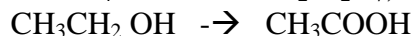
We know that the velocity of the pulse is inversely proportional to the refractive

index of the media, thus, $v_1 < v_3 < v_2$ [½]

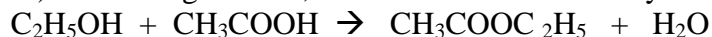
24. a) i) Ethene: Ethanol when heated with excess of concentrated sulphuric acid will form ethene.



ii) Ethanoic acid : on oxidation of ethanol with an oxidizing agent like alkaline KMnO_4 or acidified $\text{K}_2\text{Cr}_2\text{O}_7$, ethanoic acid is formed.



iii) Ester: To get esters, ethanol is reacted with any carboxylic acid.



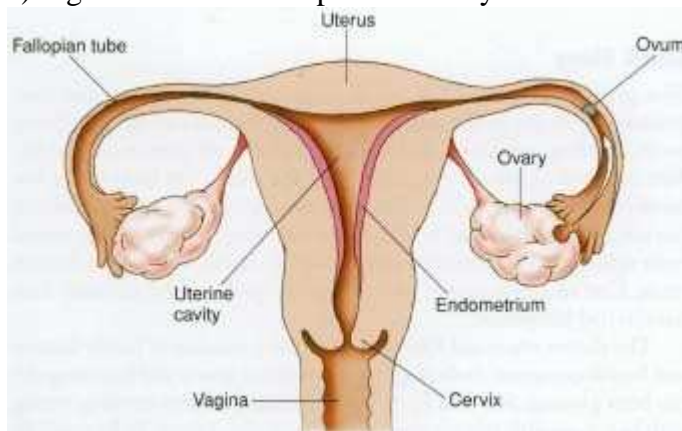
b) i) Conversion of oils to fats: $\text{CH}_2=\text{CH}_2 \rightarrow \text{CH}_3-\text{CH}_3$

ii) Chlorination of methane $\text{CH}_4 + \text{Cl}_2 \rightarrow \text{CH}_3\text{Cl} \rightarrow \text{CH}_2\text{Cl}_2 \rightarrow \text{CHCl}_3 \rightarrow \text{CCl}_4$

OR

a) $\text{CH}_2\text{Br}-\text{CH}_2\text{Br}$ b) $\text{C}_2\text{H}_5\text{ONa} + \text{H}_2$ c) $\text{CO}_2 + \text{H}_2\text{O} + \text{energy}$

25. a) Figure 8.9 Female Reproductive System.



b) Oviduct: Site for fertilization. Passage that leads the ovum to the ureter.

Ovary: Formation of ovum. Synthesis of female hormones- estrogen and progesterone.

OR

a)

Sexual reproduction		Asexual Reproduction	
1.	Two parents are required.	1.	Single parent is required.
2.	The process involved are gamete formation followed by fertilization.	2.	The process involves fission, budding, fragmentation or spore formation

b) To get new plants with similar characters.

To develop seedless variety of fruits which have higher economic value.

- 26. b
- 27. c
- 28. c
- 29. b
- 30. a
- 31. a
- 32. b
- 33. c
- 34. a
- 35. d
- 36. d
- 37. c
- 38. a
- 39. a
- 40. c
- 41. b

The End