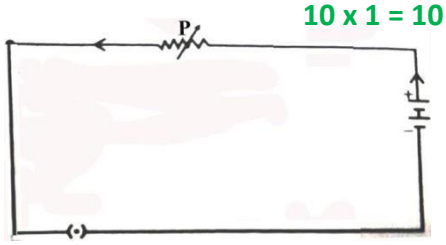
KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD
MODEL QUESTION PAPER 2018-19 (Set 2)

Subject: Science-83E

Time: 3 hours **Marks: 80**

Four alternatives are provided for each question. Choose the most appropriate alternative and write it along with its alphabet. **10 x 1 = 10**

1. In the figure the device labelled as Pis:


   A) Ammeter
   B)Bulb
   C) Rheostat
   D) Voltmeter
2. In the following reactions, the chemical reaction that takes place in sunlight is:
   A) $CaCO_3 \rightarrow CaO + CO_2$ B) $CuSO_4.5H_2O \rightarrow CuSO_4.5H_2O$
   C) $2AgBr \rightarrow 2Ag + Br_2$ D) $2HgO \rightarrow 2Hg + O_2$
3. Method of managing used envelopes: Reuse :: Method of managing fuels:
   A) Recycling B) Use for repurpose **C) Reduce the use** D) Refuse the use
4. The magnetic field around a current carrying circular loop can be increased by:
   A) increasing the radius of the coil. B) converting the coil into straight wire.
   C) decreasing the radius of the coil. D) reducing the amount of electric current through the coil.
5. The part of the human eye that controls the amount of light entering into the eye is:
   A) iris B) pupil C) rod and cone D) retina
6. In a fertile garden certain types of flower plants were not growing. After testing the soil of the garden it was found that its pH value is 5.The chemical that may be used to treat the soil is:
   A) Sodium chloride **B) Calcium hydroxide**
   C) Urea D) Copper sulphate
7. A multicellular organism that shows the development of tiny individuals on one side of mother's body is:
   A) Hydra B) Yeast C) Planaria D) Spirogyra
8. Flow of energy is unidirectional in an ecosystem because in each trophic level:
   A) Number of consumers is constant
   B) Number of consumers reduces
   C) Loss of energy is more than the amount of available energy
   D) Available energy is completely consumed by consumers
9. One of the effects of refraction among the following is:
   A) Formation of image in a mirror B) Appearance of flowers in different colours

C) The sky appears blue in colour **D) The pencil immersed in water appears to be bent**

10. An event that may happen in heterotrophic nutrition is:
A) Conversion of carbon dioxide into carbohydrate
B) Unused carbohydrates are stored in the form of starch
C) Excess of glucose converts into glycogen.
D) Water molecules decompose into hydrogen and oxygen molecules

11. The properties of metals are given in column 'A' and examples are given in column 'B' Match them and write the answer along with its alphabet. **4 x 1 = 4**

Column 'A'	Column 'B'		Answer
1) Reacts with cold water	a)	Iron	**d) Sodium**
2) Forms amphoteric oxide	b)	Magnesium	**c) Aluminium**
3) Exists in liquid state at room temperature	c)	Aluminum	**g) Mercury**
4) Best conductor of heat	d)	Sodium	**h) Silver**
	e)	Silver	
	f)	Lead	
	g)	Mercury	

Answer the following questions: **7 x 1 = 7**

12. Name the type of the mirror that always produces virtual image. Mention one use of this mirror.
Convex Mirror

13. Identify the reactants which are oxidized and which are reduced in the following chemical reaction.
$CuO + H_2 \rightarrow Cu + H_2O$
Copper oxide is losing oxygen so it is being reduced. Hydrogen is gaining oxygen so it is being oxidised.

14. Genes related to one character has two contrast traits. But only one among them is considered as dominant. How?
Sexually reproducing individuals have two copies of genes for the same trait. If the copies are not identical, the trait that gets expressed is called the dominant trait.

15. Name the gaseous products obtained by the electrolysis of aqueous sodium chloride solution.
Hydrogen gas and chlorine gas

16. Fuse wire should have higher resistance than the other wires in the circuit but it should not have high melting point. Why?
If a current larger than the specified value flows through the circuit, the temperature of the fuse wire increases. This melts the fuse wire and breaks the circuit. So fuse wire should not have high melting point.

17. What is the reason for the formation of food webs in an ecosystem?
Each organism is generally eaten by two or more other kinds of organisms which in turn are eaten by

several other organisms. So instead of a straight line food chain, the relationship can be shown as a series of branching lines called a food web.

18. Small intestine is called the site of complete digestion. Why?

When the partly digested food reaches the small intestine, the juices secreted by the small intestine completes the process of digestion. Hence it is the site of complete digestion.

Answer the following questions: **16 x 2 = 32**

19. Explain briefly the breathing cycle in the human body.

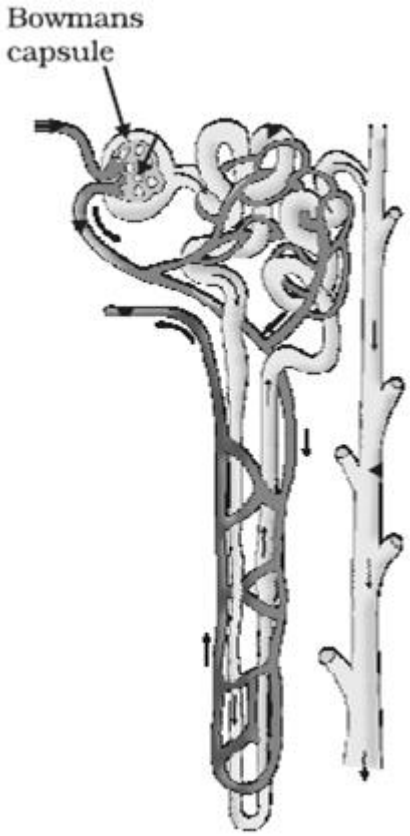
The breathing cycle includes inhalation and exhalation. When we breathe in, we lift our ribs and flatten our diaphragm. The chest cavity becomes larger as a result. Because of this, air is sucked into the lungs and fills the expanded alveoli.Exhalation is when the diaphragm and the rib muscles relax. This is increases the pressure in the chest cavity compared to atmospheric pressure, and causes air to move out from the lungs.

OR

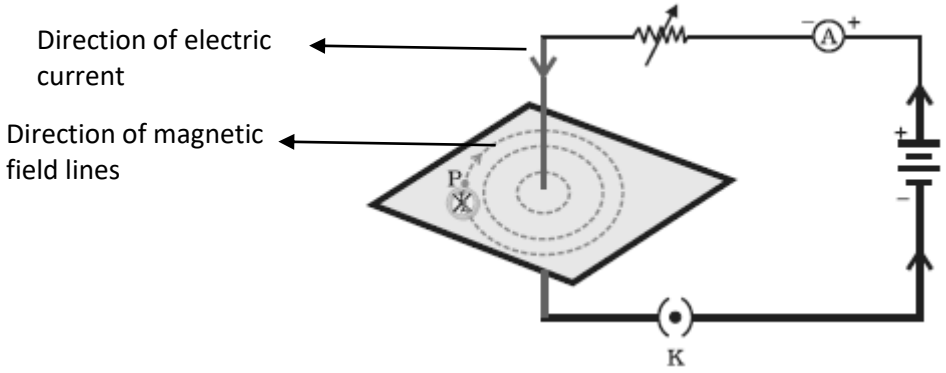
Explain the strategy of transportation of water to the highest points of the plant body by the xylem issue.

In xylem tissue, vessels and tracheids of the roots, stems and leaves are interconnected to form a continuous system of water-conducting channels reaching all parts of the plant. At the roots, cells in contact with the soil actively take up ions. This creates a difference in the concentration of these ions between the root and the soil. Water, therefore, moves into the root from the soil to eliminate this difference. The steady movement of water creates a column of water that is steadily pushed upwards.

20. Draw the diagram to show the structure of nephron and label Bowman'scapsule.



21. Draw the diagram showing the magnetic field lines around a current carrying conductor.Label the following. i) The direction of magnetic field lines ii) The direction of electric current



22. What is electric power? Write any two formulae used to calculate electric power.

Electric power of an appliance is the rate at which it consumes electric energy.

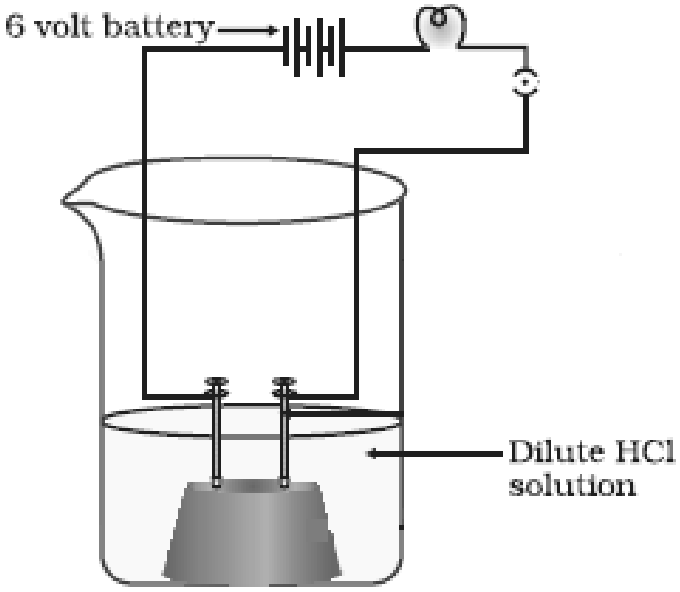
$$P = \frac{W}{t} \text{ or } P = \frac{V^2}{R} \text{ or } P = VI$$

OR

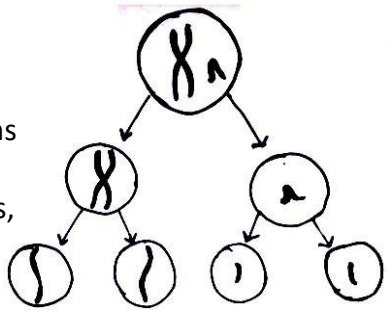
What is electric current? Which is the device used to measure electric current in the circuit? How should that device be connected in the circuit?

Electric current is defined as rate of flow of charges. The instrument used to measure current in a circuit is ammeter. It should be always connected in series in a circuit.

23. Draw the diagram of the apparatus used to demonstrate that acidic solutions conduct electricity. Label the following parts.i) The solution taken ii) Source of electric current



24. With the help of the following pattern briefly explain the reason for a) DNA Stability b) Variation phenomenon found in the successive generation of species.



a) The consistency of DNA copying during reproduction is important for the maintenance of body design features that allow the organism to use that particular place. Reproduction is therefore linked to the stability of populations of species.
b) If some variations were to be present in a few individuals in the populations, there would be some chance for the survival of the species.
Variation is thus useful for the survival of species over time.

25. How are dilute acid and weak acid different from one another? What are the precautions to be taken while diluting an acid?

Acids that give less H+ ions or acids in which there is partial dissociation of hydrogen ions are called weak acids where as a concentrated acid dissolved in water is called dilute acid.
Never add the acid to water as the reaction is exothermic, due to which it produces a large amount of heat energy. This may also cause spurting of the acid due to the heat. Acid should be added to water.

26. What is electromagnetic induction?Name the device that works on this principle.Mention the frequency of the electric current produced in India.

The phenomenon by which the electric current is generated by changing the magnetic field lines is called electromagnetic induction.
The device that works on the principle of electromagnetic induction is a dynamo.
The frequency of electric current in Indian is 50Hz.

OR

What is magnetic field? Write the two properties of magnetic field lines.

The region surrounding a magnet, in which the force of the magnet can be experienced is called magnetic field.
a) A magnetic field lines originate from North Pole and end at its south pole.

b) A magnetic field line is a closed and continuous curve.

c) The magnetic field lines are closer near the poles of a magnet where the magnetic field is strong and farther apart where the magnetic field is weak.

d) The magnetic field lines never intersect each other.

e) A uniform magnetic field is represented by parallel and equidistant field lines.

27. Related to water harvesting system
a) Mentiontwo advantages of rejuvenating indigenous methods
b) Two disadvantages by the construction of huge dams

a)
i) Water harvesting techniques recharge the ground water level which are drawn through pumps, tube-wells, wells etc.
ii) Water harvested in lakes, ponds, nadis help the communities to procure water in most part of the year. It increases production and income of the community.

iii) Giving people control over their local water resources ensures that mismanagement and over-exploitation of these resources is reduced/removed.

b)

i) Dams can be constructed only in limited number of places.

ii) Large areas of agricultural land and human habitation are to be sacrificed as they get submerged.

iii) Large ecosystems are destroyed when submerged under the water in dams.

iv) The vegetation which is submerged rots under anaerobic conditions and gives rise to large amounts of methane which is also a green-house gas.

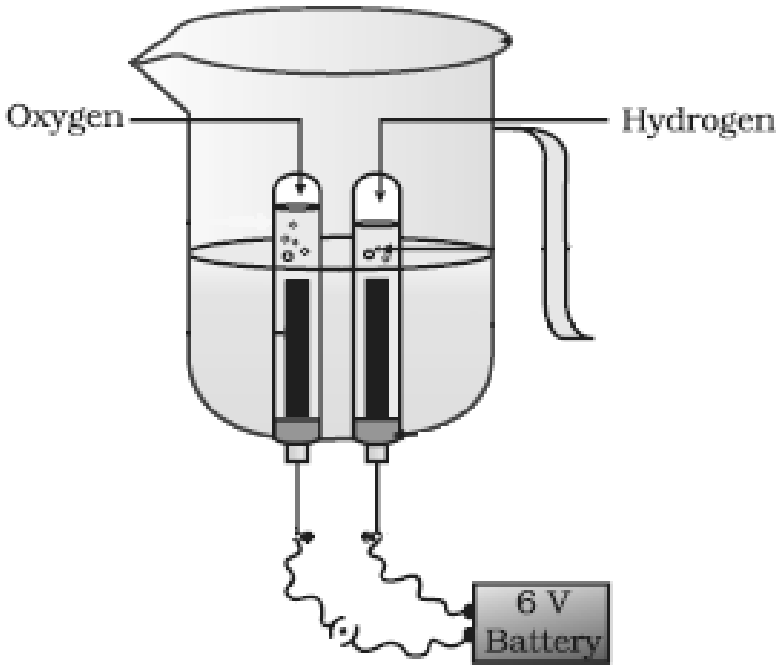
v) It creates the problem of satisfactory rehabilitation of displaced people.

OR

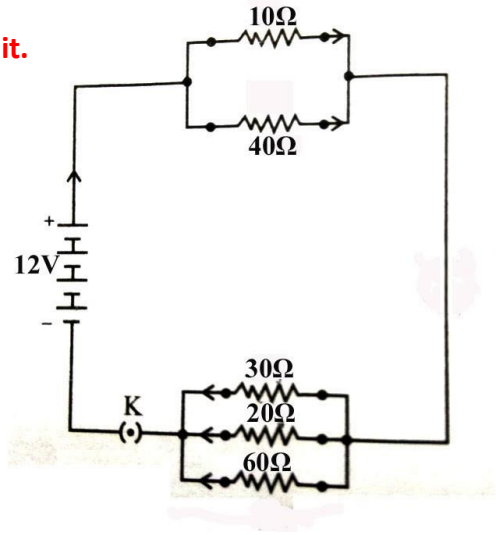
What are the advantages of harvesting water by setting of the Khadin system?

Khadin system gives people control over their local water resources ensures that mismanagement and over-exploitation of these resources is reduced/removed. It recharges the ground water beneath.

28. Draw the diagram of the apparatus used to show that water is a compound of hydrogen and oxygen. Label the following parts. i) The part where oxygen is collected ii) The part where hydrogen is collected



29. In the figure calculate the total electric current flowing in the circuit.



$$\frac{1}{R_p}=\frac{1}{R_1}+\frac{1}{R_2}$$
$$=\frac{1}{10}+\frac{1}{40}$$
$$=\frac{4+1}{40}=\frac{5}{40}=\frac{1}{8}$$
$$R_p=8\Omega$$

$$\frac{1}{R_p}=\frac{1}{R_3}+\frac{1}{R_4}+\frac{1}{R_5}$$
$$=\frac{1}{30}+\frac{1}{20}+\frac{1}{60}$$
$$=\frac{2+3+1}{60}=\frac{6}{60}=\frac{1}{10}$$
$$R_{p2}=10\ \Omega$$

Now they are in series combination,

Rtotal=Rp1 + Rp2

Rtotal = 8 + 10 =18 Ω

From Ohm's law,

V = I x R

$$I=\frac{V}{R}=\frac{12}{18}=0.667A$$

30. In multicellular organisms compared to electrical communication, chemical communication is more steady and persistent. Analyse this statement.

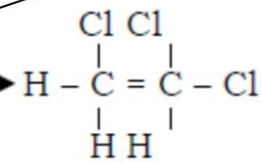
Electrical impulses reach only those cells that are connected by nervous tissue and once an electrical impulse is generated in the cell and transmitted, the cell will take some time to reset its mechanism before it can generate and transmit a new impulse.

In chemical communication, stimulated cells release a chemical compound, this compound diffuses all around the original cell. If other cells have the means to detect this compound, it would be able to recognise the information and transmit it. So it can reach all the cells of the body. Thus chemical communication is steady and persistent.

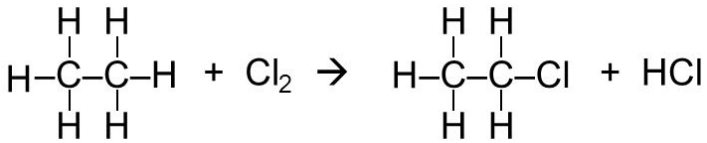
31. Observe the following reactions. State whether these reactions are addition reactions or substitution reactions. Justify your answer.

i. $H-C\equiv C-H + Cl_2 \longrightarrow H-C\equiv C-Cl + HCl$

These reactions are wrong

ii. $H-C\equiv C-H + Cl_2 \longrightarrow$ 

The correct reactions are given below:



The above reaction is an example of substitution reaction.

$$HC \equiv CH + Cl_2 \xrightarrow{CCl_4} \begin{matrix} Cl & Cl \\ | & | \\ HC = CH \end{matrix}$$

The above reaction is an addition reaction.

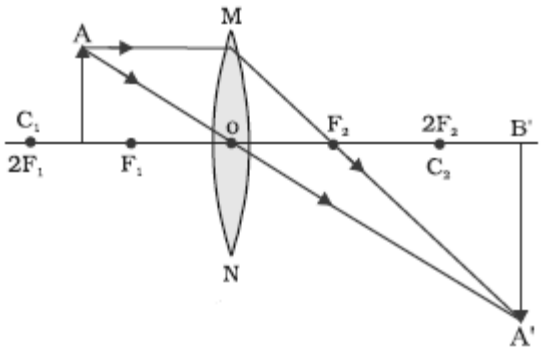
OR

You are given ethanol, concentrated sulphuric acid and a small piece of sodium metal. Using these chemicals, how do you prepare i) Hydrogen gas? ii) Ethene gas?

Drop a small piece of sodium into ethanol. Vigorous reaction occurs and hydrogen gas is produced.

If ethanol is heated at 443K with excess sulphuric acid results in the dehydration of ethanol to give ethene gas.

32. Draw the ray diagram showing the image formation by a convex lens when the object is placed between 2F1 and F1 of the lens. (F1: Principal focus of the lens)



33. Sample of an ore is heated in a test tube. In the beginning a gas is evolved which turns wet blue litmus red. On further heating a gas is evolved which makes a glowing splinter burn brilliantly. A shining greyish metal appears in the test tube. Study the data and answer the following questions.

i) What are the two gases produced?

ii) What is the possible name of the ore?

iii) Which is the metal produced in the test tube?

i) The two gases produced are sulphur dioxide and oxygen.

ii) The possible name of ore is cinnabar (ore of mercury)

iii) The metal produced in the test tube is mercury.

34. A person connects a bulb having resistance 1200Ω and an electric heater having resistance 100Ω in series. But they do not work properly. When he connects the same appliances in parallel in the circuit, they function normally. Explain the reason for this.

When an electric bulb and an electric heater are connected in series they need currents of different values to operate properly. But when they are connected in parallel the circuit divides the current through the electrical gadgets. The total resistance in a parallel circuit is decreased. This provided different resistance and different current to operate properly.

Answer the following questions: **5 x 3 = 15**

35. The focal length of a converging mirror is 4cm. If the object of height 2cm is placed 9cm from the mirror, then find the image distance, nature and size of the image.

ho =2cm

u = -9cm

f = - 4cm

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

$$\frac{1}{v}+\frac{1}{-9}=\frac{1}{-4}$$

$$\frac{1}{v}=\frac{-1}{4}+\frac{1}{9}=\frac{-9+4}{36}=\frac{-5}{36}$$

$$v=\frac{-36}{5}=-7.2cm$$

$$m=\frac{-v}{u}=\frac{-7.2}{-9}=0.8$$

$$m=\frac{h_i}{h_o}$$

$$0.8=\frac{h_i}{2}$$

$$hi=0.8\ x\ 2$$

$$hi=1.6cm$$

The image is virtual erect and diminished by a factor 0.8

OR

The velocity of light in water and kerosene are 2.25 x 10^8 ms^{-1} and 2.08x10^8 ms^{-1} respectively. Which material has highest refractive index? Prove your answer by calculation.

$$RI=\frac{Speed\ of\ light\ in\ air}{Speed\ of\ light\ in\ water}=\frac{3x10^8}{2.25x10^8}=1.33$$

$$RI=\frac{Speed\ of\ light\ in\ air}{Speed\ of\ light\ in\ kerosene}=\frac{3x10^8}{2.0810^8}=1.44$$

So refractive index of kerosene is highest.

36. (i) What is the advantage of using atomic number instead of atomic mass while constructing modern periodic table?

(ii) Sodium and chlorine are placed in the third period of the modern periodic table with group and respectively. State their valences. Which of them can form anion? Which of them can form cation? Give reason for your answer.

i) If the elements are arranged in increasing order of atomic number, the place of isotopes remain same as that of the element.

ii) The valency of sodium is 1 and the valency of chlorine is 7. Sodium forms cations and chlorine forms anions. Metals lose electrons and form cations. Non-metals gain electrons and forms anions.

37. Read the following information and answer the given questions.

Thousands of years ago only one species of squirrels was there and were evolved from common ancestor. At present there are two species of squirrels, though they have similarities among them, cannot perform reproduction between them.

a) Analyze the factor responsible for this change.

b) How can this kind of changes be considered as beneficial for species?

a) The processes of genetic drift and natural selection will result in two isolated sub-populations of squirrels becoming more and more different from each other. Eventually, members of these two groups

will be incapable of reproducing with each other even if they happen to meet. If the DNA changes are severe enough, such as a change in the number of chromosomes, eventually the germ cells of the two groups cannot fuse with each other.

b) Variations allows very strong natural selection and new species of squirrel are being generated.

OR

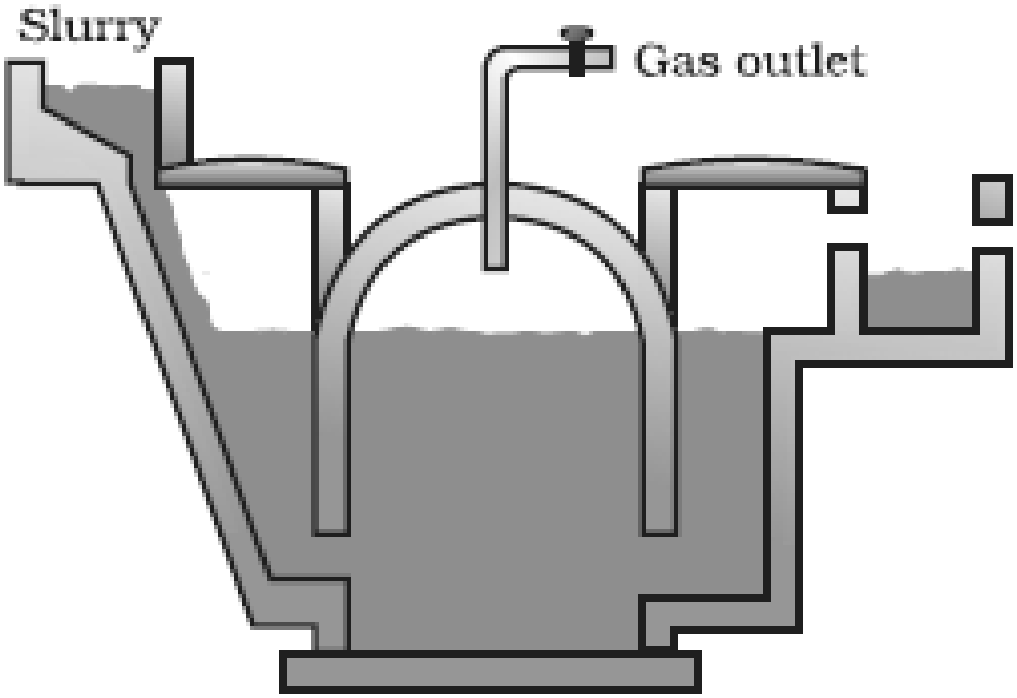
Justify the following statements with one illustration each

Though organs of different organisms have more similarities in the shapes of organs they need not be evolved from common ancestor. Though the variations are more between the organisms, they might have been evolved from common ancestor.

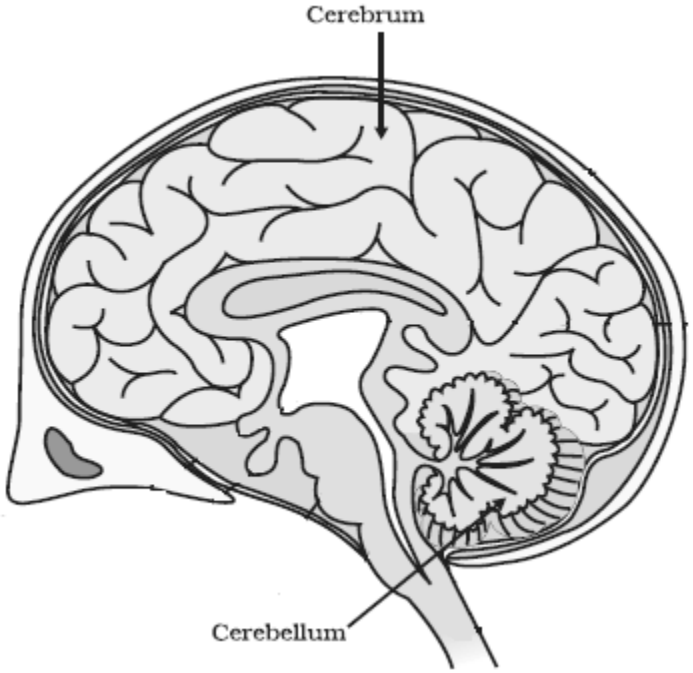
Wings of bats are skin folds stretched mainly between elongated fingers. But the wings of birds are a feathery covering all along the arm. The designs of the two wings, their structure and components, are very different. They look similar because they have a common use for flying, but their origins are not common.

In mammals, birds, reptiles and amphibians, the basic structure of the limbs is similar though it has been modified to perform different functions in various vertebrates. So they might have evolved from a common ancestor.

38. Draw the schematic diagram of gobar gas plant. Label the following parts. (i) Slurry (ii) Gas outlet



39. Draw the diagram showing longitudinal section of the human brain. Label the following parts
i) Thinking centre ii) The part that regulates body balance



Answer the following questions: **3 x 4 = 12**

40. a) Explain the phenomenon of formation of rainbow in the sky.
b) Stars appear to twinkle but planets do not appear to twinkle why?

a) A rainbow is a natural spectrum appearing in the sky after a rain shower. It is caused by dispersion of sunlight by tiny water droplets, present in the atmosphere. A rainbow is always formed in a direction opposite to that of the Sun. The water droplets act like small prisms. They refract and disperse the incident sunlight, then reflect it internally, and finally refract it again when it comes out of the raindrop.

b) The twinkling of a star is due to atmospheric refraction of starlight. The starlight, on entering the earth's atmosphere, undergoes refraction continuously before it reaches the earth. The atmospheric refraction occurs in a medium of gradually changing refractive index. Since the atmosphere bends starlight towards the normal, the apparent position of the star is slightly different from its actual position. The star appears slightly higher (above) than its actual position when viewed near the horizon. This apparent position of the star is not stationary, but keeps on changing slightly, since the physical conditions of the earth's atmosphere are not stationary.

OR

a) Explain Tyndall effect with an example.
b) Explain Presbyopia. How can this be corrected?

a) The phenomenon of scattering of light by the colloidal particles is called Tyndall effect.
This phenomenon is seen when a fine beam of sunlight enters a smoke-filled room through a small hole. Scattering of light makes the particles visible. Tyndall effect can also be observed when sunlight passes through a canopy of a dense forest.

b) Presbyopia is a common defect of the eye in which a person finds it difficult to see nearby objects comfortably and distinctly without corrective eye-glasses. It is caused when the power of accommodation of the eye decreases with ageing.

41. a) Write the molecular formula of the following and show that they form homologous series.
i) Methanol ii) Ethanol iii) Propanol
b) Write the equation of the chemical reaction taking place when ethanol is heated with alkaline potassium permanganate and name the product.

a) i) Methanol – CH_3OH
ii) Ethanol – C_2H_5OH
iii) Propanol – C_3H_7OH
They form homologous series because they differ by a CH_2 group.

b)

$$CH_3 - CH_2OH \xrightarrow[\text{Or acidified } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}} CH_3COOH$$

42. a) Write the two differences between self pollination and cross pollination.
b) "The structure and function of placenta plays important role at the time of gestation period". Explain.

a)

Self-pollination	Cross-pollination
The pollination of a flower by pollen from the same flower or from another flower on the same plant	The transfer of pollen grains of a flower to the stigma of another flower of a different plant of the same species
It involves single plant	It involves two different plants of same species
It occurs in genetically same plants	It occurs in genetically different plants of the same species
It does not require pollinating agents.	It requires pollinating agents

b) Placenta is a special tissue that develops in the uterus during pregnancy. It provides oxygen and nutrients to the growing baby and removes waste products from the baby's blood. Thus it plays an important role during gestation.

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