KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD

Model Question Paper Answers

Subject: SCIENCE – 2018-19

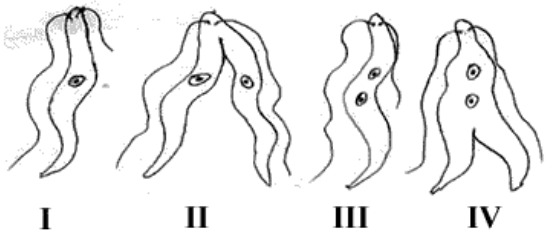
Total No. of Questions: 42 **Subject Code: 83E**

Time: 3 Hours **Max Marks: 80**

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

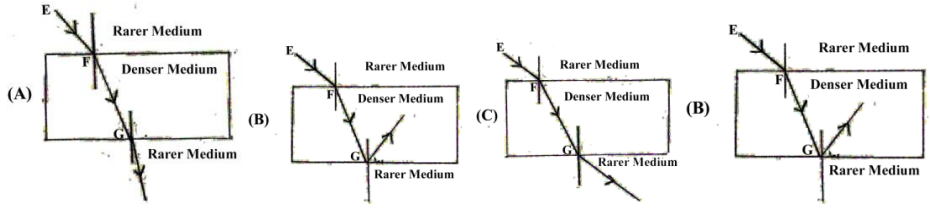
1) The SI unit of electric current is:
   (A) Ohm (B) Volt **(C) Ampere** (D) Watt
2) The substance that is oxidised in the following chemical reaction is:
   $4Na(s) + O_2(g) \rightarrow 2Na_2O(s)$
   (A) Na (B) O2 (C) Na2O (D) None of these
3. Red coloured light is used in traffic signals to indicate the vehicles to stop, because compared to other colours red light
   (A) has high frequency (B) scatters more
   (C) has less wavelength **(D) scatters less**
4. Identify the correct pair of analogous organs among the following
   (A) The forelimb of man and the forelimb of a frog
   (B) The wing of a butterfly and the wing of a bat
   (C) The wing of a bird and the wing of a bat
   (D) The forelimb of lizard and the forelimb of a frog
5. Observe the following chemical equations and identify the correct statement.
   (i) $Cuso_4 + Fe \rightarrow Feso_4 + Cu$ (ii) $2AgNo_3 + Cu \rightarrow Cu(No_3)_2 + 2Ag$
   (A) Copper is more reactive than Iron and Silver
   (B) Iron is less reactive than Copper and Silver
   (C) Copper is more reactive than Silver but less reactive than Iron
   (D) Silver is more reactive than Copper and Iron
6. The characteristics of the image of an object formed on the retina by the lens of the eye is
   (A) Real and inverted (B) Virtual and erect
   (C) Real and erect (D) Virtual and inverted

7. The correct order of binary fission in Leishmania is:



   (A) I,IV,III,II **(B) I, III, IV, II** (C) I,II,III,IV (D) III,IV,II,I
8. The pH values of four solutions P,Q, R and S are 7.8, 1.0, 13.0 and 1.4 respectively. The solution having highest hydrogen ion concentration among them is:
   (A) P **(B) Q** (C) R (D) S
   (As you decrease the pH, the concentration of H+ increases.)

9. Observe the figure. The correct figure indicating the direction of the light ray after refraction is:



(C)

10. The watershed management:
    (A) increases droughts and floods
    (B) increases production and income of the watershed community
    (C) decreases the biodiversity of the down stream reservoirs
    (D) increases deforestation

11. Functions of certain structures of nervous system in animals are given in column 'A' and the names of these structures are given in column 'B'. Match them **4 x 1 = 4**

Column – 'A'		Column – 'B'		Answer
i.	Carries involuntary quick responses	a)	Peripheral nervous system	Reflex Arc
ii.	Controls voluntary and conscious thinking	b)	Medulla	Fore brain
iii.	Maintains precision in voluntary actions and balance of the body	c)	Reflex Arc	Cerebellum
iv.	Facilitates the communication between central nervous system and the other body parts	d)	Dendrite	Peripheral nervous system
		e)	Axon	
		f)	Cerebellum	
		g)	Fore brain	

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

12. The object distance of a lens is -30cm and image distance is -10cm. Find the magnification of the lens. With the help of this, decide whether the size of the image is smaller or bigger than the size of the object.

u=-30cm

v=-10cm

$$m = \frac{v}{u} = \frac{-10}{-30} = \frac{1}{3} = 0.33$$

As magnification is <0, the image is smaller than the object.

13. What are fossils?

The preserved remains of animals or plants or other organisms from the distant past are called fossils.

14. In a bakery, baking powder was not added while preparing cake. The cake obtained was hard and small in size. What is the reason for this?

When baking powder is added as ingredient while making cake, decomposes to produce carbon dioxide which increases the size of cake and hence make it soft.

15. What is geotropism?

The upward and downward growth of shoots and roots in response to the pull of earth or gravity is called geotropism.

16. Water mixed with the milk is taken in beaker and sugar solution is taken in beaker. Light is passed through both the beakers. In which beaker the path of light is visible? Why?

Path of light is visible in the beaker containing water mixed with milk as it is a colloid. Colloids exhibit scattering of light.

17. What is a chemical combination reaction?

A reaction in which two or more reactant combine to form a single product is called combination reaction.

18. In mammals and birds oxygenated blood and deoxygenated blood gets separated. Why?

The separation of oxygenated and deoxygenated blood provides high oxygen supply to the organs. This is useful in animals that have high energy needs such as birds and mammals which constantly us energy to maintain their body temperature.

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

19. A potential difference of 220v is applied across a resistance of 440Ω in an electrical appliance. Calculate the current drawn and the heat energy produced in 20 seconds.

V=220v

R=440Ω

I=?

$$I = \frac{V}{R} = \frac{220}{440} = \frac{1}{2} = 0.5\,\text{ampere}$$

$$H = V\ I\ t$$

$$H = 220 \times 0.5 \times 20$$

$$H = 2,200\,\text{Joules}$$

20. Explain the breakdown of glucose in aerobic respiration and anaerobic respiration.

In aerobic respiration, Glucose (6-carbon molecules) is broken down into a three carbon molecule called pyruvate. The pyruvate is converted into ethanol and carbon dioxide.

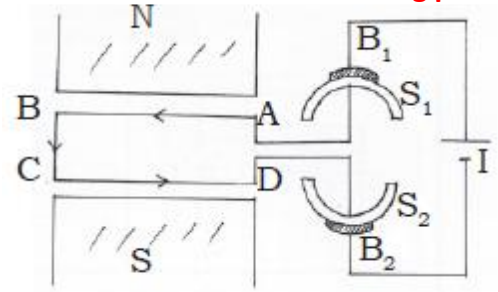
In anaerobic respiration, Glucose (6-carbon molecules) is broken down into three carbon molecule called pyruvate using oxygen. Pyruvate breaks up to give three molecules of carbon dioxide and water.

OR

Explain the process of transportation of substances in phloem.

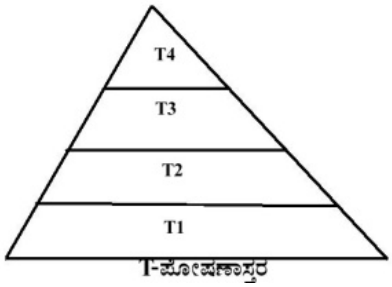
Phloem transports food materials from the leaves to different parts of the plant body. The transportation of food in phloem is achieved by utilizing energy from ATP. As a result of this, the osmotic pressure in the tissue increases causing water to move into it. This pressure moves the material in the phloem to the tissues which have less pressure. This is helpful in moving materials according to the needs of the plant.

21. Draw the diagram of an electric motor and label the following parts (i) Split rings (ii) Armature



S1 and S2 – split rings, ABCD - Armature

22. Observe the figure and answer the given questions.



(i) Which trophic level has maximum number of organisms? Why?

(ii) In which trophic level chemicals like DDT are accumulated in highest concentration? Why?

(i) T1 trophic level has maximum number of organisms. The first trophic level contains the greatest number of organisms and is comprised mainly of plants. Most primary producers get their energy directly from the sun. Primary producers are important to the whole food chain because they are the original source of energy that is then passed between other organisms.

(ii) T4 contains the highest concentration of DDT. As T4 occupy the top level in any food chain, the maximum concentration of these chemicals get accumulated in our bodies.

23. What is Myopia? Name the lens used to correct Myopia.

Myopia is a common defect of the eye in which a person is able to see nearby objects clearly but cannot see distant objects distinctly. The image is formed in front of the retina and not on the retina.
Myopia can be correct by using a concave lens of suitable power.

24. What is the resistance of a conductor? Mention the factors on which the resistance of a conductor depend.

Resistance is defined as the ratio of the potential difference across the conductor to the current flowing though the conductor.

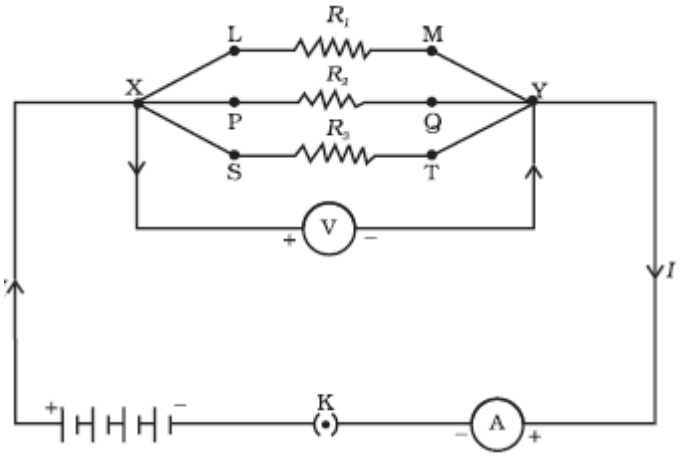
The resistance of a conductor depends a) On its length b) On its area of cross-section c) On the nature of its material d) Temperature of the conductor

OR

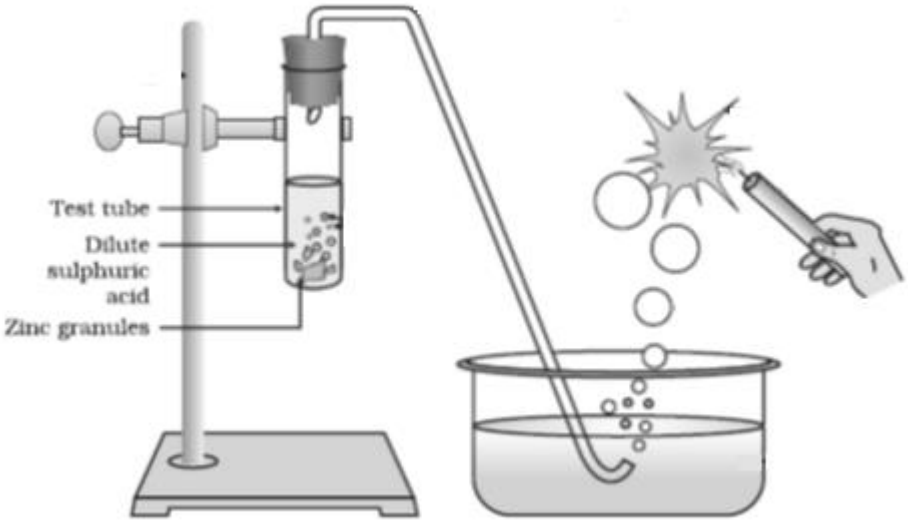
Mention the disadvantages of connecting electrical appliances in series in domestic wiring.

In a series circuit the same amount of current passes throughout the electric circuit. This is impractical to connect an electric bulb and an electric heater in series; because they need currents of widely different values to operate properly. Another major disadvantage of a series circuit is that when one component fails the circuit is broken and none of the components works.

25. Draw the diagram of the electric circuit in which the resistors are connected in parallel including ammeter and voltmeter and mark the direction of current.



26. Draw the diagram of the arrangement of apparatus to know the reaction of Zinc granules with dilute sulphuric acid and testing hydrogen gas and label the part that contain zinc granules and sulphuric acid.



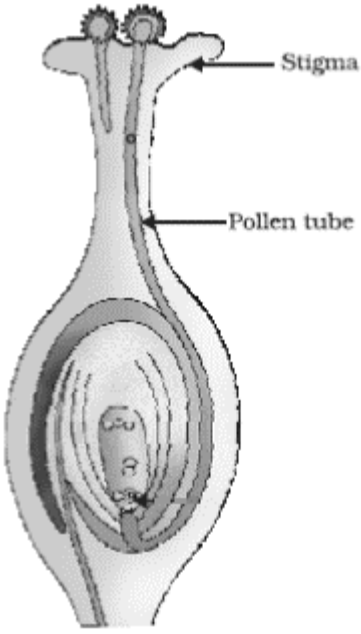
27. Explain the preparation of plaster of Paris with the help of balanced chemical equation.

Plaster of Paris is prepared by heating gypsum to 373 K. After heating gypsum it loses water molecules and becomes calcium sulphate hemihydrate in powder form.

$$CaSO_4.2H_2O \longrightarrow CaSO_4.\frac{1}{2}H_2O + \frac{3}{2}H_2O$$

28. Draw the diagram showing the germination of pollen on stigma and label the following parts.

(i) Stigma **(ii) Pollen Tube**



29. What is placenta? Write two functions of placenta.

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.

30. Write the four properties of ionic compounds.

a) Ionic compounds are solids. They are brittle and break into pieces when pressure is applied.
b) Ionic compounds have high melting and boiling points.
c) Ionic compounds are soluble in water and insoluble in organic solvents such as kerosene, petrol etc.
d) Ionic compounds conduct electricity in molten state.

OR

Write any four physical properties of metals.

a) Metals, in their pure state, have a shining surface.
b) Metals are generally hard.
c) Some metals can be beaten into thin sheets (Malleable).
d) Some metals can be drawn into thin wires (Ductile).
e) They are good conductors of heat.
f) They have high density and high melting point.
g) They are good conductors of electricity.
h) Most metals produce sound on hitting (sonorous)

31. Write the balanced chemical equations for the following chemical reactions.

(i) Potassium bromide reacts with Barium iodide

(ii) Zinc carbonate is heated

i) $2KBr + BaI_2 \longrightarrow 2KI + BaBr_2$

ii) $ZnCO_3 \longrightarrow ZnO + CO_2$

OR

Which coloured fumes are obtained when lead nitrate is heated? Write the balanced chemical equation for this reaction. Name the type of this chemical reaction.

Brown coloured fumes are obtained when lead nitrate is heated. It decomposes into lead oxide, nitrogen dioxide and oxygen. It is an example of decomposition reaction.

Lead nitrate $\longrightarrow$ Lead oxide + Nitrogen oxide + Oxygen

$2Pb(NO_3)_2 \longrightarrow 2PbO + 4NO_2 + O_2$

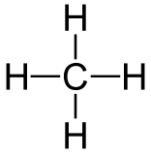
32. "Practice of reuse and recycle of materials will contribute to maintain sustainity of the environment". Support this statement with reasons.

a) Recycling requires less land for dumping segregated wastes.
b) We can save natural resources by recycling of things. Ex: Instead of extracting metals we can recycle metals.
c) By recycling we can prevent land, water or air from pollution.
Reuse is actually even better than recycling because the process of recycling uses some energy. In the 'reuse' strategy, you simply use things again and again.

33. What are saturated hydrocarbons and unsaturated hydrocarbons? Write the structure of the simplest hydrocarbon.

Compounds of carbon, which are linked by only single bonds between the carbon atoms are called saturated compounds. Compounds of carbon having double or triple bonds between their carbon atoms are called unsaturated compounds.

The structure of methane is



OR

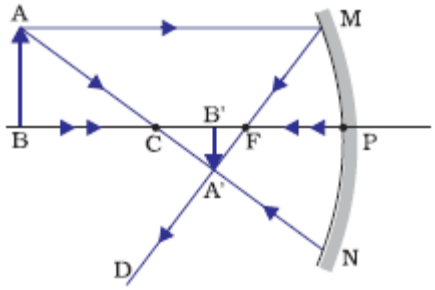
Name the functional group in the following compounds and write their molecular formula.

(i) Ethanol **(ii) Ethanoic acid**

i) The functional group in ethanol is alcohol. Its molecular formula is C_2H_5OH

ii) The functional group in ethanoic acid is Carboxylic acid. Its molecular formula is CH_3COOH

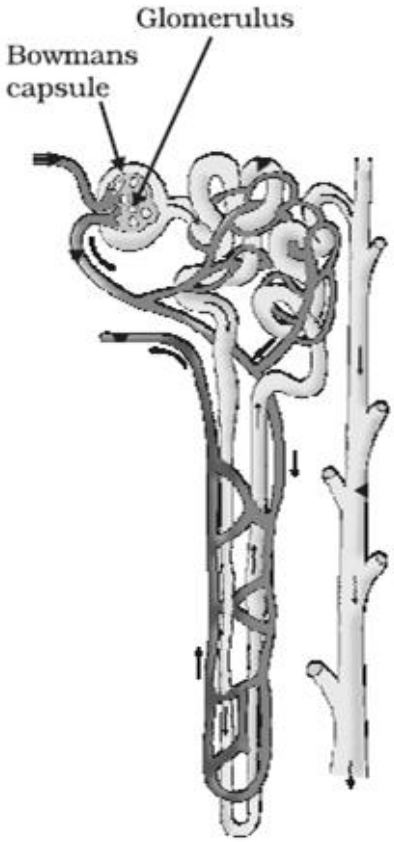
34. Draw the ray diagram showing the formation of image when the object is kept beyond centre of curvature (C) of a concave mirror.



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

35. Draw the diagram showing the structure of a nephron and label the following parts

(i) Glomerulus **(ii) Bowman's capsule**



36. State the laws of refraction. What is the meaning of "the refractive index of crown glass is 1.52"?

i) The incident ray, the refracted ray and the normal to the interface of two transparent media at the point of incidence, all lie in the same plane.

ii) The ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for the given pair of media

The refractive index of crown glass is 1.52. This means that the ratio of the speed of light in air and the speed of light in grown glass is equal to 1.52.

OR

Define the power of a lens. What is the meaning of "The power of a lens is 1 dioptre". If the power of a lens is -2.0 D, then what type of lens is that? When an object is kept at infinity from this type of lens, what is the size of the image formed?

Power of a lens is defined as the reciprocal of its focal length.

The power of a lens is 1 dioptre means the focal length of the lens is 1 metre.

Lens of – 2.5D mean the lens is concave.

When the object is kept at infinity from the concave lens, it forms a highly diminished point sized image.

37. Explain the structure of a bio gas plant and the process of production of fuel in bio gas plant.

The biogas plant has a dome-like structure built with bricks. A slurry of cow-dung and water is made in the mixing tank from where it is fed into the digester. The digester is a sealed chamber in which there is no oxygen. Anaerobic micro-organisms that do not require oxygen decompose or break down complex compounds of the cow-dung slurry. It takes a few days for the decomposition process to be complete and generate gases like methane, carbon dioxide, hydrogen and hydrogen sulphide. The bio-gas is stored in the gas tank above the digester from which they are drawn through pipes for use.

OR

"We cannot establish nuclear power reactors everywhere though large amount of electricity is produced by nuclear energy" Why? Explain.

Building a nuclear plant requires a large area near a natural water body. This is because nuclear power plants need water in order to cool the heat which is part of their condenser system. This is usually achieved with clearing of forests which can disturb the natural habitat of myriad of creatures that live nearby. This can also disrupt the ecological balance of the region.

38. The atomic numbers of two elements and are 11 and 12 respectively. Which element exhibits highest metallic property? Why? Write the molecular formula of the compounds formed when these elements combine with the element 'Z' having atomic number 8.

The element with atomic number 11 has highest metallic property as metals are placed towards the left hand side of periodic table and the metallic property decreases across the period.

Atomic number 11 is sodium and atomic number 12 is magnesium. Atomic number 8 is oxygen.

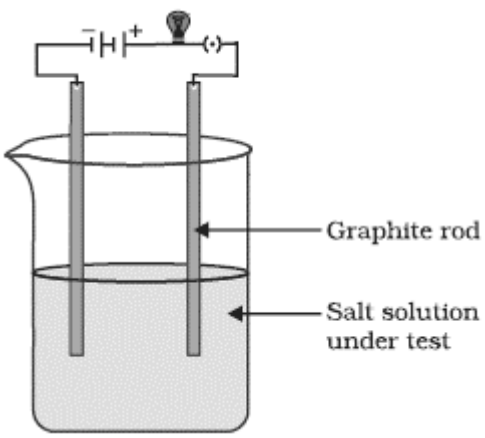
When sodium reacts with oxygen sodium oxide is formed.

$Na + O_2 \rightarrow Na_2O$

Magnesium reacts with oxygen to form magnesium oxide.

$Mg + O_2 \rightarrow MgO$

39. Draw the diagram of the apparatus used to test the conductivity of sodium chloride solution and label the graphite rod and the part where sodium chloride solution is present.



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

40. (a) Explain the process of sex determination in human beings

(b) Why are the small number of surviving tigers a cause of worry from the point of view of genetics?

(a) In human beings, the females have two X chromosomes and the males have one X and one Y chromosome. Therefore, the females are XX and the males are XY. A child who inherits an X chromosome from her father will be a girl, and one who inherits a Y chromosome from him will be a boy.

(b) Small numbers of tigers means that fewer variations in terms of genes are available. This means that when these tigers reproduce, there are less chances of producing progeny with some useful variations. Hence, it is a cause of worry from the point of view of genetics.

OR

(a) Traits acquired during the life time of an individual are not inherited. Why?

(b) How do Mendel's experiments show that the traits are inherited independently? Explain.

(a) This happens because an acquired trait involves change in non-reproductive tissues (somatic cells) which cannot be passed on to germ cells or the progeny. Therefore, these traits cannot be inherited.

(b) Mendel crossed pea plants having round green seeds (RRyy) with pea plants having wrinkled yellow seeds (rrYY). Since the F1 plants are formed after crossing pea plants having green round seeds and pea plants having yellow wrinkled seeds, F1 generation will have both these characters in them. However, as we know that yellow seed colour and round seeds are dominant characters, therefore, the F1 plants will have yellow round seeds.

Then this F1 progeny was self-pollinated and the F2 progeny was found to have yellow round seeds, green round seeds, yellow wrinkled seeds, and green wrinkled seeds in the ratio of 9:3:3:1.

41. (a) Explain substitution reaction with an example and chemical equation.

(b) Explain the cleansing action of soap.

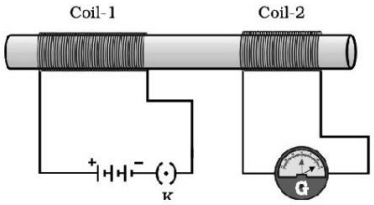
(a) The reaction in which one or more hydrogen atoms of a hydrocarbon are replaced by some other atoms is called substitution reaction.

When methane reacts with chlorine, chlorine replaces hydrogen atoms.

$CH_4 + Cl_2 \rightarrow CH_3Cl + HCl$ (in the presence of sunlight)

(b) The dirt present on clothes is organic in nature and insoluble in water. It cannot be removed by only washing with water. When soap is dissolved in water, its hydrophobic ends attach themselves to the dirt and remove it from the cloth. The molecules of soap arrange themselves in micelle formation and trap the dirt at the centre of the cluster. These micelles remain suspended in the water. The dust particles are easily rinsed away by water.

42. In the figure as the current changes in coil-1 the galvanometer connected to coil-2 shows deflection. Explain the phenomenon that causes this effect. Name and state the law used to know the direction of current in the device that works due to this phenomenon.



The phenomenon used in the above experiment is electromagnetic induction. Electric current is generated by changing the magnetic field lines is called electromagnetic induction.

The direction of current can be determined by Fleming's right hand rule. Fleming's right hand rule states that "Stretch the thumb, forefinger and middle finger of right hand so that they are perpendicular to each other. If the forefinger indicates the direction of the magnetic field and the thumb shows the direction of motion of conductor, then the middle finger will show the direction of induced current."