

**Roll No.**

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Candidates must write the Set No. on the title page of the answer book.

**SAHODAYA PRE BOARD EXAMINATION – 2024-25**

- Please check that this question paper contains **12** printed pages.
- Set number given on the right-hand side of the question paper should be written on the title page of the answer book by the candidate.
- Check that this question paper contains **39** questions.
- Write down the Serial Number of the question in the left side of the margin before attempting it.
- 15 minutes time has been allotted to read this question paper. The question paper will be distributed 15 minutes prior to the commencement of the examination. The students will read the question paper only and will not write any answer on the answer script during this period. Students should write anything in the question paper.

**CLASS- X****SUB: SCIENCE (086)****Time Allowed: 3 Hours****Maximum Marks:80****General Instructions:**

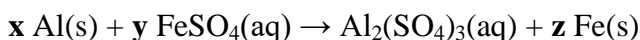
1. All questions would be compulsory. However, an internal choice of approximately 33% would be provided. 50% marks are to be allotted to competency-based questions.
2. Section A would have 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.
3. Section B would have 6 Short Answer (SA) type questions carrying 02 marks each.
4. Section C would have 7 Short Answer (SA) type questions carrying 03 marks each.
5. Section D would have 3 Long Answer (LA) type questions carrying 05 marks each.
6. Section E would have 3 source based/case based/passage based/integrated units of assessment (04 marks each) with sub-parts of the values of 1/2/3 marks.

## SECTION-A

**Question 1 to 16 is multiple choice questions. Only one of the choices is correct.**

**Select and write the correct choice as well as the answer to these questions.**

- 1.** Identify **x, y, z** in the following balanced chemical equation. **1**



- A. 2,2,3      B. 2,3,2      C. 2,3,3      D. 3,3,2

- 2.** Identify the correct observations when calcium metal is added to water **1**

- (i) It does not react with water  
 (ii) It reacts violently with cold water  
 (iii) It reacts less violently with cold water  
 (iv) bubbles of hydrogen gas formed stick to the surface of calcium.

- A. (i) and (iv)      B. (ii) and (iii)      C. (i) and (ii)      D. (iii) and (iv)

- 3.** An aqueous solution turns red litmus solution blue. Excess addition of which of the following solution would reverse the change? **1**

- A. Baking powder  
 B. Lime  
 C. Ammonium hydroxide solution  
 D. Hydrochloric acid

- 4.** The aqueous solution of one of the following salts will turn Methyl orange indicator red. The salt is **1**

- A.  $\text{K}_2\text{SO}_4$       B.  $\text{NH}_4\text{Cl}$       C.  $\text{K}_2\text{CO}_3$       D.  $\text{NaNO}_3$

- 5.** Identify the oxidizing and reducing agent for the following reaction respectively **1**



- A. ZnO & C      B. C & ZnO      C. C & Zn      D. CO & ZnO

- 6.**

Column I	Column II
(a) A metal which is a poor conductor of heat	i. Na
(b) A metal which can be easily cut with a knife	ii. Ga
(c) A metal melts which melts when kept on our palm.	iii. Al
(d) A metal forms amphoteric oxide	iv. Pb

**1**

Column I	Column II
(a) A metal which is a poor conductor of heat	i. Na
(b) A metal which can be easily cut with a knife	ii. Ga
(c) A metal melts which melts when kept on our palm.	iii. Al
(d) A metal forms amphoteric oxide	iv. Pb

Match column I with column II and select the correct option using the given codes

- A. (a) -iii (b) -ii (c) -i (d) -iv  
 B. (a) -iv (b) -i (c) -ii (d) -iii  
 C. (a) -i (b) -iv (c) -iii (d) -ii  
 D. (a) -ii (b) -iii (d) -iv (d) -i

7. Which of the following are exothermic processes? 1

- (i) Reaction of water with quick lime
- (ii) Dilution of an acid
- (iii) Evaporation of water
- (iv) Sublimation of camphor (crystals)

A. (i) and (ii)    B. (ii) and (iii)    C. (i) and (iv)    D. (ii) and (iv)

8. Glucose is converted to pyruvate in Yeast during anaerobic respiration. This process takes place in X. Further pyruvate may be converted to Y and carbon dioxide. Here X and Y respectively are 1

- A. Ethyl alcohol and cytoplasm
- B. Lactic acid and cytoplasm
- C. Cytoplasm and Ethyl alcohol
- D. Cytoplasm and Lactic acid

9. Blood vessel that carries blood from lungs to heart through: 1

- A. Pulmonary artery
- B. Pulmonary vein
- C. Coronary artery
- D. Aorta

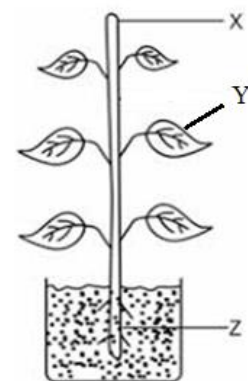
10. An incomplete equation for the digestion of starch using saliva is shown as: 1  
Saliva + Starch (in test tube) →

What will be the likely outcome of this?

- A. Saliva will convert starch into complex fat molecules.
- B. Saliva will convert starch into complex sugar molecules.
- C. Saliva will breakdown starch into simple sugar molecules.
- D. Saliva will breakdown starch into simple protein molecules

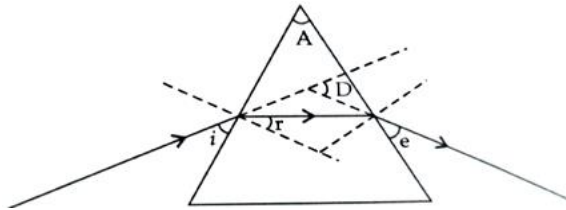
11. The following plant is kept near an open window for seven days to get sunlight, Find out the correct observation from the following options. 1

- A. Part X will grow and bent towards the window.
- B. Part Z will start growing upwards and out of the soil.
- C. Part Y does not grow at all.
- D. Part Y will grow downwards.



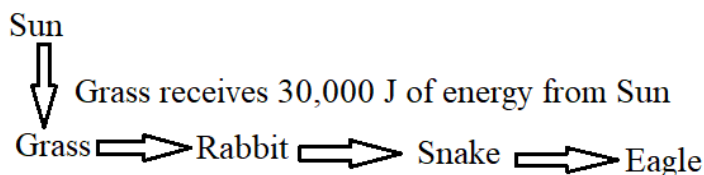
12. If a pure tall pea plant is crossed with a pure dwarf pea plant then, what percentage of  $F_1$  and  $F_2$  generation will be tall respectively? 1
- A. 25%,                      B. 50%, 50%                      C. 75%, 100%                      D. 100%, 75%

13. Write the angles marked correctly in the diagram of prism given below. 1
- A. i, D, r  
B. A, D, r  
C. i, r, e  
D. A, D, e



14. An object is placed 20cm in front of a plane mirror. The mirror is moved 2cm towards the object. The distance between the positions of the original and final images seen in the mirror is: 1
- A. 2 cm                      B. 4 cm                      C. 10 cm                      D. 22 cm

15. Find out the ratio of the amount of energy absorbed by the primary consumer to the amount of energy absorbed by the secondary consumer in the following food chain. 1



- A. 1:2                      B. 1:10                      C. 2:1                      D. 10:1

16. Ozone forms by combination of free oxygen atoms and oxygen molecules. How do free oxygen atoms form at higher levels of atmosphere? 1
- A. By splitting of molecular oxygen into free oxygen atoms in the presence of low energy UV radiations.  
B. By splitting of a molecular oxygen into free oxygen atoms in presence of high energy UV radiations.  
C. By the combination of two molecular oxygen in the presence of high energy UV radiations.  
D. By the combination of two free oxygen atoms in the presence of lower energy UV radiations.

**Question No 17 to 20 consist of two statements – Assertion (A) and Reason (R).**

**Answer these questions by selecting the appropriate option given below:**

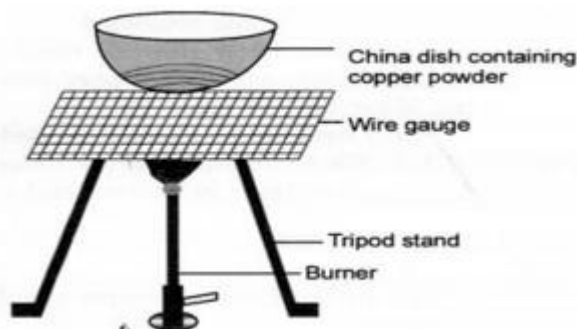
- A. Both A and R are true and R is the correct explanation of A.  
B. Both A and R are true but R is not the correct explanation of A.  
C. A is true but R is false.  
D. A is false but R is true.

17. **Assertion (A):** Curry stain on a white fabric turns reddish brown on applying soap. **1**  
**Reason(R):** Acidic solutions have pH less than seven.
18. **Assertion (A):** In humans, if gene (B) is responsible for black eyes and gene (b) is **1**  
responsible for brown eyes, then the colour of the eyes of the progeny  
having gene combination Bb, bb or BB will be black only.  
**Reason (R):** The black colour of the eyes is a dominant trait.
19. **Assertion (A):** An object is placed at a distance of  $f$  from a concave lens of focal length **1**  
 $f$ , its image will be formed at infinity.  
**Reason (R):** The distance of image in concave lens can never be infinity.
20. **Assertion (A):** Flow of energy in an eco-system is unidirectional. **1**  
**Reason(R):** Energy captured by autotrophs does not revert back to solar input but is  
passed into the primary consumers.

### SECTION-B

Question No. 21 to 26 are very short answer questions.

21. **2**



Study the above diagram and answer the following questions:

- A. Write the balanced chemical equation for the reaction involved in the above process.  
B. State and define the type of the reaction taking place in the above.
22. A. Mention the characteristic feature of alveoli that allows it for the exchange of gases in **2**  
an efficient manner.  
B. Major amount of water is selectively reabsorbed by the tubular part of nephron in  
humans. What are the factors on which the amount of water reabsorbed depends?
23. Name two protein digesting enzymes along with the parts from where they are secreted **2**  
in human being.

**OR**

Give reasons:

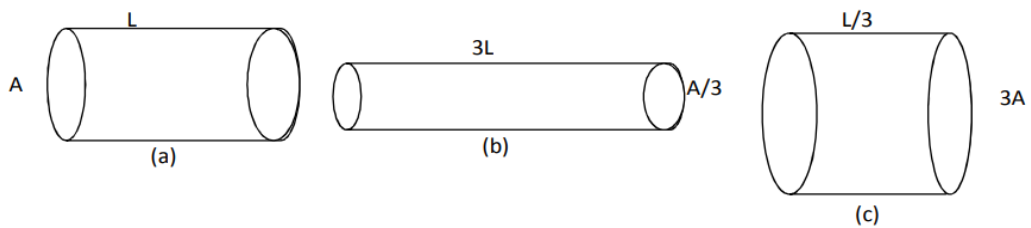
- A. Arteries have thick muscular wall.  
B. Plants have low energy needs.

24. The refractive index of flint glass with respect to benzene is 1.2. If the refractive index of benzene with respect to air is 1.5 then calculate the 2
- A. Refractive index of flint glass with respect to air.
- B. Show the path of light with the help of a diagram when a ray of light travels obliquely from benzene to flint glass.

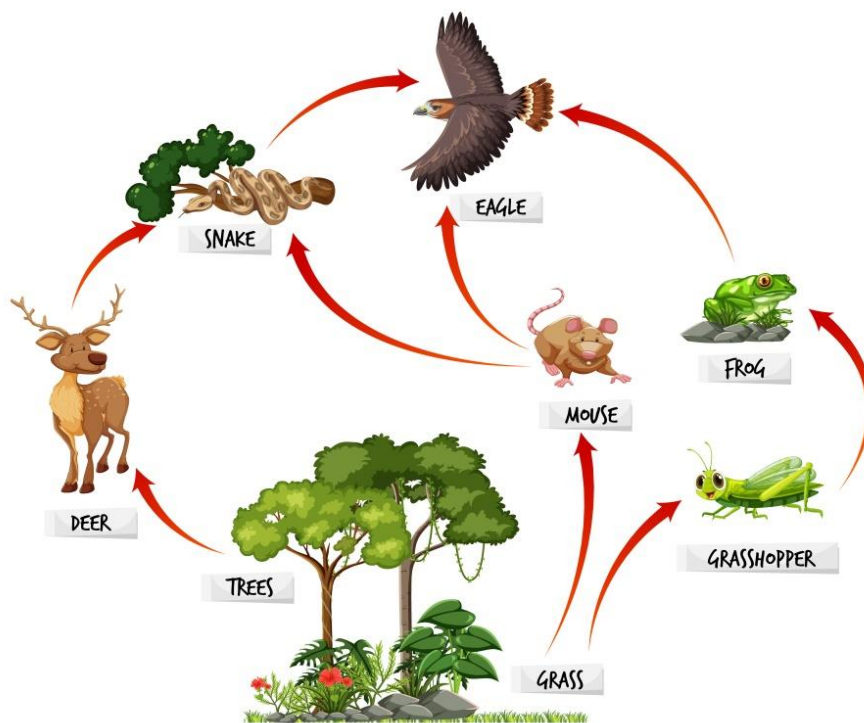
25. A wire of resistance of 16 Ohm. It is melted and drawn into wire of half its original length. Calculate the resistance of the new wire? 2

**OR**

The figure shows three cylindrical copper conductors along with their face areas and lengths. Compare the resistance and resistivity of the three conductors. Justify your answer.



26. Study the food web given below. 2



- A. Identify and write the food chain from the web shown, in which the eagle will receive the highest percentage of energy from the producers.
- B. Which organism will be most affected in the above web when a non biodegradable pesticide is introduced in the soil? State the phenomenon involved here.

## SECTION-C

**Question No. 27 to 33 are short answer questions.**

- 27.** A. An ore of metal 'X' is found in nature as its carbonate. Metal 'X' is used in galvanization of iron articles. Identify the metal 'X' and name its ore. **3**  
B. We cannot use carbon to obtain sodium from sodium oxide. State the reason.  
C. Write the chemical reactions involved during the extraction of sodium metal from its ore.

- 28.** A compound 'P' used for making statues on mixing with water gets converted into a hard substance 'Q'. **3**  
A. Write the common name and chemical formula of P, Q.  
B. Write the balanced chemical equation for the reaction involved in the above process.  
C. List any other two uses of substance P.

**OR**

- A. If someone is suffering from the problem of acidity after over eating, which of the following would you suggest as a remedy. Give reason for your choice.

*Lemon juice, Vinegar, Baking Soda solution.*

- B. What are antacids?

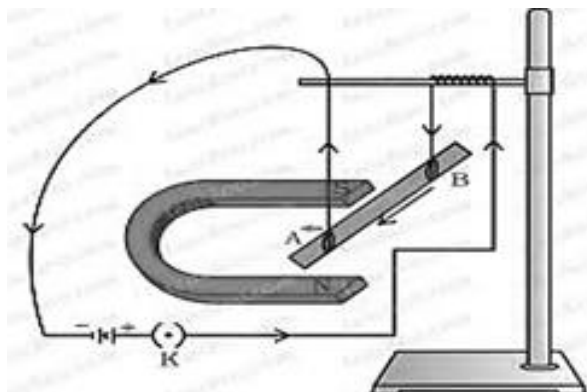
- 29.** Two major forces that help in the transport of water in a plant. Force X is the driving force in the movement of water during the day, whereas the force Y helps the movement of water in a plant during the night or during the day when humidity is very high. **3**  
A. Identify X and Y.  
B. Describe how each of these helps in the movement of water in a plant.

- 30.** A. In a family of four individuals, the father possessed long ears and the mother possessed short ears. If the parents had pure dominant and recessive traits respectively, then calculate the ratio of genetic makeup of F<sub>2</sub> generation. Show a suitable cross. **3**  
B. If father had short ears and the mother had long ears, explain what effect it will have on the ratio of genetic makeup in F<sub>2</sub> generation.

- 31.** A person is unable to see the object placed beyond 2 m from his eyes. **3**  
A. Name the defect of vision the person is suffering from.  
B. Mention the type of lens that he should use for the correction of the defect and calculate its power.  
C. Draw a labelled diagram for the correction of the defect in the above case.

32. A. An electric bulb is rated 220V and 60W. Calculate its power when it is operated on 110V. 3
- B. A wire of resistance 5 ohm is bent in the form of a closed circle. What is the effective resistance between the two points at the ends of any diameter of the circle?
- C. An electric refrigerator rated 400W operates 8 hours per day. What is the cost of the energy to operate it for 30 days at Rs 3.00 per kWh?

33. A. Observe the apparatus set up of Kick wire experiment and answer the following questions. 3



- How will be the displacement of the conductor changed when (i) strength of the magnetic field is larger? (ii) the length of the conductor be smaller?
- B. How does the strength of the magnetic field at the centre of a circular coil of wire depend upon: (i) the radius of the coil (ii) the number of turns in the coil?
- C. Find the direction of force experienced by an electron moving horizontally towards east in a magnetic field in vertically downward direction. Also name the rule.

#### SECTION-D

**Question No 34 to 36 are long answer questions.**

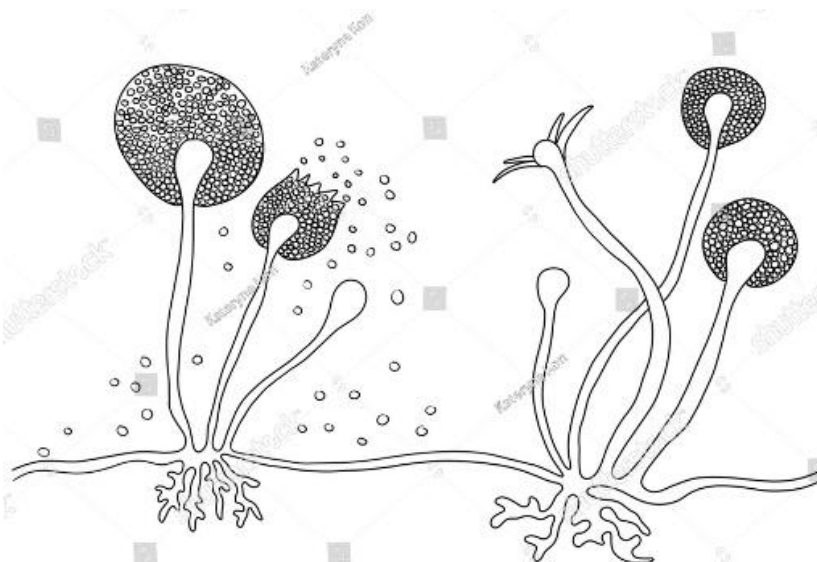
34. A. Define isomerism. 5
- B. Draw the structure of pentanone.
- C. A compound X is formed by the reaction of a carboxylic acid  $C_2H_4O_2$  and an alcohol which is used in making tincture of iodine in presence of an acid catalyst. The alcohol when heated with concentrated  $H_2SO_4$  gives a compound Y.
- i) Identify the compounds X and Y
  - ii) Write the chemical equation for formation of X
  - iii) Name the process and write the formula of the compound formed when Y is treated with hydrogen gas in presence of catalyst.

**OR**



- A. Define catenation.
- B. Draw the electron dot structure of ethane.
- C. Two organic compounds A and B have same molecular formula ( $C_6H_{12}$ ). Draw the structure, if
- A is a cyclic compound
  - B is naturally occurring straight chain unsaturated compound.
  - State the relation between A and B.

- 35.** A. Plants produced through vegetative propagation are genetically identical to their parents. State two additional advantages of vegetative propagation other than the one mentioned above. **5**
- B. Name the reproductive and non-productive parts of Rhizopus as shown in the following diagram.



- C. How are the spores protected till they begin to grow?
- D. Amoeba, Leishmania and Plasmodium multiply by fission. Is there any difference in the division of these organisms? Explain.

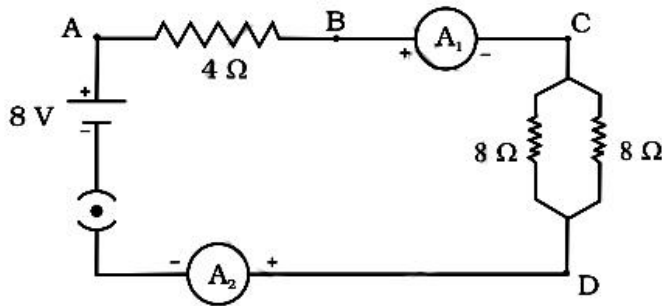
**OR**

Given below are certain situations. Analyse and describe its possible impact.

- If we cut a part of Planaria.
- Stigma is removed from a flower.
- Style is plugged from a flower.
- Uterus lining is not thickened.
- Fallopian tubes are plugged.

36. Find out the following in the electric circuit given in figure:

5



- A. Effective resistance of two  $8\ \Omega$  resistors in the combination.
- B. Current flowing through  $4\ \Omega$  resistor.
- C. Potential difference across  $4\ \Omega$  resistor.
- D. Power dissipated in  $4\ \Omega$  resistor.
- E. Is there any difference in the Ammeter readings? Justify your answer.

OR

You are given with 3 resistors of resistance  $9\ \Omega$  each. How will you connect them so that

- A. Same current flows through each resistor. What will be the total resistance in this case?
- B. Potential difference is same across each resistor. Find the total resistance for the same combination.
- C. Total resistance of the combination becomes  $6\ \Omega$ .
- D. Write about any two advantages of connecting the home appliances in parallel rather than series.

### SECTION-E

Question No. 37 to 39 are case-based /data-based questions.

37. Soaps are molecules in which the two ends have differing properties, one is hydrophilic, that is, it interacts with water, while the other end is hydrophobic, that is, it interacts with hydrocarbons. When soap is at the surface of water, the hydrophobic 'tail' of soap will not be soluble in water and the soap will align along the surface of water with the ionic end in water and the hydrocarbon 'tail' protruding out of water. Inside water, these molecules have a unique orientation that keeps the hydrocarbon portion out of the water.

- A. Define saponification reaction.
- B. Name the structure formed by soap when added in water.

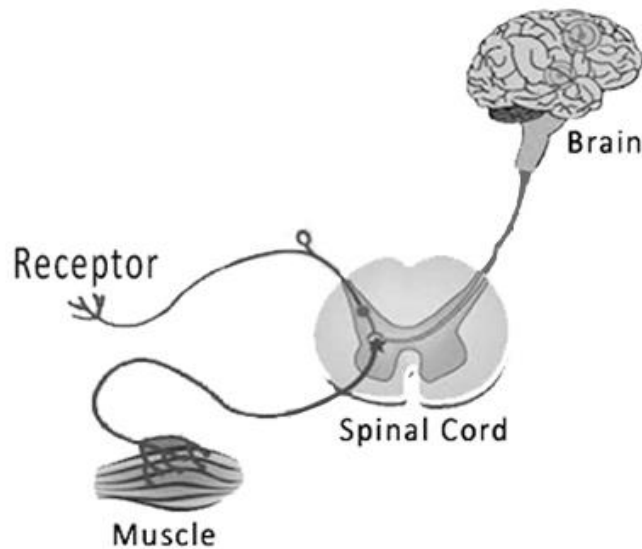
Attempt either sub-part C or D

- C. Compare soap and detergent on the basis of their composition.

OR

- D. Which is more suitable for testing hardness of water, soap or detergent? Justify your answer.

38. Sneha observed a picture and was listening to her teacher that cerebral hemispheres are largest part of the brain. They are most specialized and complex part of the brain. Each hemisphere has association areas which stores information and experience. She saw that her blinking of eyes, movement of diaphragm during respiration, withdrawal of hand or foot every time when it is suddenly pinched or pricked with a needle or touch by a hot object, coughing, yawning, sneezing etc. are all reflex action. She asked to her teacher how the parts of the brain convey the information to the required body parts to respond. 4



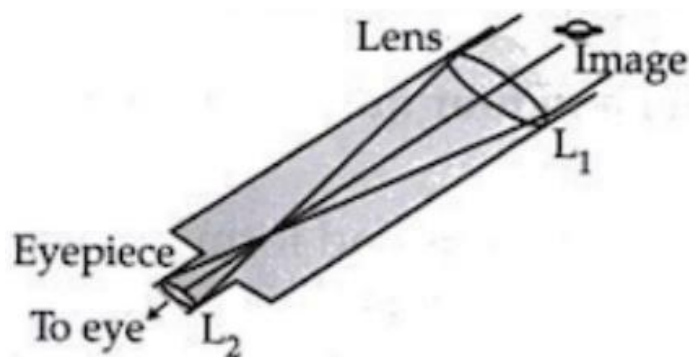
**Attempt either sub-part A or B.**

- A. What is reflex action? State the role of brain in reflex actions.

**OR**

- B. State two limitations of nervous coordination in human being.  
C. How reflex action is different from walking?  
D. Which part of the human brain is the site of intelligence and memory? Also name the part which is responsible for maintaining the posture and balance of the body?

39. 4



Sruti wanted to see the stars of the night sky. She decided to make a refracting telescope. She bought two lenses,  $L_1$  and  $L_2$ . out of which  $L_1$  was bigger and  $L_2$  was smaller. The larger lens gathers and bends the light, while the smaller lens magnifies

the image. Big, thick lenses are more powerful. So to see far away, she needed a big powerful lens.

- A. Based on the diagram shown, what kind of lenses would Sruti need to make the telescope ?
- B. If the powers of the lenses  $L_1$  and  $L_2$  are in the ratio of 4:1, which lens will produce more convergent light ? State reason.

**Attempt either option C or D**

- C. The telescope has a convex lens (Eyepiece) with a focal length of 20 cm. The image formed by the lens  $L_1$  (Objective) is placed upside down 15 cm from the lens  $L_2$ . How far away from the convex lens (Eyepiece) an image will be formed?

**OR**

- D. When the object is very far from the lens  $L_1$  (Objective) a point size image is formed 30cm in front of the  $L_1$ . Calculate the power of the lens.

**\*\*\***