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DELHI POLICE PUBLIC SCHOOL
HALF YEARLY EXAMINATION (2025-26)
SCIENCE(SUBJECT CODE-086)

CLASS- X. – A
TIME - 3 Hrs.

Date: 25/09/2025
Max.Marks= 80
Total no. of pages-09

General Instructions :

(i) All questions are compulsory.
(ii)This question paper is from pg.1 to pg.9 consists of 39 Questions in 3 Sections. Section A - Biology (Q.1to Q.16), Section B - Chemistry(Q.17 to Q.29)and Section C- Physics(Q.30to Q.39)
(ii) An internal choice is provided in some questions. A student is expected to attempt only one of these questions.

SECTION - A

1.In plants , waste products like resins and gums are stored in the - [1]
a) leaves that fall off b)old xylem c)phloem d)cellular vacuoles

2.The opening and closing of stomata depends upon the - [1]
a) temperature of the surrounding environment
b) amount of carbon dioxide in the guard cells
c) amount of oxygen in the guard cells
d) flow of water in and out of guard cells

3.Which of the following statement/s is /are true with respect to the neuron? [1]
I - Dendrites of neuron pass the impulse to the axon
II- Axon of neuron carries the impulse from the cell body
III-Sensory neuron carries the impulse to the specific effector tissues
IV- Transmission of impulse from neuron to muscle occurs at the neuro-muscular junction
a) I only b)I and III c) II and III d)II and IV

4.A doctor prescribed regular insulin injections to his patient because - [1]
a) his heart beat and pulse was very low
b) he was suffering from goitre
c) the pancreatic hormonal secretions were very low
d) his blood urea levels were very high

5.Which of the following is the most affected due to biological magnification in the given food chain : phytoplanktons —>small fish —-> big fish —-> man [1]
a) phytoplanktons b)small fish c)big fish d)man

6.The_____ and _____ are involved in control of hunger and breathing respectively- [1]

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a) cerebrum and cerebellum
b) Cerebellum and medulla
b)Medulla and cerebellum
d)Cerebrum and medulla

7.In the human respiratory pathway , the path taken when we breathe in air is - [1]

a) nostrils —> larynx —> trachea—> pharynx—>Alveoli
b) nostrils —> trachea —> larynx—>Pharynx —> alveoli
c) Nostrils —> pharynx —>Larynx —>trachea —>Alveoli
d) Nostrils —>larynx—>pharynx—>Trachea—>alveoli

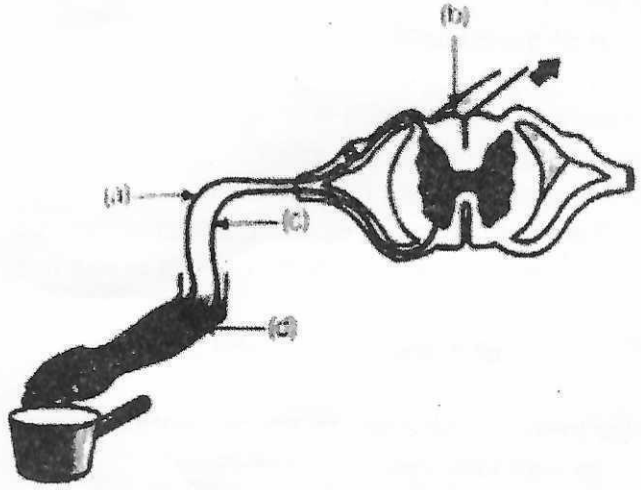
ASSERTION - REASON BASED Q'S (Choose correct option for Q8,Q9 from below)

a) Both Assertion and reason are true and reason is the correct explanation
b) Both Assertion and reason are true but reason is not the correct explanation
c) Assertion is true but reason is false
d) Assertion is false but reason is true

8.Assertion- Chemical coordination is seen in both plants and animals [1]
Reason- Plant hormones control directional growth , whereas in animals growth is never seen only in one direction .

9. Assertion - The movement of root and shoot towards gravity and light respectively is directional in nature [1]
Reason - They both occur due to plant growth hormones and show directional growth .

10. a)Label parts - a, b, c and d in the given diagram.
(b) Name the neuron between a and c within the spinal cord [2]



11. Explain the role of the respiratory carrier in humans ? Why does the respiratory carrier have no role in the transport of carbon dioxide ? [2]

OR

How would the photosynthetic pathway be affected if water is not split by chemical energy? Explain briefly .

12.What is the role of the following in digestion- [2]

a) Saliva in mouth
b) Pancreatic juices

13.Explain how the nephron forms urine in the kidneys . [3]

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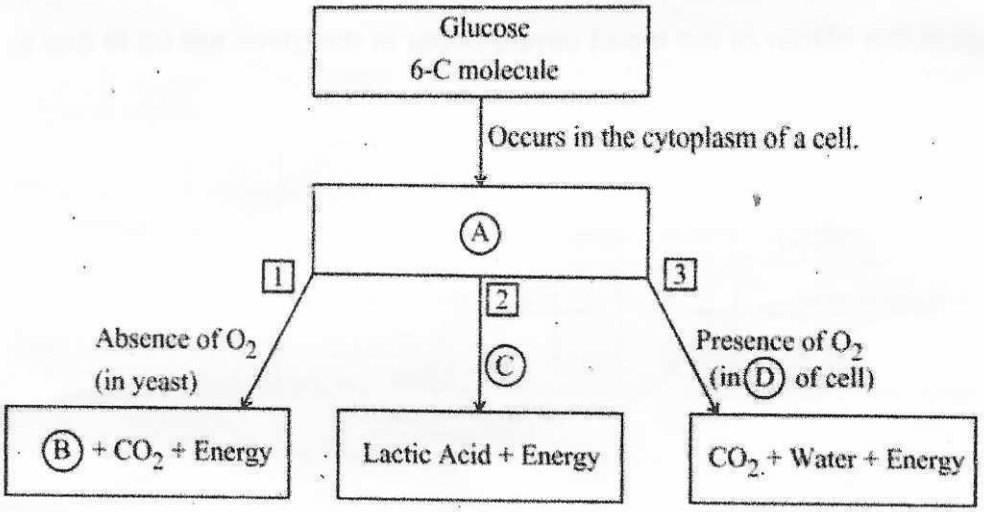
14.a)Explain the 10% law of energy transfer in a food chain along with an example .
b) How is ozone formed ? How is it being depleted in the atmosphere ? [3]



15.Study the pathway depicted with respect to various respiratory conditions / situations in various types of cells . In all of the situations , glucose is broken down to release varied products . [4]

a) Write the names of A,B,C and D
b) By what processes is glucose obtained in plants (I) and animals (II) for cellular respiration ?
c) Why do athletes face severe muscular cramps during intensive running sessions ?

OR

d) Which pathway is beneficial to the food and beverage industry and how ?

16.a)Define Double circulation . How do arteries and veins differ from each other
b) Explain how the separation of the heart in birds and mammals is advantageous in contrast to amphibians . [5]

OR

a) Name the tissue fluid in the body . Explain how it is formed along with two functions .
b) Draw a neat diagram of the human excretory system labelling -
i) blood vessel bringing blood to the kidneys
ii) Release of urine takes place
iii) Filtration of urine takes place

SECTION - B

17. On heating solid lead nitrate in a test tube we observe [1]
a)Fumes of yellow colour b)Melting of lead nitrate
c)Formation of black solid d)Fumes of brown colour

18.Which of the following gases can be used for storage of fresh sample of an oil for a long time?

 [1]

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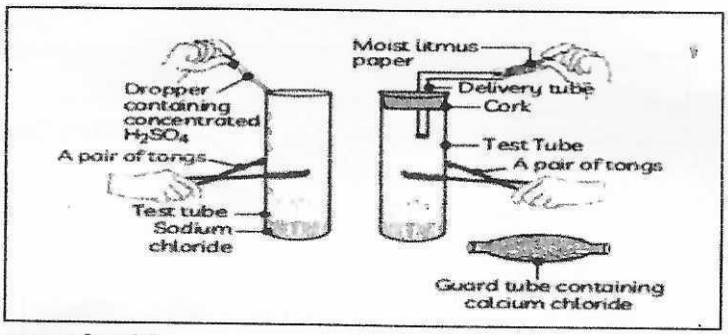
a) Carbon dioxide and Oxygen
b) Nitrogen and Oxygen.
c) Carbon dioxide and Helium
d) Helium and Nitrogen

19.The change in the colour of the moist litmus paper in the given set up is due to [1]



(i)Presence of acid
(ii)Presence of base
(iii)Presence of H+ in the solution
(iv)Presence of litmus which act as an indicator

a) (i) and (ii) b) Only (ii) c) Only (iii) d) Only (iv)

20.How will you protect yourself from the heat generated while diluting a concentrated acid? [1]
a) By adding acid to water with constant stirring
b) By adding water to acid with constant stirring
c) By adding water to acid followed by base
d) By adding base to acid with constant stirring

21.Aqua regia is called as royal water because it dissolves gold, its concentration is 1:3 concentrated [1]
a) $H_2SO_4 : HNO_3$ b)$HNO_3 : H_2SO_4$
c) HNO_3 : HCl d)HCl : HNO_3

22.Which of the following metals liberate hydrogen with 5% HNO_3 [1]
(i)Cu (ii) Zn (iii) Mn (iv) Mg

a) (i) and (ii) b) (ii) and (iii) c) (iii) and (iv) d) (I) and (iv)

23.Reaction between X and Y , forms compound Z, X looses electron and Y gains electron . which of the following properties is not shown by Z? [1]
a) Has high melting point
b) Insoluble in water
c) Conducts electricity in molten state
d) Occurs as solid

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24.ASSERTION REASON BASED QUESTION [1]

ASSERTION- Carbonic acid is a weak acid.
REASON- It ionises completely in aqueous solution.

25.What is observed when a solution of potassium iodide solution is added to a solution of lead nitrate? Name the type of reaction. Write a balanced chemical equation to represent the above chemical reaction. [2]

26.When electricity is passed through aqueous solution of common salt , three products are obtained. Name them, specifying the electrode at which each of these products is obtained. Also give one use of each. [3]

27.An element X is stored in kerosene and cannot be extracted from its ore using a reducing agent . X forms an ionic compound on reaction with chlorine.

a) Can we store X in water? Give reason to support your answer.

b) Identify the element X . Name the process used and write the equation for extraction of X from its ore. [3]

[OR]

The domes of many buildings in Europe are made of copper. These domes now appear greenish in colour.

a) Why do the domes appear greenish though copper is orange-red in colour?

b) In your opinion, should the copper domes be replaced by iron domes to overcome the problem of change of colour of copper domes?

c) Domes used to be made from thin sheets of metals. Why did the ancient architects use copper to make domes?

28.The metals produced by various reduction processes are not pure. They contain impurities which must be removed to obtain pure metals. The most widely used method for refining impure metals is electrolytic refining. [4]

(a)What is the cathode and anode made of in the refining of copper by this process?

(b)Name the solution used in the above process and write its formula.

(c)How copper is extracted by electrolytic refining ?

(d)Carbonates and sulphides are converted into oxides during the process of extraction.Justify the statement.

[OR]

A metal M which is used in thermite process, when heated with oxygen gives an oxide B which is amphoteric in nature. Identify M and B.

29.(a) Salt A commonly used in bakery products on heating gets converted into another salt B which itself is used for removal of hardness of water and a gas C is evolved. The gas C when passed through lime water turns it milky. Identify A, B and C. Also write the balance chemical equations for the reactions involved. [2]

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(b)You have four solutions A, B, C and D. The pH of solution A is 6, B is 9, C is 12 and D is 7. [3]

i) Identify the most acidic and most basic solutions.

ii)Arrange the above four solutions in the increasing order of H+ ion concentration.

iii)State the change in colour of pH paper on dipping in solution C and D.

[OR]

(a) Show the formation of calcium chloride by the transfer of electrons. What are the ions present in it? [2]

(b) Explain with the help of an activity that metals are good conductor of heat. [2]

(c) "Solid NaCl does not conduct electricity but brine solution does". Justify the statement. [1]

SECTION - C

30. Raman was observing spherical lenses and he concluded the following statements from his understanding of refraction through curved surfaces. [1]

I. Convex lenses can produce both real and virtual images depending on the position of the object.

ii. Concave lenses always produce real, inverted images regardless of the object's position.

III. In both concave and convex ~~mirrors~~ lenses, the image location can be determined using the lens formula $1/v - 1/u = 1/f$
where f is the focal length, v is the image distance, and u is the object distance.

Choose from the following the correct option that lists the correct statements about refraction through spherical lenses. [1]

A. I and II B. I, II and III C. II and III D. I and III.

31. Choose the correct option from the below which explains the reason for us to perceive the day sky as blue. [1]

A. The blue color of the sky is due to longer wavelengths like red and orange scattering more than shorter wavelengths, making blue stand out more.

B. The sky appears blue because all colors are scattered equally, but blue light is stronger and more visible to the human eye.

C. The atmosphere contains blue-colored particles that give the sky its blue appearance.

D. As sunlight passes through the atmosphere, shorter wavelengths, such as blue are scattered more than other colors.

The following question consists 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, and R is not the correct explanation of A.

C. A is true but R is false.

D. A is false but R is true.

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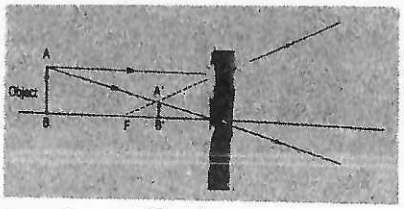
32. Assertion (A): An object is placed at a distance of 32 cm from a concave mirror of focal length 16 cm. The image will not form at infinity.
Reason (R): For above given situation the equation 1/v + 1/u = 1/f gives v = -32cm. [1]

33.



The above image shows the formation of an image with an optical instrument.

A. Identify the optical instrument (shown schematically as a rectangle) in the above figure.

B. What type of image is formed in this case?

C. Calculate the object distance of the optical instrument shown in above ray diagram if the focal length of the above optical instrument is 15 cm which forms it's image at 10 cm from the instrument. [2]

<u>For visually impaired students</u>

A. Under what conditions does a convex lens forms a virtual image?

B. Why does a piece of paper catch fire if we allow sunlight to pass through a convex lens onto the paper?

34 .Attempt either option A OR B.

A. Show the refraction phenomena of a ray of light through a glass prism in a ray diagram.
And label the angle of incidence<i , angle of deviation <D in the diagram. [2]

OR

B. Show the refraction phenomena of a ray of light through a glass slab and represent angle of incidence< i, lateral displacement 'd'in the diagram.

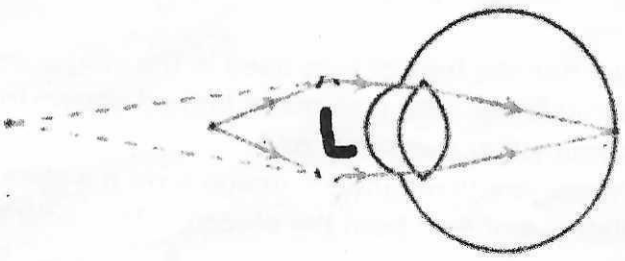
<u>For visually impaired students</u>

A. Explain dispersion of light through a glass prism. Also mention which colour of white light deviate most in dispersion and why?

OR

B. What arrangement needs to be done to obtain the same white ray of light after dispersion through first glass prism.

35.



The above image shows a corrective measure for a particular defect of vision.

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(i) Identify the defect of vision and state what kind of lens L is used to correct this deficiency.
(ii) Draw and label a ray diagram that shows the defect of vision in the above case before correction. [3]

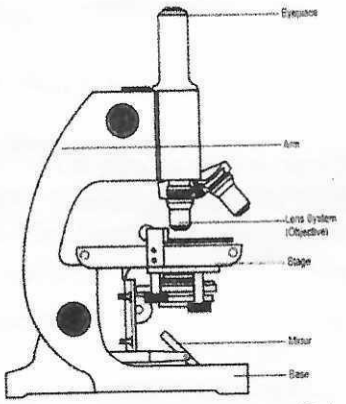
For visually impaired students
(i) What is scattering of light?
(ii) Explain the optical phenomena twinkling of stars w.r.t atmospheric refraction.
(iii) The sun can be seen 2 minutes earlier than the actual sunrise. Why?

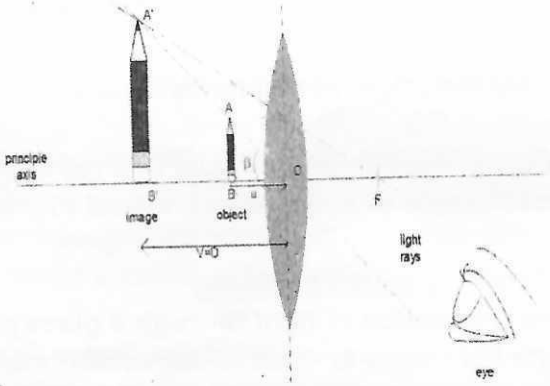
36.i) Why are concave mirrors used by dentist and ENT specialists ?
ii) An object 5 cm tall was placed in front of a spherical mirror at 20 cm distance from the mirror. If a virtual image of 10 cm tall was formed behind the mirror, find the focal length of the mirror and the position of the image. Name the type of mirror used. [3]

37.i) State Snell's law of refraction mathematically.
ii) A convex lens forms a real image four times magnified at a distance of 60 cm from the lens.Calculate the focal length and the power of the lens. [3]

38.

Simple Microscope





Karina was observing a slide of microorganism using a Simple microscope which magnify it's size by 100 times. Simple microscope magnify objects by bending light rays through a lens. The shorter the focal length of the lens, the greater the magnification. It's works on the principal that when an object is placed within the focal length of the lens, the microscope forms a magnified image. [4]

A.Mention the type of lens used in the simple microscope shown above?
B. What is the nature of image formed shown in above ray diagram.
Attempt either subpart C or D.
C.Where would magnified image form if a slide of microbes is observed by keeping at a distance of 5cm from the objective lens with 8cm focal length of the lens.

8

OR

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D.Find out the original size of microbe if it is observed as 100 times bigger to a size of 2cm.

For visually impaired students

Sonia took three concave mirrors of different focal length and performed the experiment to see the image formation by placing an object at different distances with these mirrors as shown in the following table:

Type of Mirror	Object distance (u)	Focal length (f)
X	30 cm	20 cm
Y	40 cm	20 cm
Z	20 cm	30 cm

A) List any two characteristics (nature) of the image formed in case X

B) Mention the type of mirror will form real image of same size. Justify your answer.

Attempt either subpart C or D.

C) Identify the object distance and focal length from above which resembles the situation in which concave mirror can be used as saving mirrors.Justify.

OR

D) Where would the image forms using mirror Z.

39. Attempt either option A or B.

A. i) What do you mean by refractive index of diamond 2.42 ? Explain in brief. [5] Also find the speed of light in diamond.

ii) How does optical density of a medium different from it's mass density. Explain it in case of kerosene and water medium.

iii) Light enters from air to water which has refractive index of 1.33. Calculate the speed of light in water.

OR

B. i) What do you mean by power of accomodation of the eye lens.

ii) How does ciliary muscle changes the focal length of the eye lens in humans.

iii) The far point of a myopic person is 150 cm in front of the eye calculate the focal length and power of the lens required to enable him to see objects clearly.

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