

INDIAN SCHOOL AL WADI AL KABIR

SAMPLE PAPER 2

Class X Science (086) Theory

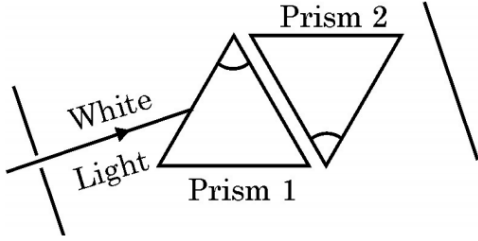
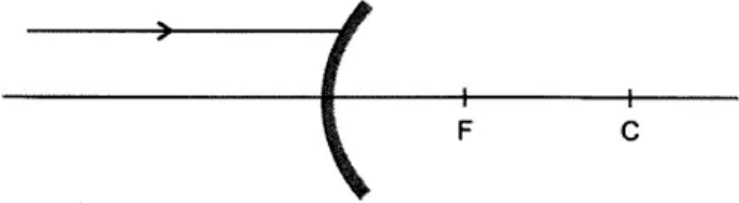
Time: 3 Hours

Maximum Marks: 80

General Instructions:

- (i) The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.
- (ii) Section–A - question no. 1 to 20 - all questions and parts thereof are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.
- (iii) Section–B - question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.
- (iv) Section–C - question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should in the range of 50 to 80 words.
- (v) Section–D – question no. - 34 to 36 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.
- (vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (vii) Wherever necessary, neat and properly labeled diagrams should be drawn.

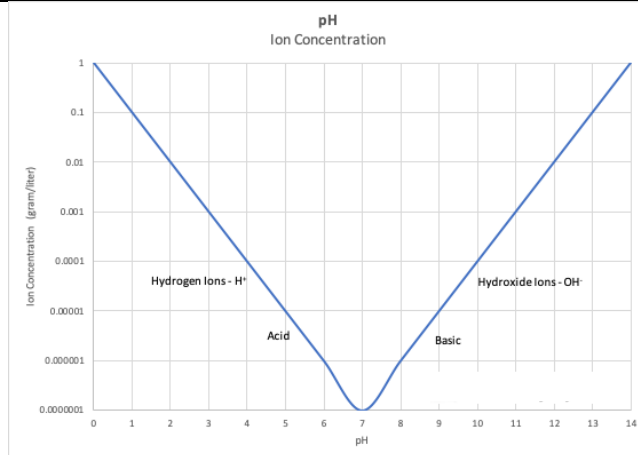
SECTION A		
No.	Questions	Marks
1	Identify the substance oxidised in the following reaction: $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$ <p style="text-align: center;">OR</p> State the type of chemical reaction that takes place when electric current is passed through water.	1
2	Out of the three elements P, Q and R having atomic numbers 11, 17 and 19 respectively, which two elements will show similar properties?	1
3.	The elements whose oxides can turn red litmus solution blue are: (a) Carbon and sulphur (b) Sodium and carbon (c) Potassium and magnesium (d) Magnesium and sulphur.	1
4	A cylindrical conductor of length ' ℓ ' and uniform area of cross-section 'A' has resistance 'R'. Another conductor of length 2.5ℓ and resistance $0.5R$ of the same material has area of cross-section -----	1
5	Sky appears dark in space. Give reason	1
6	A student uses spectacles of focal length -2 m. Calculate the power of this lens. <p style="text-align: center;">OR</p> You are given three media A, B and C of refractive index 1.33, 1.65 and 1.46. In which medium does the light will travel the fastest	1

7	<p>Complete the path of white light when it passes through two identical prisms placed as shown:</p> 	1
8	<p>Redraw the diagram given below in your answer book and show the direction of the light ray after reflection from the mirror.</p> 	1
9	<p>Two resistors X and Y of resistances $5\ \Omega$ and $10\ \Omega$ respectively joined in parallel. The voltage supplied is 6V. Draw circuit diagram to show the combination of resistors in this case.</p> <p style="text-align: center;">OR</p> <p>The maximum resistance which can be made using four resistors each of $2\ \Omega$ is _____.</p>	1
10	<p>What is the importance of anal sphincter?</p>	1
11	<p>Why are testes located outside the abdominal cavity in humans?</p> <p style="text-align: center;">OR</p> <p>Why is fertilisation said to be internal in humans?</p>	1
12	<p>What is a trophic level?</p> <p style="text-align: center;">OR</p> <p>What is a food web?</p>	1
13	<p>Why do parasitic unicellular organisms reproduce through multiple fission?</p>	1
<p>For question numbers 14, 15 and 16, two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:</p> <p>a) Both A and R are true, and R is correct explanation of the assertion. b) Both A and R are true, but R is not the correct explanation of the assertion. c) A is true, but R is false. d) A is false, but R is true.</p>		
14	<p>Assertion: Calcium carbonate when heated gives calcium oxide and water. Reason: On heating calcium carbonate, decomposition reaction takes place.</p>	1
15	<p>Assertion: Aerobic respiration yields more energy. Reason: Incomplete oxidation of glucose occurs in aerobic respiration.</p> <p style="text-align: center;">OR</p> <p>Assertion: Energy needs of a plant are very high Reason : Transpiration occurs through stomata</p>	1
16	<p>Assertion: Energy flow is unidirectional in a food chain. Reason: Energy transferred from one trophic level to another cannot be returned back.</p>	1

Answer Q. No 17 - 20 contain five sub-parts each. You are expected to answer any four subparts in these questions.

17	<p><u>Read the following and answer any four questions from 17 (i) to 17 (v)</u></p> <p>An artificial kidney is a device to remove nitrogenous waste products from the blood through dialysis in case of patients have kidney failure. Artificial kidneys contain a number of tubes with a semi-permeable lining, suspended in a tank filled with dialysing fluid. This fluid has the same osmotic pressure as blood, except that it is devoid of nitrogenous wastes. The patient's blood is passed through these tubes. During this passage, the waste products from the blood pass into dialysing fluid by diffusion. The purified blood is pumped back into the patient. This is similar to the function of the kidney, but it is different since there is no reabsorption involved.</p>	(1x4)															
17(i)	<p>The filtering units of kidney are;</p> <p>a) Neuron b) Hepatic cells c) Nephron d) Ureters</p>																
17(ii)	<p>Study the below given table:</p> <table border="1" data-bbox="347 1010 1292 1395"> <thead> <tr> <th>Substance</th> <th>Blood plasma %</th> <th>Urine %</th> </tr> </thead> <tbody> <tr> <td>Water</td> <td>90</td> <td>90</td> </tr> <tr> <td>Plasma proteins</td> <td>8</td> <td>0</td> </tr> <tr> <td>Glucose</td> <td>0.2</td> <td>0.1</td> </tr> <tr> <td>Urea</td> <td>0.03</td> <td>2</td> </tr> </tbody> </table> <p>Compare the contents of blood and urine and identify the substance that does not get filtered from blood into the renal tubule.</p> <p>a) Urea b) Plasma proteins c) Glucose d) Water</p>	Substance	Blood plasma %	Urine %	Water	90	90	Plasma proteins	8	0	Glucose	0.2	0.1	Urea	0.03	2	
Substance	Blood plasma %	Urine %															
Water	90	90															
Plasma proteins	8	0															
Glucose	0.2	0.1															
Urea	0.03	2															
17(iii)	<p>The dialysing fluid is different from blood in:</p> <p>a) Osmotic pressure b) Water content c) Nitrogenous waste d) None of the above</p>																
17(iv)	<p>Artificial kidney differs from normal kidney in which of the following steps?</p> <p>a) Diffusion b) Reabsorption c) Filtration d) None of the above</p>																

17(v)	The purified blood is returned to the body through a: a) Artery b) Capillary c) Vein d) None of the above	
18	<u>Read the following and answer any four questions from 18 (i) to 18 (v)</u> pH scale:- The scale developed to measure the concentration of hydrogen ion in a solution is known as pH scale where p in pH implies potenz in German. pH scale ranges from 0(highly acidic)-14(highly alkaline). An increase in OH ⁻ ion concentration in the solution results in increase in the strength of alkali hence the value of pH increases.	(1x4)
18(i)	Which one of the following solutions would you use to test the pH of a given sample? (a) Blue litmus solution (b) Red litmus solution (c) Universal indicator solution (d) Mixture of red and blue litmus solution	
18(ii)	If pH of the solution changes from 6 to 4, the solution become: (a) less basic (b) less acidic (c) more acidic (d) neutral.	
18(iii)	A student was given four unknown colourless samples labelled A, B, C and D. He was asked to test their pH with pH paper. He observed the following colour changes: A – light green B – dark red C – light orange D – dark blue The correct sequence of increasing order of pH of sample is: a) $A < B < C < D$ b) $A < D < C < B$ c) $C < B < A < D$ d) $B < C < A < D$.	
18(iv)	Study the graph below and answer the following question:	



The solution having a high concentration of hydrogen ions has -----

- a) A high pH value
- b) pH value 7
- c) A low pH value
- d) pH value ranges from 0-14

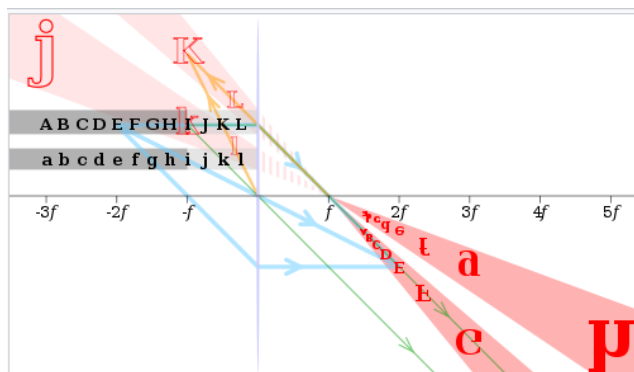
18(v) Study the table and select the solution which is most acidic.

Substance	pH
Apples	3.0
Baking soda	8.5
Black coffee	5.0
Household ammonia	12.0
Lemon juice	2.5
Milk	6.5

19 Read the following and answer any **four** questions from 19 (i) to 19 (v)

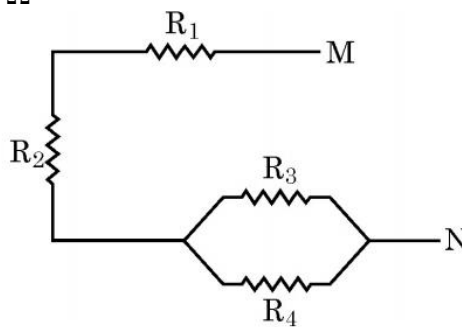
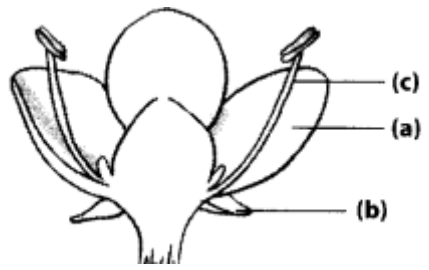
(1x4)

A lens is a transmissive optical device that focuses or disperses a light beam by means of refraction. A simple lens consists of a single piece of transparent material, while a compound lens consists of several simple lenses (elements), usually arranged along a common axis. Lenses are made from materials such as glass or plastic, and are ground and polished to a desired shape. A lens can focus light to form an image, unlike a prism, which refracts light without focusing. A positive or converging lens in air focuses a collimated beam travelling along the lens axis to a spot (known as the focal point) at a distance f from the lens. Conversely, a point source of light placed at the focal point is converted into a collimated beam by the lens.



	In the figure, images of black letters in a thin convex lens of focal length f are shown in red. Selected rays are shown for letters E, I and K in blue, green and orange, respectively. Note that E (at $2f$) has an equal-size, real and inverted image; I (at f) has its image at infinity; and K (at $f/2$) has a double-size, virtual and upright image.	
19(i).	The image formed by a convex lens can be a) virtual and magnified b) virtual and diminished c) virtual and of same size d) virtual image is not formed	
19(ii).	When the object is placed between f and $2f$ of a convex lens, the image formed is a) at f b) at $2f$ c) beyond $2f$ d) between O and f	
19(iii).	Convex lens focus a real, point sized image at focus, the object is placed a) At focus b) Between F and $2F$ c) At infinity d) At $2F$	
19(iv).	If an object is placed 21 cm from a converging lens, the image formed is slightly smaller than the object. If the object is placed at a distance of 19 cm from the lens, the image formed is slightly larger than the object. The approximate focal length of the lens is: a) 20 cm b) 18 cm c) 10 cm d) 5 cm	
19(v).	Which of the following statements is true? a) A convex lens has 4 dioptr power having a focal length 0.25 m b) A convex lens has -4 dioptr power having a focal length 0.25 m c) A concave lens has 4 dioptr power having a focal length 0.25 m d) A concave lens has -4 dioptr power having a focal length 0.25 m.	
20	Read the following and answer any four questions from 20 (i) to 20 (v) In electronics and electromagnetism, the electrical resistance of an object is a measure of its opposition to the flow of electric current. The reciprocal quantity is electrical conductance, and is the ease with which an electric current passes. Electrical resistance shares some conceptual parallels with the notion of mechanical friction. The resistance of an object depends in large part on the material it is made of. Objects made of electrical insulators like rubber tend to have very high resistance and low conductivity, while objects made of electrical conductors like metals tend to have very low resistance and high conductivity. This relationship is quantified by resistivity or conductivity. The nature of a material is not the only factor in resistance and conductance, however; it also depends on the size and shape of an object. For example, a wire's	(1x4)

	resistance is higher if it is long and thin, and lower if it is short and thick. All objects resist electrical current, except for superconductors, which have a resistance of zero. Resistivity is a measure of the material's ability to oppose electric current.	
20(i)	The hindrance presented by material of conductor to the smooth passing of electric current is known as: a) Resistance b) Conductance c) Potential difference d) None of these	
20(ii)	When a 40V battery is connected across an unknown resistor there is a current of 100 mA in the circuit. Find the value of the resistance of the resistor: a) 4 Ω b) 800 Ω c) 0.8 Ω d) 400 Ω	
20(iii)	If length of a conductor and its radius is increased twice, how the resistance will change? a) Resistance will remain unchanged b) Resistance increase twice c) Resistance will become half d) Resistance will increase 4 times	
20(iv)	The SI unit of resistance is a) ohm m b) volt c) ohm d) watt	
20(v)	There is wire of length l and cross section A. Which of the given have least resistance? a) Length doubled, Area halved b) Length tripled, Area doubled c) Length halved, Area doubled d) The original wire	
SECTION B		
21	Differentiate between budding and fission. OR How is fission in amoeba different from fission in paramecium during favourable conditions?	2
22	Explain the importance of the following in digestion: a) Salivary amylase b) Lipase	2
23	Write chemical equations that shows aluminium oxide reacts with acid as well as base. OR	2

	Write the electron dot structure for sodium and chlorine atoms. How do these form a chemical bond? Name the type of bond so formed. Show the formation of sodium chloride using electron dot structures.	
24	F and Cl are the elements each having seven valence electrons. Which of these (a) has the largest atomic radius, (b) is most reactive? Justify your answer stating reason for each.	2
25	For the combination of resistors shown in the following figure, find the equivalent resistance between M & N where $R_1=5\ \Omega$, $R_2=2\ \Omega$, $R_3=3\ \Omega$, $R_4=6\ \Omega$	2
		
26	It is desired to obtain an erect image of an object, using a concave mirror of focal length 20 cm. (i) What should be the range of distance of the object from the mirror? (ii) Will the image be bigger or smaller than the object?	2
SECTION C		
27	Briefly explain any three methods of contraception. OR i) Differentiate between pollination and fertilisation. ii) Identify the parts labelled (a) and (b) in the diagram shown below:	3
		
28	i) With the help of equations, explain the formation of ozone in the atmosphere. ii) Suggest any two methods to manage the disposal of non biodegradable waste.	3
29	Give reasons: i) Respiratory rate in aquatic organisms is higher than in terrestrial organisms. ii) Capillaries are the thinnest blood vessels. iii) Trachea does not collapse when there is no air in it.	3
30	(i) Using balanced chemical equation, explain the difference between a displacement reaction and a double displacement reaction. (ii) Write the essential condition for the following reaction to take place. $2\text{AgBr} \rightarrow 2\text{Ag} + \text{Br}_2$	3

31	Four elements P, Q, R and S belong to the third period of the Modern Periodic Table and have respectively 1, 3, 5 and 7 electrons in their outermost shells. Write the electronic configurations of Q and R and determine their valancies. Write the molecular formula of the compound formed when P and S combine.	3
32	A student was given Mn, Zn, Fe and Cu metals. Identify which of them (a) Will not displace H ₂ from dil.HCl (b) Will react only with steam to give hydrogen gas. (c) Will give H ₂ with 5% HNO ₃ Write the chemical reactions involved.	3
33	What is scattering of light? Use this phenomenon to explain why (i) the Sun appears reddish at sunrise and (ii) the clear sky appears blue.	3
SECTION D		
34	(i) Explain why is hydrochloric acid a strong acid and acetic acid, a weak acid. How can it be verified? (ii) Give reason: Dry hydrogen chloride gas does not turn blue litmus red whereas dilute hydrochloric acid does. (iii) What is baking soda chemically called? Give reaction involved in its preparation. Write one of its uses. OR A student dropped few pieces of marble in dilute hydrochloric acid, contained in a test tube. The evolved gas was then passed through lime water. What change would be observed in lime water? What will happen if excess of gas is passed through lime water? With the help of balanced chemical equations for all the changes explain the observations	5
35	i)With the help of a flowchart depict the anaerobic respiration in muscle cells. ii)Draw a neat diagram of the human respiratory system and label the following: a) Alveolus b) Rib cage c) Diaphragm	5
36	(i) A concave mirror of focal length 10 cm can produce a magnified real as well as virtual image of an object placed in front of it. Draw ray diagrams to justify this statement. (ii) An object is placed perpendicular to the principal axis of a convex mirror of focal length 10 cm. The distance of the object from the pole of the mirror is 10 cm. Find the position of the image formed. OR (i) Define the following terms: (a) Power of a lens (b) Principal focus of a concave mirror (ii) Write the relationship among the object distance (u), image distance (v) and the focal length (f) of a (a) Spherical lens (b) Spherical mirror (iii) An object is placed at a distance of 10 cm from optical centre of a convex lens of focal length 15 cm. Draw a labelled ray diagram to show the formation of image in this case.	5

Prepared by : The Department of Science 2020 -21

Checked by :HOD – SCIENCE