

SPECTRA PRE-BOARD EXAMINATION

SPECTRA CLASSES

CLASS 10TH

SUBJECT-SCIENCE

TIME-3HR.

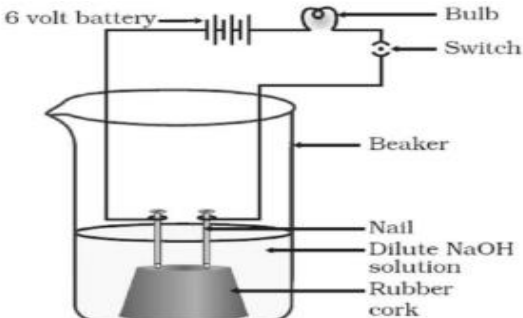
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General Instruction:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION-A

Select and write one most appropriate option out of the four options given for each of the questions 1-20.

1	A student strongly heats hydrated ferrous sulphate salt in a dry test tube. He would observe a: (a) yellow residue (b) brown residue (c) light green residue (d) white residue	1
2	A student tests a sample drinking water and reports its pH value as 6 at room temperature. Which one of the following might have been added in water? (a) Calcium chloride (b) Sodium chloride (c) Sodium bicarbonate (d) Bleaching powder	1
3	In an attempt to demonstrate electrical conductivity through an electrolyte, the following apparatus was set up. Which among the following statement(s) is (are) correct? 	1

- (i) Bulb will not glow because electrolyte is not acidic

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	(ii) Bulb will glow because NaOH is a strong base and furnishes ions for conduction. (iii) Bulb will not glow because circuit is incomplete (iv) Bulb will not glow because it depends upon the type of electrolytic solution (a) (i) and (iii) (b) (ii) and (iv) (c) (ii) only (d) (iv) only									
4	Which of the following salts has the minimum pH value? (a) (NH ₄) ₂ SO ₄ (b) NaHCO ₃ (c) K ₂ SO ₄ (d) NaCl	1								
5	In the redox reaction $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$ (a) MnO ₂ is reduced to MnCl ₂ & HCl is oxidized to H ₂ O (b) MnO ₂ is reduced to MnCl ₂ & HCl is oxidized to Cl ₂ (c) MnO ₂ is oxidized to MnCl ₂ & HCl is reduced to Cl ₂ (d) MnO ₂ is oxidized to MnCl ₂ & HCl is reduced to H ₂ O	1								
6	The correct structural formula of butanoic acid is: <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">(a)</th> <th style="width: 25%;">(b)</th> <th style="width: 25%;">(c)</th> <th style="width: 25%;">(d)</th> </tr> </thead> <tbody> <tr> <td> $\begin{array}{cccc} H & H & H & O \\ & & & \\ H-C & -C & =C & -C-OH \\ & & & \\ H & & & \end{array}$ </td> <td> $\begin{array}{ccccccc} H & H & H & H & O \\ & & & & \\ H-C & -C & -C & -C & -C-OH \\ & & & & \\ H & H & H & H & H \end{array}$ </td> <td> $\begin{array}{cccc} H & H & H & H \\ & & & \\ H-C & -C & -C & -C-OH \\ & & & \\ H & H & H & H \end{array}$ </td> <td> $\begin{array}{cccc} H & H & H & O \\ & & & \\ H-C & -C & -C & -C-OH \\ & & & \\ H & H & H & \end{array}$ </td> </tr> </tbody> </table>	(a)	(b)	(c)	(d)	$\begin{array}{cccc} H & H & H & O \\ & & & \\ H-C & -C & =C & -C-OH \\ & & & \\ H & & & \end{array}$	$\begin{array}{ccccccc} H & H & H & H & O \\ & & & & \\ H-C & -C & -C & -C & -C-OH \\ & & & & \\ H & H & H & H & H \end{array}$	$\begin{array}{cccc} H & H & H & H \\ & & & \\ H-C & -C & -C & -C-OH \\ & & & \\ H & H & H & H \end{array}$	$\begin{array}{cccc} H & H & H & O \\ & & & \\ H-C & -C & -C & -C-OH \\ & & & \\ H & H & H & \end{array}$	1
(a)	(b)	(c)	(d)							
$\begin{array}{cccc} H & H & H & O \\ & & & \\ H-C & -C & =C & -C-OH \\ & & & \\ H & & & \end{array}$	$\begin{array}{ccccccc} H & H & H & H & O \\ & & & & \\ H-C & -C & -C & -C & -C-OH \\ & & & & \\ H & H & H & H & H \end{array}$	$\begin{array}{cccc} H & H & H & H \\ & & & \\ H-C & -C & -C & -C-OH \\ & & & \\ H & H & H & H \end{array}$	$\begin{array}{cccc} H & H & H & O \\ & & & \\ H-C & -C & -C & -C-OH \\ & & & \\ H & H & H & \end{array}$							
7	Pentane has the molecular formula C ₅ H ₁₂ . It has (a) 5 covalent bonds (b) 12 covalent bonds (c) 16 covalent bonds (d) 17 covalent bonds	1								
8	If salivary amylase is lacking the saliva, the events that get affected in the mouth cavity will be a) Proteins breaking down into amino acids b) Starch breaking down into sugars c) Fats breaking down into fatty acids and glycerol d) Absorption of vitamins	1								
9	Among the following, which vertebrate group / groups heart does not pump oxygenated blood to different parts of the body a) Pisces and Amphibians b) Amphibians and Reptiles c) Amphibians only d) Pisces only	1								

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10	<p>In the given figure, which one shows cross pollination?</p> <div style="text-align: center;"> </div> <p>(a) B only (b) C and B (c) B and D (d) A and C</p>	1
11	<p>Name the hormone which controls the basal metabolic rate in animals</p> <p>(a) Adrenaline (b) Thyroxine (c) Aldosterone (d) Oxytocin</p>	1
12	<p>Which one of the following is not one of the direct conclusions that can be drawn from Mendel's experiment?</p> <p>(a) Only one parental trait is expressed (b) Two copies of each trait is inherited in sexually reproducing organism (c) For recessive trait to be expressed, both copies should be identical (d) Natural selection can alter frequency of an inherited trait</p>	1
13	<p>A wire of resistance 8Ω is bent into a circle. Find the resistance across the diameter.</p> <p>a) 8Ω b) 4Ω c) 2Ω d) 1Ω</p>	1
14	<p>Choose the incorrect statement from the following regarding magnetic field lines:</p> <p>a) The direction of magnetic field at a point is taken to be the direction in which the North Pole of the magnetic compass needle points b) Magnetic field lines are closed curves. c) If magnetic field lines are parallel and equidistant they represent zero field strength.</p> <p>Relative strength of magnetic field is indicated by the degree of closeness of the field lines.</p>	1
15	<p>Three resistors of resistances $1 \Omega, 2 \Omega$ and 3Ω are connected in series with the battery of 12 V. Values of potential differences V_1, V_2, V_3 across the 3 resistors of respective values are</p> <p>a) 2 V, 4 V, 6 V b) 6 V, 4 V, 2 V c) 3 V, 2 V, 1 V b) d) $\frac{1}{12}$ V, $\frac{2}{12}$ V, $\frac{3}{12}$ V</p>	1
16	<p>At the time of short circuit, the electric current in the circuit</p> <p>a) vary continuously c) does not change b) reduces substantially d) increases heavily</p>	1

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Q. no 17 to 20 are Assertion - Reasoning based questions.**These consist of two statements – Assertion (A) and Reason (R). Answer these questions 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**

17.	Assertion: Silver bromide decomposition is used in black and white photography. Reason: Light provides energy for this decomposition reaction.	1
18.	Assertion: Veins have thin walls to collect blood from different organs Reason : Blood in veins are not under pressure	1
19.	Assertion : A cross between a tall plant (TT) and short pea plant (tt) resulted in progeny that were all dwarf plants. Reason : Dwafness is a recessive trait in the monohybrid cross obtained by Mendel.	1
20.	Assertion (A): The end of a solenoid where current appears to flow clockwise behaves as a magnetic South Pole. Reason (R): Direction of magnetic field associated with current carrying conductor coil is found by applying right-hand thumb rule.	1

SECTION - B**Q. no. 21 to 26 are very short answer questions.**

21.	<p>Tamanna added dilute Hydrochloric acid to four metals and recorded her observations as shown in the table given below :</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Metal</th> <th>Gas Evolved</th> </tr> </thead> <tbody> <tr> <td>Iron</td> <td>Yes</td> </tr> <tr> <td>Copper</td> <td>Yes</td> </tr> <tr> <td>Magnesium</td> <td>No</td> </tr> <tr> <td>Zinc</td> <td>Yes</td> </tr> </tbody> </table> <p>Select the correct observation(s) and give chemical equation(s) of the reaction involved.</p> <p style="text-align: center;">OR</p> <p>A clear solution of slaked lime is made by dissolving Ca(OH)₂ in an excess of water. This solution is left exposed to air. The solution slowly goes milky as a faint white precipitate forms. Explain why a faint white precipitate forms, support your response with the help of a chemical equation.</p>	Metal	Gas Evolved	Iron	Yes	Copper	Yes	Magnesium	No	Zinc	Yes	2
Metal	Gas Evolved											
Iron	Yes											
Copper	Yes											
Magnesium	No											
Zinc	Yes											
22.	(a) What is peristaltic movement?	2										

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	(b) 'Stomata remain closed in desert plants during daytime'. How do they perform photosynthesis?	
23.	Write two different ways in which glucose is oxidised to provide energy in human body. Write the products formed in each case.	2
24.	(a) Why does the flow of signals in a synapse from axonal end of one neuron to dendritic end of another neuron take place but not in the reverse direction? (b) Name the plant hormones responsible for the following : (i) Growth of stem (ii) Promotion of cell division	2
25.	With the help of labelled ray diagram show the path followed by a narrow beam of monochromatic light when it passes through a glass prism. OR Describe an activity that the colours of white light split by a glass prism can be recombined to get white light by another identical glass prism also draw a diagram to show the recombination of the spectrum of white light.	2
26.	The following organisms form a food chain. Which of these will have the highest concentration of non-biodegradable chemicals? Name and define the phenomenon associated with it. Insects, Hawk, Grass, Snake, Frog	2
SECTION - C		
Q.no. 27 to 33 are short answer questions		
27.	Lead nitrate solution is added to a test tube containing potassium iodide solution. (a) Write the name and colour of the compound precipitated. (b) Write the balanced chemical equation for the reaction involved. (c) Name the type of this reaction justifying your answer.	3
28.	Carbon cannot reduce the oxides of sodium, magnesium and aluminium to their respective metals. Why? Where are these metals placed in the reactivity series? How are these metals obtained from their ores? Take an example to explain the process of extraction along with chemical equations.	3
29.	Give reasons: (a) Ventricles have thicker muscular walls than atria. (b) Transport system in plants is slow. (c) Circulation of blood in aquatic vertebrates differs from that in terrestrial vertebrates. OR What are nephrons? How is a nephron involved in the filtration of blood and formation of urine?	3
30.	An object 4 cm in height, is placed at 15 cm in front of a concave mirror of focal length 10 cm. At what distance from the mirror should a screen be placed to obtain a sharp image of the object. Calculate the height of the image.	3

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31.	<p>Analyse the following observation table showing variation of image-distance (v) with object-distance (u) in case of a convex lens and answer the questions that follow without doing any calculations :</p> <table border="1"> <thead> <tr> <th>S. No</th> <th>Object distance u (cm)</th> <th>Image distance v (cm)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-100</td> <td>+25</td> </tr> <tr> <td>2</td> <td>-60</td> <td>+30</td> </tr> <tr> <td>3</td> <td>-40</td> <td>+40</td> </tr> <tr> <td>4</td> <td>-30</td> <td>+60</td> </tr> <tr> <td>5</td> <td>-25</td> <td>+100</td> </tr> <tr> <td>6</td> <td>-15</td> <td>+120</td> </tr> </tbody> </table> <p>(a) What is the focal length of the convex lens? Give reason to justify your answer. (b) Write the serial number of the observation which is not correct. On what basis have you arrived at this conclusion? (c) Select an appropriate scale and draw a ray diagram for the observation at S.No. 2. Also find the approximate value of magnification.</p>	S. No	Object distance u (cm)	Image distance v (cm)	1	-100	+25	2	-60	+30	3	-40	+40	4	-30	+60	5	-25	+100	6	-15	+120	3
S. No	Object distance u (cm)	Image distance v (cm)																					
1	-100	+25																					
2	-60	+30																					
3	-40	+40																					
4	-30	+60																					
5	-25	+100																					
6	-15	+120																					
32.	<p>a) What is an electromagnet? List any 2 uses. b) State the purpose of software used in making an electromagnet. c) List 2 ways of increasing the strength of an electromagnet if the material of the electromagnet is fixed.</p> <p style="text-align: center;">OR</p> <p>a) Differentiate between – Short circuiting and overloading b) What is the use of electrical fuse? c) What type of material is used for fuse wire and why?</p>	3																					
33.	<p>Why is damage to the ozone layer a cause for concern? What are its causes and what steps are being taken to limit this damage?</p>	3																					
<p>SECTION - D Q.no. 34 to 36 are Long answer questions</p>																							
34.	<p>(a) With the help of a suitable example, explain the process of hydrogenation mentioning the conditions of the reaction and any one change in physical property with the formation of the product. (b) What is an oxidising agent? What happens when an oxidising agent is added to ethanol?</p> <p style="text-align: center;">OR</p> <p>(a) Draw isomers of butane and write their IUPAC names. (b) State the reason why carbon can neither form C⁴⁺ cations nor C⁴⁻ anions, but forms covalent bonds. (c) Write the structural formula of benzene.</p>	5																					
35.	<p>What is vegetative propagation? List with brief explanation three advantages of practising this process for growing some types of plants. Select two plants</p>	5																					

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	<p>from the following which are grown by this process: Banana, Wheat, Mustard, Jasmine, Gram</p> <p style="text-align: center;">OR</p> <p>(a) State one genetically different feature between sperms and eggs of humans. What is its consequence? (b) List three techniques that have been developed to prevent pregnancy. Which one of these techniques is not meant for males? How does the use of these techniques have a direct impact on the health and prosperity of a family?</p>	
36.	<p>a) Draw a schematic labelled diagram of a domestic wiring circuit which includes (i) a main fuse (ii) a power meter (iii) one light point and (iv) a power plug b) Why is it necessary to connect in earth wire to electric appliances having metallic covers?</p>	5
<p>SECTION - E</p> <p>Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.</p>		
37.	<p>The arrangement of metals in a vertical column in the decreasing order of their reactivities is called the reactivity series or activity series of metals. The most reactive metal is at the top position of the reactivity series. The least reactive metal is at the bottom of the reactivity series. Hydrogen, though a non-metal, has been included in the activity series of metals only for comparison. Apart from it, the hydrogen atom also has tendency to lose its valence electron and form cation which behaves like metal.</p> <p>(i) Which metal can be displaced by copper from its salt solution? (a) Zinc (b) Silver (c) Iron (d) Lead</p> <p>(ii) An element 'X' after reacting with acids liberates hydrogen gas and can displace lead and mercury from their salt solutions. The metal 'X' is (a) Copper (b) gold (c) calcium (d) hydrogen.</p> <p>(iii) the most reactive metal is (a) Potassium (b) barium (c) zinc (d) calcium</p> <p>(iv) What happens when Metals react with nitric acid?</p> <p style="text-align: center;">OR</p> <p>Sodium hydroxide When electricity is passed through an aqueous solution of sodium chloride (called brine), it decomposes to form sodium hydroxide. The process is called the chlor-alkali process because of the products formed—chlor for chlorine and alkali for sodium hydroxide.</p> <p>i) Write the chemical equation involved in this process? ii) What are the substance that are formed at anode and cathode on chlor-alkali process? iii) What are the uses of chlorine? iv) What will happen if Zinc pieces are added into NaOH? Write chemical equation.</p>	4

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38.	<p>Mendel was educated in a monastery and went on to study science and mathematics at the University of Vienna. Failure in the examinations for a teaching certificate did not suppress his zeal for scientific quest. He went back to his monastery and started growing peas. Many others had studied the inheritance of traits in peas and other organisms earlier, but Mendel blended his knowledge of science and mathematics and was the first one to keep count of individuals exhibiting a particular trait in each generation. This helped him to arrive at the laws of inheritance.</p> <p>Based on the above information, answer the following questions.</p> <p>(i) Why did Mendel select a pea plant for his experiments? Give two points to justify.</p> <p>(ii) Write the monohybrid cross between tall and dwarf plants?</p> <p>(iii) A tall and green plant with genotype (TtGg) cross bred with dwarf and yellow plant (ttgg). Write phenotypes obtained in the cross. Out of 6400 plants obtained, how many plants would be tall and yellow?</p> <p style="text-align: center;">OR</p> <p>In human, the allele for brown eyes (B) is dominant over that for blue eyes (b). A brown eyed woman marries a blue eyed man, and they have six children. Four of the children are brown eyed and two of them are blue eyed.</p> <p>(i) What is the genotype of blue eyed offspring?</p> <p>(a) BB (b) Bb (c) bb (d) Cannot be determined</p> <p>(ii) What is the woman's genotype?</p> <p>(a) BB (b) Bb (c) bb (d) Cannot be determined</p> <p>(iii) The ovum, produced by the mother carries the gene regarding eye colour is</p> <p>(a) BB (b) Bb (c) B or b (d) B only.</p> <p>(iv) The ratio of brown eyed children to blue eyed children in this family is 2:1, which deviates from typical phenotypic ratios for monohybrid inheritance. What might be the reason?</p>	4
39.	<p>A current - carrying conductor is placed in a magnetic field. Now answer the following:</p> <p>(i) List the factors on which the magnitude of force experienced by conductor depends.</p> <p>(ii) When is the magnitude of this force maximum?</p> <p>(iii) State the rule which helps in finding the direction of motion of conductor.</p> <p>(iv) If initially this force was acting from right to left, how will the direction of force change, if</p> <p>(a) direction of magnetic field is reversed?</p> <p>(b) direction of current is reversed?</p> <p style="text-align: center;">OR</p> <p>In our daily life we use two types of electric current whose current-time graphs are given below:</p>	4

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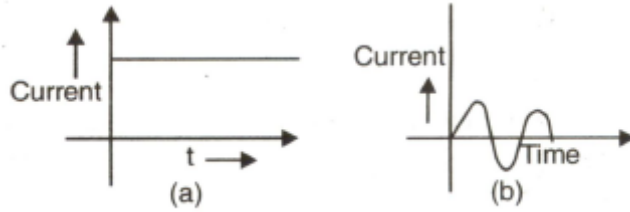
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- (i) Name the type of current in two cases.
- (ii) Identify any one source for each type of current.
- (iii) What is the frequency of current in case (b) in our country?
- (iv) On the basis of these graphs, list two differences between the two currents.

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