COMMON PRE-BOARD EXAMINATION 2022-23

Subject: SCIENCE (086)

Date:

General Instructions:

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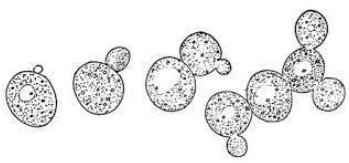
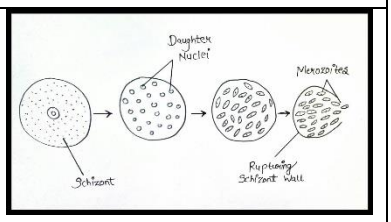
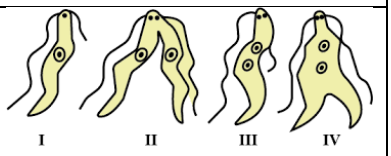
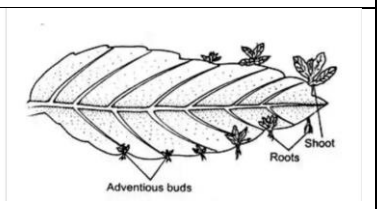
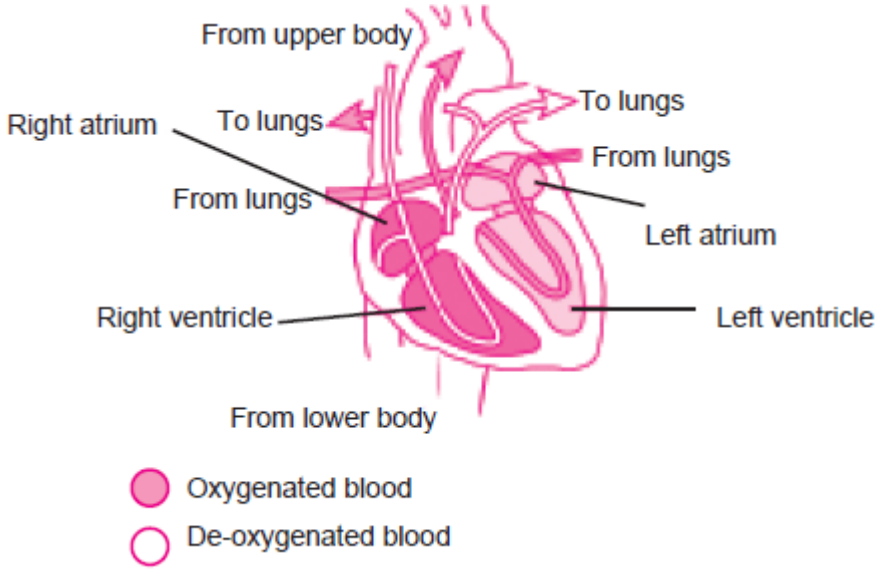
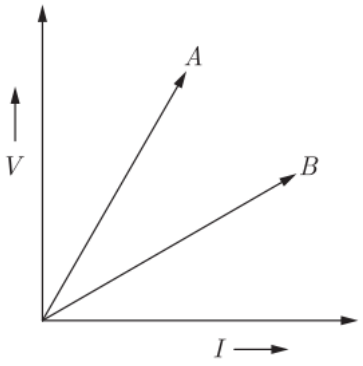
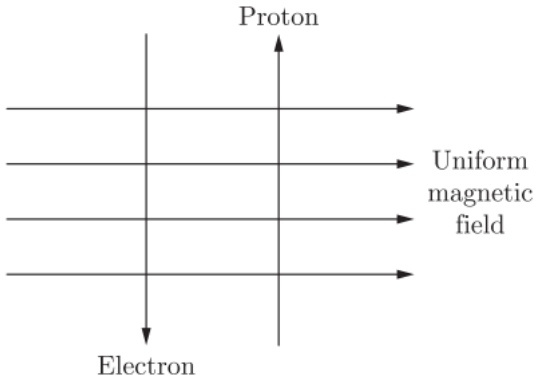
- ***a)*** *General Instructions: This question paper consists of 39 questions in 5 sections.*
- ***b)*** *All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
- ***c)*** ***Section A*** *consists of 20 objective type questions carrying 1 mark each.*
- ***d)*** ***Section B*** *consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.*
- ***e)*** ***Section C*** *consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words*
- ***f)*** ***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.*
- ***g)*** ***Section E*** *consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.*

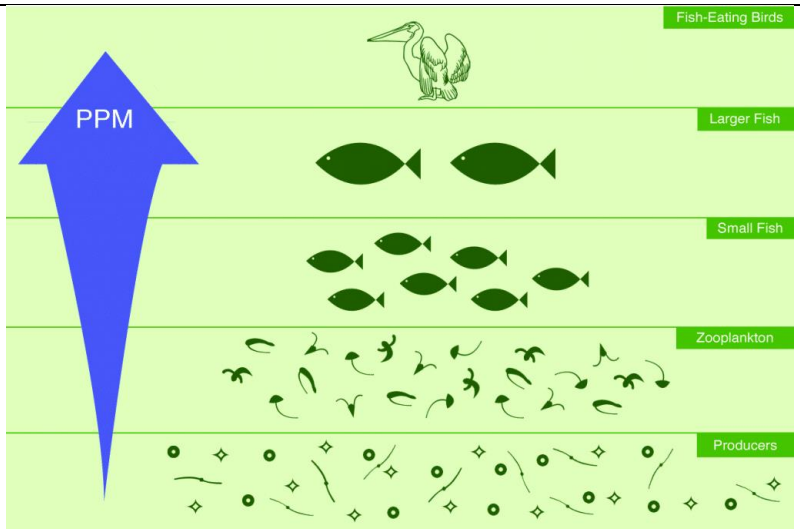
SECTION A

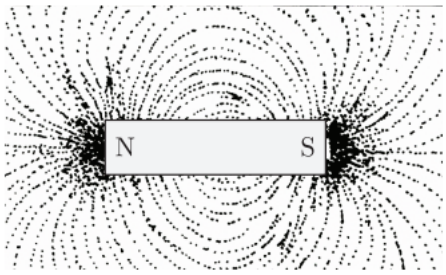
<table>
<tr><td>1</td><td>A sting from insect A has pH of 6. The table shows the pH of four substances.
<table><tr><th>Substance</th><th>pH</th></tr><tr><td>Hydrochloric acid</td><td>1</td></tr><tr><td>Vinegar</td><td>5</td></tr><tr><td>Baking soda</td><td>8</td></tr><tr><td>Sodium hydroxide</td><td>14</td></tr></table>Which substance is used to treat the sting?
a) Vinegar b) Sodium hydroxide c) Baking soda d) Hydrochloric acid</td><td>1</td></tr>
<tr><td>2</td><td>We store silver chloride in dark coloured bottles because it
a) is a white solid b) undergoes redox reaction
b) decomposes by light d) undergoes corrosion</td><td>1</td></tr>
<tr><td>3</td><td>Four metals Al, Zn, Cu and Fe are added in different test tubes containing dilute HCl. No bubbles are seen in the case of
a) Al b) Zn c) Cu d) Fe</td><td>1</td></tr>
<tr><td>4</td><td>The name of the compound CH_3-CH_2-CH_2-CHO is
a) Butanone b) Butanal c) Propanone d) Propanal</td><td>1</td></tr>
<tr><td>5</td><td>Which of the following reactions represents a combination reaction?
a) $CaO + H_2O \rightarrow Ca(OH)_2$
b) $CaCO_3 \rightarrow CaO + CO_2$
c) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
d) $FeSO_4 \rightarrow Fe_2O + SO_2 + SO_3$</td><td>1</td></tr>
</table>

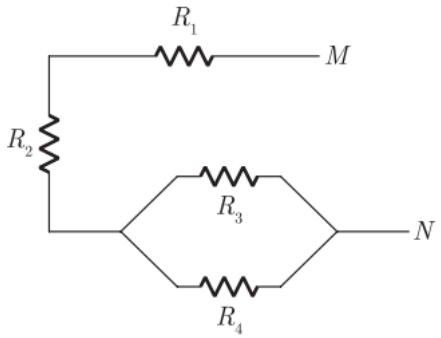
6	Which of the following will change blue litmus to red? a) NaOH(aq) b) H_2SO_4(aq) c) $NaHCO_3$ (aq) d) NH_4OH(aq)	1
7	The property of carbon atom by virtue of it forms bond with other carbon atoms is called a) Catenation b) allotropy c) isomerism d) polymerisation	1
8	S.NO / Mode of reproduction I  II  III  IV  (a) I binary fission in Amoeba , II fission in Malarial parasite , III Regeneration in planaria, IV Propagation through vegetative leaves (b) I binary fission in Leishmania , II spore formation in Rhizopus , III Regeneration in planaria, IV Propagation through layering (c) I budding in yeast , II fission in Malarial parasite , III binary fission in leishmania, IV Propagation through vegetative leaves (d) I budding in yeast , II fission in Malarial parasite , III Fragmentation in spirogyra, IV Propagation in Bryophyllum by grafting	1
9	Pea plants can have smooth seeds or wrinkled seeds. One of the phenotypes is completely dominant over the other. A farmer decides to pollinate one flower of a plant with smooth seeds using pollen from plant with wrinkled s (i) Which of the following conclusions can be drawn? (1) The allele for smooth seeds is dominated over that of wrinkled seeds. (2) The plant with smooth seeds is heterozygous. (3) The plant with wrinkled seeds is homozygous. (a) 1 only (b) 1 and 2 only (c) 1 and 3 only (d) 1, 2 and 3eeds. The resulting pea pod has all smooth seeds.	1

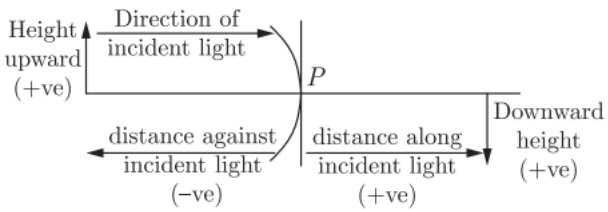
10	The image shows oxygenated and de-oxygenated blood in the human heart.  What is the direction of deoxygenated blood from right ventricle of the heart? (a) towards the lungs. (b) towards the left atrium of heart. (c) towards the upper body. (d) towards the lower body.	1
11	In photosynthesis, the source of Oxygen released is (a)Carbon dioxide (b) Water (c)both a & b (d)none of these	1
12	Which of the following is not a digestive enzyme contained in the pancreatic juice? (i) Lipase (ii) Hydrochloric acid (iii) Mucus (iv) Trypsin (a) (i) and (ii) (b) (i) and (iv) (c) (ii) and (iii) (d) (i) and (iii)	1
13.	V-I graph for the two wires A and B are shown in the figure. If we connect both the wires one by one to the same battery which of the two will produce more heat per unit time?  (a) A (b) B (c) Both A and B (d) None of thes	1

14.	A uniform magnetic field exists in the plane of paper pointing from left to right as shown in Figure. In the field an electron and a proton move as shown. The electron and the proton experience  (a) forces both pointing into the plane of paper (b) forces both pointing out of the plane of paper (c) forces pointing into the plane of paper and out of the plane of paper, respectively. (d) force pointing opposite and along the direction of the uniform magnetic field respectively	1
15.	What is the maximum resistance which can be made using five resistors each of $\frac{1}{5}\,\Omega$? (a) 1/5 Ω (b) 10 Ω (c) 5 Ω (d) 1 Ω	1
16.	Which of the following statement is not correct about the magnetic field? (a) Magnetic field lines form a continuous closed curve. (b) Magnetic field line do not interest each other. (c) Direction of tangent at any point on the magnetic field line curve gives the direction of magnetic field at that point. (d) Outside the magnet, magnetic field lines go from South to North pole of the magnet.	1
	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(A):** Decomposition of vegetable matter into compost is an example of exothermic reaction **Reason(R):** Exothermic reactions are those reactions in which heat is evolved.	1
18.	**Assertion :** The magnetic field is stronger at a point which is nearer to the conductor and goes on decreasing on moving away from the conductor. **Reason :** The magnetic field B produced by a straight current carrying wire is inversely proportional to the distance from the wire.	1
19.	**Assertion:** The accumulation of lactic acid in the muscles causes muscle cramps. **Reason:** During vigorous physical exercise leg muscles respire anaerobically.	1
20.	**Assertion:** Mendel selected pea plant for his experiments **Reason**: Pea plant is cross pollinating and has unisexual flowers**.**	1

	SECTION – B	
21.	Draw a neat diagram to show the refraction of a light ray through a glass prism and label on it the angle of incidence and angle of deviation. **OR** Why does the colour of the sky appear blue? Explain in brief.	2
22.	Explain the formation of ionic compound, $MgCl_2$ with electron dot structure. **OR** During the electrolytic refining of metals i) Which will be used as anode and cathode for purifying silver by this process? ii) Suggest a suitable electrolyte for the process.	2
23.	(a) An old man is advised by his doctor to take less sugar in his diet. (i)Name the disease from which the man is suffering. (ii)Mention the hormone due to imbalance of which he is suffering from this disease. (iii)Which endocrine gland secretes this hormone? (b) Which aprt of the brain gets effected by alcohol?	2
24.	 Study the above figure. Define the phenomenon is depicted in the figure?	2
25.	Urine formation takes place in the kidneys. It involves three major processes: Ultrafiltration, reabsorption and tubular secretion. Where do Ultrafiltartion and reabsorption process take place in nephron?	2
26.	Give reason (a) Separation of right side and the left side of heart in birds and mammals (b) Gaseous exchange takes place continuous non stop in the lungs even during exhalation	2
	SECTION C	
27	Sodium sulphate solution is added to a test tube containing barium chloride 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	In an industrial process used for the manufacture of sodium hydroxide, a gas 'A' is formed as a by-product. The gas 'A' reacts with lime water to give a compound 'B' which is used as a bleaching agent. Identify 'A' and 'B'. Also give the chemical equations involved.	3
29.	(a) i)What is the site of fat digestion in human? ii)Name the enzyme that digest emulsified fats.iii)Mention the end product of fat digestion.	3

	(b) It is necessary to move the food in regulated manner along the digestive tube so that it can be processed properly in each part .How is the movement regulated along the gut? **OR** (a)Where are the waste products stored in plants? (b) Depict the pathway of breakdown of pyruvate in yeast cells. What is this process named as?	
30.	Manju uses a concave mirror for image formation for different positions of an object. What inferences can be drawn about the following when an object is placed at a distance of 10 cm from the pole of a concave mirror of focal length 15 cm? (a) Position of the image (b) Size of the image (c) Nature of the image Draw a labelled ray diagram to justify your inferences.	3
31.	(a) Define optical centre of a spherical lens. (b) You are given a convex lens of focal length 30 cm. Where would you place an object to get a real, inverted and highly enlarged image of the object ? Draw a ray diagram showing the image formation. (c) A concave lens has a focal length of 20 cm. At what distance should an object be placed so that it forms an image at 15 cm away from the lens ?	3
32.	Answer the following questions : (i) What is the direction of magnetic field lines outside a bar-magnet? (ii) What is the SI unit of magnetic field? (iii) What does crowding of magnetic field lines indicate? **OR** Study the diagram given below and answer the questions that follow :  (a) Why do the iron filings arrange in such a pattern? (b) What does this pattern demonstrate? (c) Why do the iron filings near the bar magnet seem to align in the shape of closed curves?	3
33.	In the given food chain, suppose the amount of energy at fourth trophic level is 5 kJ, what will be the energy available at the producer level? Explain. Grass → Grasshopper → Frog → Snake → Hawk	3
	SECTION – D	
34.	(a) List any two characteristics of homologous series? Write the name and formula of next higher homologue of C_5H_{12}. (b) Select the saturated hydrocarbons from the following: C_3H_6, C_5H_{10}, C_4H_{10}, C_6H_{14}, C_2H_4. (c) A compound 'X' is formed by the reaction of a carboxylic acid $C_2H_4O_2$ and absolute alcohol in presence of a few drops of H_2SO_4. Name the process. Write the chemical reaction.	5

	OR a) State the role of alkaline $KMnO_4$ in the reaction involving conversion of an alcohol to the corresponding carboxylic acid. Write chemical equation of this reaction. b) Define isomerism. Draw any two possible isomers of pentane. c) What is the difference between soaps and detergents?	
35.	i)List any four methods of contraception used by humans. How does their use have a direct effect on the health and prosperity of a family? ii)Draw a neat diagram of human female reproductive system . Name and label the following parts: a. Site of fertilisation b. Site of implantation c. structure where female gamete is produced. OR i)Why is fertilization in Angiosperms known as Double fertilisation? What happens to ovary and ovule after fertilization gets over? ii) Draw a diagram of a pistil showing pollen tube growth into the ovule and label all parts.	5
36.	(a) For the combination of resistors shown in the following figure, find the equivalent resistance between M and N.  (b) State Joule's law of heating (c) How many 132 Ω resistors in parallel are required to carry 5 A on a 220 V line?	5
	SECTION E	
37	Metal oxides of medium reactive metals can be reduced to the corresponding metals by using reducing agents like carbon. Besides using carbon, sometimes displacement reactions can also be used. These displacement reactions are highly exothermic. The amount of heat produced is so large that the metals are produces in the molten state. a) What is a displacement reaction? b) A copper coin was dipped in silver nitrate solution for a few hours/days. What will happen to the copper coin? c) $MnO_2+4Al \rightarrow 3Mn+2Al_2O_3+heat$ Identify the substance reduced and the reducing agent in the given reaction. **OR** (d) Name the process used to join railway tracks. Write the chemical reaction for the process.	4

38.	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. In one of his experiments , Pure bred pea plant with violet flowers (dominant characteristic) were crossed with pure bred pea plant with white flowers (recessive characteristic) . The F1 generation was self pollinated to give rise to the F2 generation. **(**a) What is the expected observation of the F1 generation of plants ? (b) What is the expected observation of the F2 generation of plants ? (c) What will be the genotypic ratio of F2 offspring , also mention whether it will be homozygous or heterozygous ? **OR** (d)State one law which was formulated from Monohybrid cross.	4
39.	While dealing with the reflection of light by spherical mirrors, we shall follow a set of sign conventions called the New Cartesian Sign Convention. In this convention, the pole (P) of the mirror is taken as the origin. The principal axis of the mirror is taken as the x -axis of the coordinate system. In a spherical mirror, the distance of the object from its pole is called the object distance (u). The distance of the image from the pole of the mirror is called the image distance (v). Magnification produced by a spherical mirror gives the relative extent to which the image of an object is magnified with respect to the object size. It is expressed as the ratio of the height of the image to the height of the object. It is usually represented by the letter (m).  (a) How can you calculate the magnification of a spherical mirror? (b) What does a negative sign in the value of magnification indicates?	4

	(c) Find the focal length of a convex mirror whose radius of curvature is 32 cm. **OR** (d) Where is the principle focus of a spherical mirror lies?	

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