केन्द्रीय विद्यालय संगठन, कोलकाता संभाग

KENDRIYA VIDYALAYA SANGATHAN, KOLKATA REGION

प्री–बोर्ड परीक्षा / PRE-BOARD EXAMINATION – 2024-25

कक्षा / CLASS – X अधिकतम अंक /MAX. MARKS-80

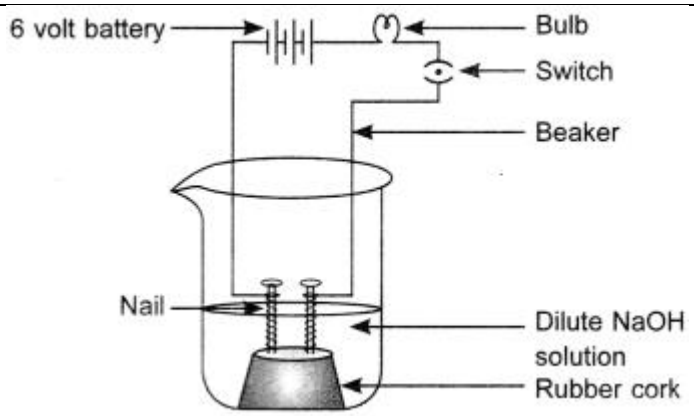
विषय/SUB. – SCIENCE(086) समय/TIME – 03 घंटे/Hours

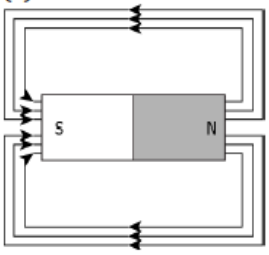
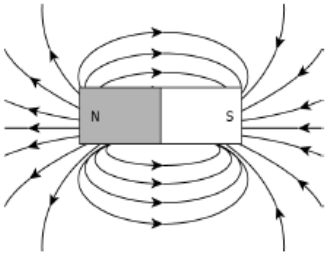
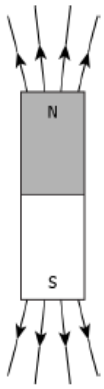
General Instructions:

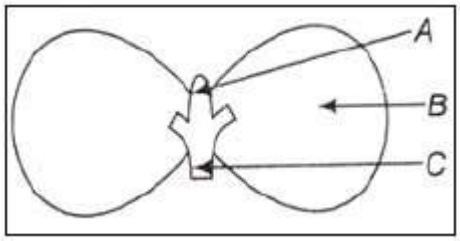
1. All questions would be compulsory. However, an internal choice of approximately 33% would be provided. 50% marks are to be allotted to competency-based questions.
2. Section A would have 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.
3. Section B would have 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 are 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.	A student performs an experiment to form aluminium chloride from aluminium and chlorine. Which of the following option gives the chemical equation of the reaction? A. $Al + Cl_2 \rightarrow AlCl_2$ B. $2Al + Cl_2 \rightarrow 2AlCl$ C. $2Al + 3Cl_2 \rightarrow 2AlCl_3$ D. $3Al + 3Cl_2 \rightarrow 3AlCl_3$	1
2.	Rita reacts a base with a metal. It forms a salt and hydrogen gas is released. By what method can the presence of hydrogen be detected? A. by water B. by litmus paper C. by methyl orange D. by a burning candle	1
3.	During cellular oxidation of Glucose, ATP is produced along with formation of	1

	other products in this reaction. Which of the following events is associated with production of maximum ATP molecules per molecule of Glucose during this process? Synthesis of A. ethanol in yeast B. lactic acid in muscle cells C. carbon dioxide in yeast cells D. carbon dioxide in human cells	
4.	The uncle of Manoj is hospitalised. Doctor said that there is a cerebellar dysfunction in a patient. Which of the following activities will get disturbed in the uncle of Manoj as a result of this? A. Salivation B. Hunger control C. Posture and balance D. Regulation of blood pressure	1
5.	A researcher adds barium hydroxide to hydrochloric acid to form a white-coloured barium chloride. Which of the following option gives the balanced chemical equation of the reaction? A. $HCl + Ba(OH)_2 \rightarrow BaCl_2 + 2HOH$ B. $2HCl + Ba(OH)_2 \rightarrow BaCl_2 + 2HOH$ C. $2HCl + Ba(OH)_2 \rightarrow BaH_2 + 2HCl + O_2$ D. $HCl + 2Ba(OH) \rightarrow 2BaCl_2 + 2HOH + O_2$	1
6.	Neelam's teacher asked her one question in the classroom. Her question was-"Which tube in Human excretory system connects kidney to urinary bladder?" Choose an appropriate answer for her. A. Urethra B. Nephron C. Tubule D. Ureter	1
7.	Which of the following is an endothermic reaction? A. Burning of candle. B. Cooking of food. C. Decomposition of Vegetable matter. D. Reaction of Sodium with air	1
8.	Which of the following statements is not true with respect to variation? A. All variations in a species have equal chance of survival B. Change in genetic composition results in variation C. Selection of variants by environmental factors forms the basis of evolutionary processes. D. Variation is minimum in asexual reproduction	1
9.	The apparatus given in the adjoining figure was set up to demonstrate electrical conductivity.	1

	 Which of the following statement(s) is (are) correct? (i) Bulb will not glow because electrolyte is not basic. (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 ……. *For Visual Impaired Students* Iqbal observed that in his village farmers neutralise the effect of Acidity on the soil. They often add some White colour substances in the agricultural field while doing that. Identify that White colour substance which was used by farmers to neutralise the effect of Acidity. A. Slaked lime B. Gypsum C. Caustic soda D. Baking soda	
10.	Mendel crossed a tall Pea plant (TT) with short Pea plant (tt) and got all tall plants in F1 generation. Why? A. Tallness is the dominant trait B. Shortness is the dominant trait C. Tallness is the recessive trait D. Height of plant is not governed by gene t or T	1
11.	While performing an experiment in classroom one group of students put two metals in cold as well as hot water. One metal start reacting with cold water and other with hot water but both of them started floating above the water. Identify those metals. A. Manganese and sodium B. Sodium and calcium C. Magnesium and sodium	1

	D. Magnesium and calcium	
12.	A student learns that magnetic field strength around a bar magnet is different at every point. Which diagram shows the correct magnetic field lines around a bar magnet? (a)  (c)   (b)  (d) ……. *For Visual Impaired Students* A student inserts a bar magnet in the coil. The student observes deflection in the galvanometer connected to the coil. What will happen if the magnet is continuously getting in and out of the coil? (a) The current induced in the coil will increase (b) The current will change its direction continuously (c) The magnetic field will create a motion in the coil (d) The magnetic field of the bar magnet would keep decreasing	1
13.	C_3H_8 belongs to the homologous series of A. Alkynes B. Alkenes C. Alkanes D. Cycloalkanes	1
14.	A soft iron bar is introduced inside a current-carrying solenoid. The magnetic field inside a solenoid: A. Decrease B. Will increase C. Will become zero D. Will remain unaffected	1
15.	Point to be kept in mind for verification of Ohm's Law is:	1

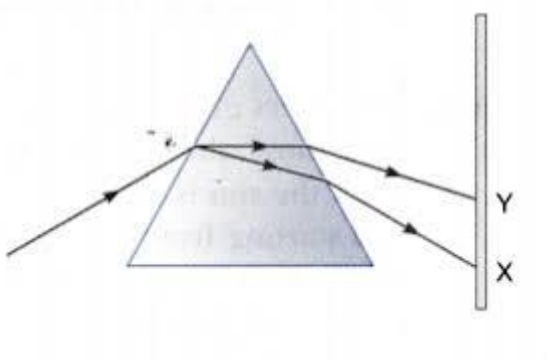
	A. Ammeter and voltmeter should be connected in series B. Ammeter should be connected in series and voltmeter in parallel C. Ammeter should be connected in parallel and voltmeter in series D. Ammeter and voltmeter should be connected in parallel	
16.	In the below figure, parts A, B and C are, sequentially,  A. Cotyledon, plumule and radicle B. Plumule, radicle and cotyledon C. Plumule, cotyledon and radicle D. Radicle, cotyledon and plumule ……. *For Visual Impaired Students* The ability of a cell to divide into several cells during reproduction in Plasmodium is called A. budding B. multiple fission C. binary fission D. reduction division	1

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, 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

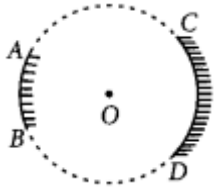
17.	**Assertion(A)**: Traits like tallness and dwarfness in pea plant are inherited independently. **Reason(R)**: When a homozygous tall pea plant is crossed with dwarf pea plant, medium sized pea plant is obtained in F1 generation.	1
18.	**Assertion (A)**: The acid must always be added to water with constant stirring. **Reason (R)**: Mixing of an acid with water decreases the concentration of H+ ions per unit volume.	1
19.	**Assertion (A)**: If a graph is plotted between the potential difference and the current flowing, the graph is a straight line passing through the origin. **Reason (R)**: The current is directly proportional to the potential difference.	1
20.	**Assertion(A)**: A compass needle is placed near a current carrying wire. The deflection of the compass needle decreases when the magnitude of an electric current in the wire is increased. **Reason (R)**: Strength of a magnetic field at a point near the conductor increases on increasing the current.	1

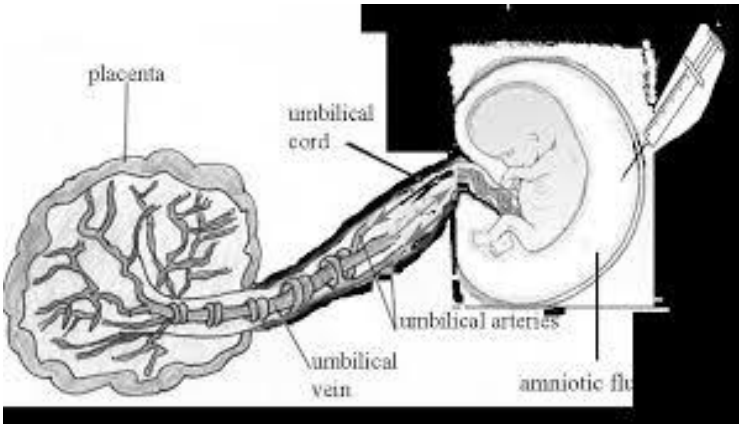
Section-B

Question No. 21 to 26 are very short answer questions

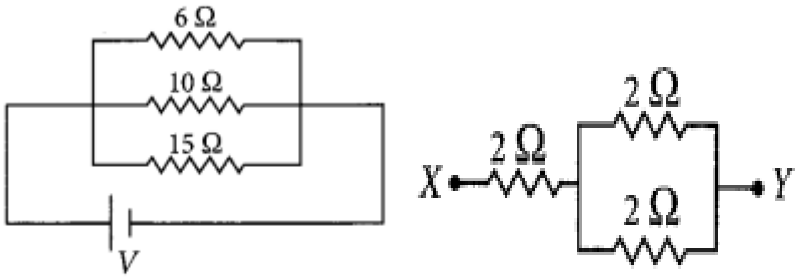
21.	While travelling from Delhi to Kolkata, the train suddenly stopped at Agra station. Ashish in the train observed from window that some railway technicians were trying to join a broken railway track. They are using some chemical substances to join the tracks. One chemical substance is a metal which form amphoteric oxide when reacts with oxygen and other one is a metallic oxide which is basic in nature. (a) Identify the chemical substances used. (b) What is this reaction called? Also write down a balanced chemical equation involved during the reaction.	2
22.	Sashi experienced muscular cramps during the training session for his upcoming football match. Mr. Sen, his coach advised him on a schedule of some aerobic exercises to overcome his problem of muscular cramps. Sashi followed his coach's advice and did not face the problem of muscular cramps again during his match. (a)Which life process is depicted in the above situation? Define the life process. (b)Why did Sashi experienced muscular cramps? Justify.	2
23.	Compare the wavelength of colour X and Y given in the following figure. Also define the phenomena shown in the following figure.  ……. <u>*For Visual Impaired Students*</u> Sushant felt a natural phenomena during the formation of rainbow. Define that natural phenomena and state one condition in which rainbow is formed.	2
24.	(a) What is peristaltic movement? (b) 'Stomata remain closed in desert plants during daytime'. How do they do photosynthesis? OR, What is double circulation in human beings? Why is it necessary?	2
25.	(a)From the given group of organisms, create a food chain most advantageous for humans with regard to energy. Hawk, Snake, Rat, Goat, Cereal plant, Human being	2

	(b) State one possible disadvantage if any cereal plant is growing in soil rich in pesticides.	
26.	Which type of tropisms are shown in the following figure? Define them.  ……. *For Visual Impaired Students* "Reflex arcs continue to be more efficient for quick responses". Justify this statement giving reason.	2
	Section-C **Question No. 27 to 33 are short answer questions**	
27.	Joseph is provided with magnesium ribbon and sulphur powder by his science Teacher. Help him to frame an activity to show that metal oxides are basic and non-metal oxide are acidic in nature.	3
28.	A.1% of starch in a test tube is added to 1 ml of saliva. After keeping the mixture for an hour, a drop of iodine solution is added. Mention the change in colour of the test tube. What does this indicate about the salivary action on starch? B. Which part of human digestive system stores bile? How is digestion affected when the bile duct is completely blocked? OR, A potted plant with variegated leaves was taken in order to prove a factor necessary for photosynthesis. The potted plant was kept in the dark for 24 hours and then placed in bright sunlight for a few hours. (a) What aspect of photosynthesis is being tested in the above diagram? (b) Why was the plant placed in the dark before beginning the experiment? (c) Write a balanced chemical equation to represent the process of photosynthesis.	3
29.	A metal (E) is stored under kerosene. When a small piece of it is left open in the air, it catches fire. When the product formed is dissolved in water, it turns red litmus to blue. (a) Name the metal (E). (b)Write the chemical equation for the reaction when it is exposed to air and when the product is dissolved in water. (c) Explain the process by which the metal is obtained from its molten chloride.	3

30.	AB and CD, two spherical mirrors, from parts of a hollow spherical ball with its centre at O as shown in the diagram. If arc AB = 1/2 arc CD, what is the ratio of their focal lengths? State which of the two mirrors will always form virtual image of an object placed in front of it and why? Draw a ray diagram to justify the virtual image formation.  ……. *For Visual Impaired Students* An object is placed at a distance of 30 cm in front of a convex mirror of focal length 15 cm. Write three characteristics of the image formed by the mirror.	3
31.	What is a solenoid? Draw a diagram to show field lines of the magnetic field through and around a current carrying solenoid. State the use of magnetic field produced inside a solenoid.	3
32.	(a) A divergent lens has a focal length of 30 cm. At what distance should an object of height 5 cm from the optical centre of the lens be placed so that its image is formed 15 cm away from the lens? Find the size of the image also. (b) Draw a ray diagram to show the formation of image in the above situation.	3
33.	(a) (i)In the following food chain, 100 J of energy is available to the lion. How much energy was available to the producers? Plants → Deer → Lion (ii)What will happen if Deer is missing from the above food chain? (b) If all the waste we produce/generates is biodegradable, will this have no impact on the environment? Analyse and justify.	3
Section-D **Question No. 34 to 36 are long answer questions.**		
34.	A compound X is formed by the reaction of carboxylic acid $C_2H_4O_2$ and alcohol in the presence of a few drops of H_2SO_4. The alcohol on oxidation with alkaline $KMnO_4$ followed by acidification gives the same carboxylic acid as used in this reaction. A. Give the names and structures of (a) carboxylic acid, (b) alcohol and (c) compound X. B. Also, write the reactions involved. OR, Explain the given reactions with the examples (a) Hydrogenation reaction (b) Oxidation reaction (c) Substitution reaction (d) Saponification reaction (e) Combustion reaction	5

35.	The image below shows a developing foetus in the mother's womb. The developing foetus is connected to the placenta by means of umbilical cord. The Umbilical vein and artery run inside the umbilical cord.  (i) Name two substance that moves through the blood vessels. (ii) If the placenta has less villi how will it affect the baby's growth? (iii) Draw the female reproductive system and label the region where the embryo develops inside the female body. Explain how this region is adapted for nourishing the baby. (iv) Some of the foetal cells fall off into the amniotic fluid and can be collected by careful procedure. The cells were screened and found to contain XY chromosome. a) What is the sex of the foetus? b) How is this prenatal sex determination misused? ……. <u>*For Visual Impaired Students*</u> When an insect sits on the flower of a plant then some particles A present in the top of little stalks in the flower attach to its body hair. When this insect now sits on the flower of another similar plant, then particles A attached to the hair of insect are put on the top of a flask-shaped organ at the centre of flower. The particle A grows a long tube B from the top of flask-shaped organ through which C moves down and reaches the bottom part of flask-shaped organ. Here C fuses with the nucleus of D contained in structure E. the fusion of C and D forms a new cell F which grows and develops into a seed of the plant? (a) What are particles A? Define the process of transferring A from one flower to another flower of different plant of same type by the insect. (b) Identify the tube B. What is its function? (c) What is C and D? (d)Identify E and F. (e) Draw a diagram to depict the above mentioned process.	5
36.	(a) Define electrical power and define its SI unit. (b) A torch bulb is rated 5 V and 500 mA. Calculate its	5

(i) power
(ii) resistance
(iii) energy consumed in KWh when it is lighted for 2 hours.
(b)Find the equivalent resistance of the following circuits.



……

For Visual Impaired Students

State Joules law of heating and explain it.

Section – E

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

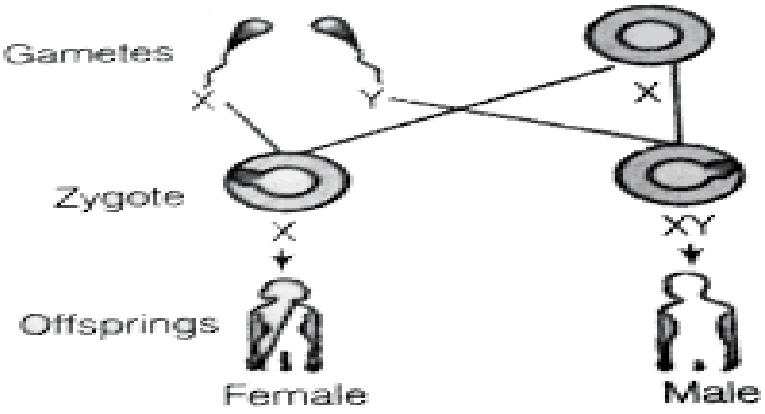
37. Ram took samples of five metals 'A', 'B', 'C', 'D' and 'E' and added to the solution given in the table one by one. The results he obtained have been tabulated as follows: 4

Metal	$FeSO_4$	$ZnSO_4$	$AgNO_3$	$Al_2(SO_4)_3$	$MgSO_4$	$CuSO_4$
A	No reaction	No reaction	displacement	No reaction	No reaction	displacement
B	displacement	No reaction	displacement	No reaction	No reaction	displacement
C	No reaction	No reaction	displacement	No reaction	No reaction	No reaction
D	No reaction	No reaction	No reaction	No reaction	No reaction	No reaction
E	displacement	displacement	displacement	No reaction	No reaction	displacement

Use the above table to answer the following questions about the given metals.
(a) Which of the above metals was found to be most reactive by Ram and why?
(b) What was Ram's observation when 'B' was added to CuSO4?
(c) Help Ram to Arrange 'A', 'B', 'C', 'D' and 'E' in the increasing order of their reactivity.
(d) According to Ram, Container of which metal can store zinc sulphate and silver nitrate solution and why? OR,
(d) In which of the above solutions, Ram can store any of the above mentioned metals and why?

38. Human beings exhibit male heterogamy. In humans, males (XY) produce two different types of gametes, X and Y. The human female (XX) produces only one type of gametes containing X chromosomes. The sex of the baby is determined by the type of male 4

gamete that fuses with the female gamete. If the fertilizing sperm contains X chromosome, then the baby produced will be a girl and if the fertilizing sperm contains Y chromosome, then the baby produced will be a boy. Hence, it is a matter of chance that determines the sex of a baby. There is an equal probability of the fertilizing sperm having an X or Y chromosome. Thus, it is the genetic make up of the sperm that determines the sex of the baby.



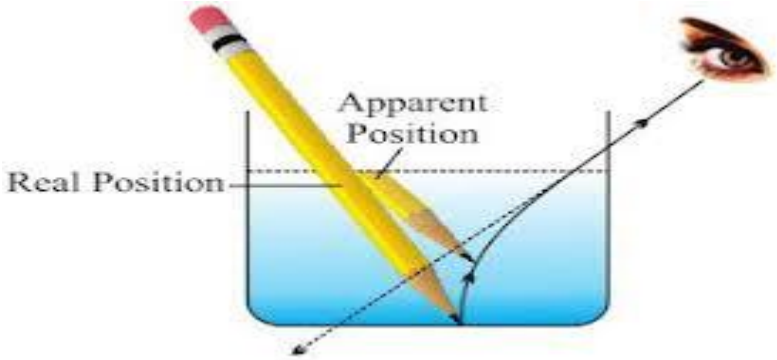
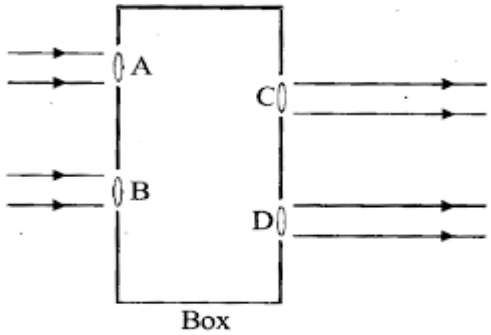
Sex determination in human beings

But the process of sex determination in snails is not genetically determined.

Use the above information to answer the following questions:

(a) Humans have two different sex chromosomes, X and Y. Based on Mendel's laws, a male offspring will inherit which combination of chromosomes?
(i) Both the X chromosomes from one of its parents
(ii) Both the Y chromosomes from one of its parents
(iii) A combination of X chromosomes from either of its parents
(iv) A combination of X and Y chromosomes from either of its parents

(b) What is the probability of having a girl child in third pregnancy if the first two progenies are boys?
i) 25%
ii) 50%
iii) 65%
iv) 10%

	(c) Y chromosome is always larger than the X-chromosome. i) True ii) False OR, (c)How many sex chromosomes are present in a human being? (d) But the process of sex determination in snails is not genetically determined. Justify this statement.	
39.	When the rays of light travels from one transparent medium to another, the path of light is deviated. This phenomena is called refraction of light. The bending of light depends on the optical density of medium through which the light pass.  The speed of light varies from medium to medium. A medium in which the speed of light is more is optically rarer medium whereas in which the speed of light is less is optically denser medium. Whenever light goes from one medium to another, the frequency of light does not change however, speed and wavelength change. It concluded that change in speed of light is the basic cause of refraction. Now, answer the following questions: (a)Define Refractive Index. (b)What will be the refractive index of the medium in which the speed of light is 2.5 $\times 10^8$m/s? (c) Beams of light are incident through the holes A and B and emerge out of box through the holes C and D respectively as shown in the figure. Which of the following could be inside the box?  (i) A rectangle glass slab	4

	(ii) A convex lens (iii) A concave lens (iv) A prism ……. *<u>For Visual Impaired Students</u>* State Snell's Law of refraction of light. (d) A pencil when dipped in water in a glass tumbler appears to be bent at the interface of air and water. Will the pencil appear to be bent to the same extent, if instead of water we use liquids like, kerosene or turpentine? Support your answer with reason.	