BK BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
SENIOR SECONDARY CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL
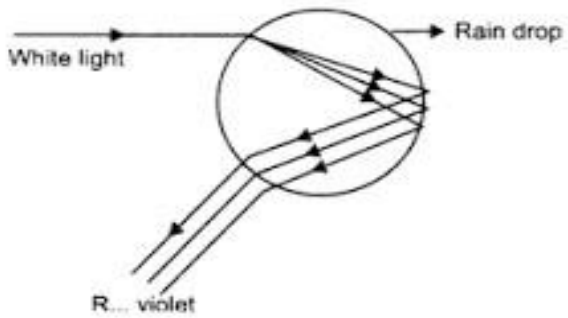
PRE BOARD EXAMINATION 2024-25
MARKING SCHEME SCIENCE (086)

Class: X   Duration: 3 Hr
Date: 16 /11/2024   Max. Marks: 80

	SECTION-A	
1	(c) 16 covalent bonds	1
2	(c) Hydrogen	1
3	(c) Calcium bicarbonate	1
4	(a) addition of oxygen	1
5	(a) Sonorousness	1
6	(b) $AgNO_3$ solution and Copper metal	1
7	(a) Iodine	1
8	(b) KOH	1
9	(c) Lack of oxygen and formation of lactic acid.	1
10	(b) II, III	1
11	(c) Posture and balance	1
12	(d) Tt and tt	1
13	(b) At twice the focal length	1
14	(b) Accommodation.	1
15	(c) CFCs; Ozone	1
16	(a) Broken down by biological processes	1
17.	(c) A is true but R is false.	1
18.	(d) A is false but R is true.	1
19.	(a) Both A and R are true, and R is the correct explanation of A.	1
20.	(a) Both A and R are true, and R is the correct explanation of A	
21	The purpose of making urine is to remove waste products, toxins, and excess substances like water, salts, and urea from the blood, maintaining the body's fluid balance and regulating blood pressure.The bladder stores urine. The urethra releases urine.	1 ½ ½
22	Arteries have thick and elastic walls to withstand and accommodate the high pressure of blood pumped by the heart. Veins have valves to prevent the backflow of blood and ensure it moves in one direction toward the heart.	1+1
23	Respiration is a process that breaks down carbohydrates in food into glucose, which then combines with oxygen in cells to produce energy. This process also produces carbon dioxide and water.	2
24	1. (a) (i) The incident, refracted, and normal rays all lie in the same plane ½	2

	(ii) The ratio of the sine of the angle of incidence to the sine of the angle of refraction is constant	½
	(b)	1

$$^{air}n_{glass} = \frac{\text{speed of light in air}}{\text{speed of light in glass}}$$

$$1.5 = \frac{3 \times 10^8 \text{ m/s}}{\text{speed of light in glass}}$$

$$\Rightarrow \text{speed of light in glass} = \frac{3 \times 10^8}{1.5}$$

$$= 2 \times 10^8 \text{ m/s}$$

25	Coils in electric toasters and irons are made of an alloy instead of pure metal because alloys have several advantages over pure metals, including:	
	(i) Higher resistance: Alloys have a higher resistance than pure metals, which results in a greater heating effect. This is useful for toasting.	
	(ii) Higher melting point: Alloys have a higher melting point than pure metals, so they don't melt or oxidize easily at high temperatures.	
	(iii) Less likely to corrode: Alloys don't corrode easily. (1+1 any two)	
	OR	
	The resistance depends upon resistivity of the material, length, temperature, and area of across -section. 1	
	Mathematically,	
	R=pl/A 1	
	Where p is the resistivity, is the length and A is area of cross section. From above, p=RA/l= ohm X m^2/m=ohm-metre.	

26	a) Bile juice plays a significant role in digestion by emulsifying fats, breaking large fat globules into smaller ones. This increases the surface area for enzymes like lipase to act on fats, aiding in their digestion and absorption.	1+1
	b) Sucrose is transferred into phloem tissue through active transport. Companion cells actively pump sucrose into the sieve tube elements of the phloem, creating a concentration gradient that allows water to follow by osmosis, generating pressure that helps move the sucrose solution to different parts of the plant.	

SECTION-C

27	(a) In a food chain consisting of snake, insect, grass and frog, assign an appropriate trophic level to frog.	1
	(b) 10 percent law ,flow of energy.	1
	(c)i)Maximum available energy- Phytoplankton	½
	ii) Maximum concentration of pesticides- Fish eating Bird.	1/2
28		3
	When marble ($CaCO_3$)reacts with dil. HCl, CO_2 gas evolved	
	$CaCO_3$ (s) +2HCl (aq)◊ $CaCl_2$ (aq) + H_2O (l) + CO_2 (g)	

	When this gas is evolved and is passed through lime water, becomes milky due to the formation of insoluble Calcium carbonate. Ca (OH) 2 + CO2 (g)◊ CaCO3 (s) +H2O (l) But when milkiness disappears i.e. when CO2 gas is passed in excess through CaCO3 (s)	
29	(a)Cinnabar 1 (b)Mercury is obtained from its ore by roasting.1 HgS + O2 → Hg + SO2 1 (c) When aluminium is heated with Fe2O3 to get molten iron, it is called thermite reaction. Fe2O3 + 3Al → Al2O3 + 2Fe 1 Molten iron is used to weld broken railway tracks. 1	3
	OR	
	(i) Metals which are low in reactivity series can be obtained by heating their compounds. For example, mercury is obtained by heating its ore, cinnabar (HgS), in air. HgS + O2 → Hg + SO2	
	(ii) Metals which are in the middle of the series are generally obtained by heating their compounds with some reducing agent such as carbon. For example, iron is obtained from haematite (Fe2O3) by reduction with carbon. 2Fe2O3 + 3C → 4Fe + 3CO2	
30	Water droplets acts as tiny prism in the sky. The sunlight when enters these tiny droplets undergo internal reflection and also refract these rays which are dispersed causing a band of seven colours called rainbow. Rainbow is always formed in the direction opposite to the sun. 1 1 The phenomenon take part in this are: 1 (i) Dispersion of light (ii) Total internal reflection (iii) Refraction of light.	3

31	According to ohm's law: $V = IR$ where V is voltage applied, in volts(V) I is current drawn, in ampere(A) R is the resistance of the circuit, ohms(Ω) current $= V/R$ $\quad\quad = 220/55$ $\quad\quad = 4$ Ampere power $= v \times I$ $\quad\quad = 220 \times 4$ $\quad\quad = 880$ Watt	½ 1 ½ 1	

| 32 | Two or more than two resistors are said to be connected in series, if they are joined end to end and the same (i.e., total) current flows through each one of them

 (a) Electric circuit   (b) Equivalent circuit

 in figure (a), $V=V1+V2+V3$
 Ohm's law, $V=IR_s$

 From above equations
 $IR_S=V1+V2+V3$
 On applying Ohm.s law to the three resistors separately, we have
 $V_1=IR_1, V_2=IR_2, V_3=IR_3$
 $\therefore IRs=IR_1+IR_2+IR_3$
 $\therefore Rs =R_1+R_2+R_3$
 If n resistors with resistances $R_1, R_2...Rn$ are connected in series,

 $Rs =R_1+R_2+...+Rn$ | 1

 ½

 ½ | |

33	a) free ear lobe is appears to be dominant in this case. As it exists in more individuals in a population.	1	
	b) It is not sex-linked as both male and females have the attached ear lobes.	1	
	c) 1:2:1	2	

	SECTION-D		
34	Attempt either option A or B.		
	(a) H—S---H F---F	2	
	(b) (i) C + O_2 -→ CO_2 (ii) CH_4 + 2 O_2 -→ CO_2 + H_2O	3	

	(iii) $CH_3 CH_2 OH + 3 O_2 \rightarrow 2Co_2 + 3H_2O$	
	OR	2
	(i) Alcohol + carboxylic acid _--- Ester + Water 2 (ii) Ester + NaOH--- Soap and Alcohol 1 (iii) Series of organic compound which differ by CH2 unit and examples 2	5
35	Attempt either option A or B.	
	(a) In complex multicellular organisms, it is not possible to reconstruct the whole organism from a fragment because their cells are highly specialized for specific functions. Unlike simpler organisms, where all cells can divide and differentiate into any type, in complex organisms, most cells have lost this ability.	2
	(b) Sexual maturation of reproductive tissues and organs is necessary for reproduction because it ensures the production of viable gametes (sperm and eggs) and the development of the body for successful mating, fertilization, and gestation. These changes, regulated by hormones, prepare an organism for the processes necessary to produce offspring.	3
	OR	
	(a) Variations are useful for a species during drastic alterations in niches because they increase the likelihood that some individuals possess traits that allow them to survive and adapt to new environmental conditions.	2
	(b) After implantation, the uterus provides a safe and supportive environment for the embryo by supplying nutrients, oxygen, and waste removal through the blood. The placenta forms a connection between the mother and the embryo, facilitating the exchange of nutrients and gases and producing hormones that regulate the pregnancy, ensuring proper growth and development of the embryo.	3
36	Attempt either option A or B.	
	2. (a) Note: Power = V × I V =220V, I= 0.5A So power = 220 × 0.5 =110Watts 1 (b) Energy of one day =Power × Time=400W×8h=3.2KWh. Energy of 30 days =3.2KWh×30=96KWh. 1 (c) The main difference between a kilowatt (kW) and a kilowatt-hour (kWh) is what they measure: kW measures power, while kWh measures energy. 1 OR (a) According to Ohm's Law, the flow of current through a conductor is directly proportional to the potential difference applied at its ends provided that temperature and physical conditions are constant. 1 V∝I ⇒V=IR where R is the constant of proportionality, which is called resistance. Unit of potential difference is volt (V) and that of current is ampere (A). Hence from relation V = IR, R = V/I The unit of resistance is the ohm(Ω). If V=1 Volt and I=1 Ampere, then R = (1V)/1A) = 1 Ω. 1	

		Thus, 1 Ohm is the resistance of a conductor such that when a potential difference of 1 Volt is applied to its ends and a current of 1 Ampere flows through it.	
		(b) (i) Voltage is directly proportional to electric current. (ii) Voltage is also directly proportional to resistance. 1	

	SECTION – E		
37	Case Based		2
	(a) Give Smell in acid and base example Onion		1
	(b) Litmus and Methyl orange or phenolphthalein.		
	OR		1
	(b) Scale by which find the strength. 0 to 6		
38	Attempt either subpart A or B.		2
	A. Sensory neuron→ Relay neuron → Motor neuron→ Effector		2
	B. Reflex arcs have evolved in animals to enable rapid, automatic responses to stimuli without the need for conscious thought. This allows animals to respond quickly to potentially harmful situations, ensuring survival by protecting the body from injury.		
	C. Spinal cord		1
39	D. Reflex arc		1
	(a) **at the centre of curvature** 1		
	(b) Behind the mirror, diminished 1		
	(c) The convex mirror is used as a rear view mirrors in automobiles because it can form a small and erect image of an object. 2		
	Or		
	Concave mirror because it can form erect and magnified image of the object. 2		
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----------------------------ALL THE BEST ------------------------------