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ಕರ್ನಾಟಕ ಶಾಲಾ ಪರೀಕ್ಷೆ ಮತ್ತು ಮೌಲ್ಯನಿರ್ಣಯ ಮಂಡಲಿ, ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು - **560 003**

KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD, MALLESHWARAM, BENGALURU – 560 003

ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪರೀಕ್ಷೆ, ಮಾರ್ಚ್ / ಏಪ್ರಿಲ್ — **2023**

S. S. L. C. EXAMINATION, MARCH/APRIL, 2023

ಮಾದರಿ ಉತ್ತರಗಳು

MODEL ANSWERS

ದಿನಾಂಕ : 10. 04. 2023] ಸಂಕೇತ ಸಂಖ್ಯೆ : **83-E (Phy)**

Date : 10. 04. 2023] **Code No. : 83-E (Phy)**

ವಿಷಯ : ವಿಜ್ಞಾನ

Subject : SCIENCE

(ಭೌತ ವಿಜ್ಞಾನ, ರಸಾಯನ ವಿಜ್ಞಾನ ಮತ್ತು ಜೀವ ವಿಜ್ಞಾನ / **Physics, Chemistry & Biology**)

(ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ / ಎನ್.ಎಸ್.ಆರ್. & ಎನ್.ಎಸ್.ಪಿ.ಆರ್.)

(Private Fresh / NSR & NSPR)

(ಭೌತಶಾಸ್ತ್ರ / **Physics**)

(ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ / English Medium)

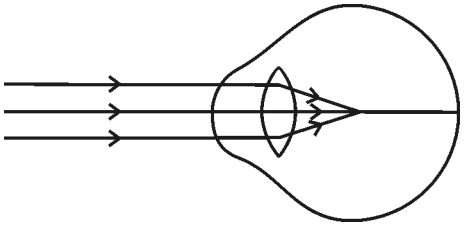
[ಗರಿಷ್ಠ ಅಂಕಗಳು : **100**

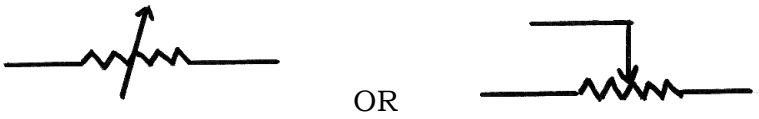
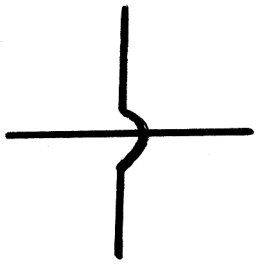
[Max. Marks : 100

PART – A

(Physics)

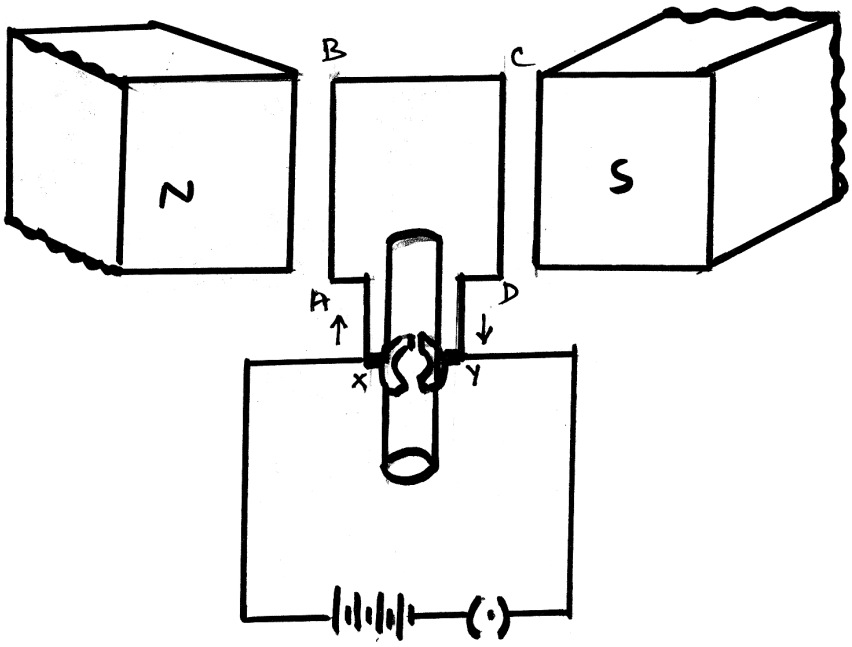
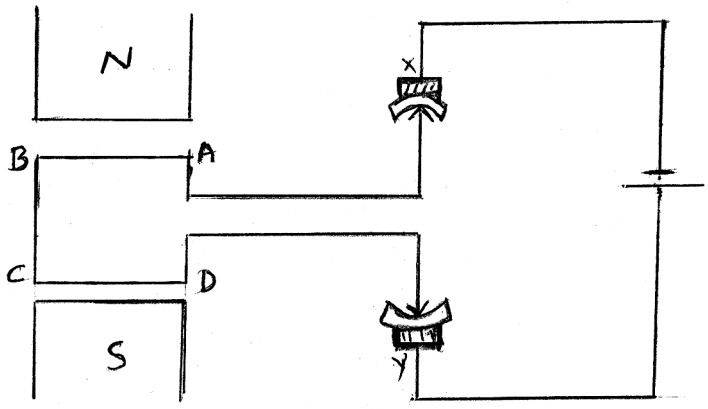
Qn. Nos.	Value Points	Total
I.	**Multiple choice questions :** **4 × 1 = 4**	
1.	The device used to measure the rate of current in a circuit is (A) Ammeter (B) Voltmeter (C) Galvanometer (D) Battery Ans. : (A) Ammeter	1

Qn. Nos.	Value Points	Total
2.	Observe the given figure. Identify the eye defect indicated in this figure.  (A) Presbyopia (B) Hypermetropia (C) Myopia (D) Cataract *Ans.* : (C) Myopia	1
3.	A light ray enters to rarer medium from a denser medium. Then the speed of that light ray (A) decreases and bends towards the normal (B) increases and bends away from the normal (C) decreases and bends away from the normal (D) increases and bends towards the normal *Ans.* : (B) increases and bends away from the normal	1
4.	The inner wall of the solar cooker is painted black. Because black colour (A) reflects light (B) converges solar rays (C) prevents from rusting (D) absorbs more heat *Ans.* : (D) absorbs more heat	1

Qn. Nos.	Value Points	Total
II.	**Answer the following questions :** **2 × 1 = 2**	
5.	Write the symbols of the following components used in an electric circuit. i) Rheostat ii) Wires crossing without joining *Ans.* : i)  OR **Rheostat** ii)  Wires crossing without joining $\frac{1}{2}+\frac{1}{2}$	1
6.	What does the thumb indicate in the right hand thumb rule ? *Ans.* : Direction of current	1
III.	**Answer the following questions :** **5 × 2 = 10**	
7.	Light enters from air to benzene having refractive index 1·50. Calculate the speed of light in benzene. (Speed of light in air : 3×10^8 ms^{-1}) **OR** A concave lens has focal length of 12 cm. At what distance should the object from the lens be placed so that it forms an image at 9 cm from the lens ? *Ans.* : Refractive index of a medium = $\frac{\text{Speed of light in air}}{\text{Speed of light in Benzene}}$ OR	

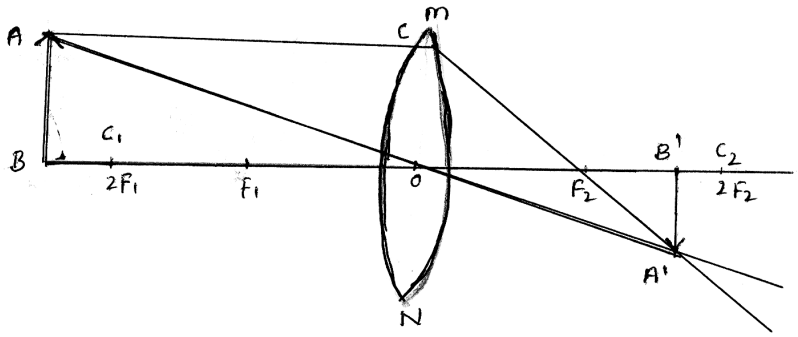
Qn. Nos.	Value Points		Total
	$n_m = \frac{C}{V}$	$\frac{1}{2}$	
	$1{\cdot}50 = \frac{3 \times 10^8}{\text{Speed of light in Benzene}}$	$\frac{1}{2}$	
	$1{\cdot}50 \times$ Speed of light in Benzene $= 3 \times 10^8$	$\frac{1}{2}$	
	Speed of light in Benzene $= \frac{3 \times 10^8}{1 \cdot 50}$	$\frac{1}{2}$	
	Speed of light in Benzene $= 2 \times 10^8$ ms^{-1}		2
	OR		
	$f = -12$ cm; $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$		
	$v = -9$ cm; $\frac{1}{u} = \frac{1}{v} - \frac{1}{f}$	$\frac{1}{2}$	
	u = ?; $\frac{1}{u} = \frac{1}{-9} - \frac{1}{-12}$		
	$\frac{1}{u} = -\frac{1}{9} + \frac{1}{12}$	$\frac{1}{2}$	
	$\frac{1}{u} = \frac{-4+3}{36}$		
	$\frac{1}{u} = \frac{-1}{36}$	$\frac{1}{2}$	
	$-u = 36$		
	$u = -36$ cm	$\frac{1}{2}$	2
8.	Name the major constituent of biogas and write the properties of biogas.		
	OR		
	List the hazards of nuclear power generation.		

Qn. Nos.	Value Points	Total
	Ans. :	
	★ Methane / CH_4 $\frac{1}{2}$	
	★ When burnt leaves no residue like ash $\frac{1}{2}$	
	★ It burns without smoke $\frac{1}{2}$	
	★ Its heating capacity is high $\frac{1}{2}$	2
	OR	
	★ Improper nuclear-waste storage and disposal result in environmental contamination	
	★ There is a risk of accidental leakage of nuclear radiation	
	(Consider any suitable answer)	2
9.	"Connecting electrical appliances in parallel is advantageous over connecting them in series" in a circuit. Justify.	
	Ans. :	
	★ This is helpful particularly when each gadget has different resistance and requires different current to operate properly.	
	★ In the parallel circuit when one component fails the circuit will not break.	
	★ Parallel circuit divides the current through the electrical gadgets.	
	(Any *two*) 1 + 1	2
10.	Draw the diagram of a simple electric motor and label 'brushes'.	
	Ans. :	

Qn. Nos.	Value Points	Total
	 *X, Y*-Carbon brushes For diagram — $1\frac{1}{2}$ For label — $\frac{1}{2}$	2
	OR  Electric motor For diagram — $1\frac{1}{2}$ For label — $\frac{1}{2}$	2

Qn. Nos.	Value Points	Total
11.	To get an image of the same size of the object, at what position an object is to be placed in front of a concave mirror ? Mention the nature of the image formed. *Ans.* : ★ At *'C'* / at centre of curvature 1 ★ Real and inverted 1	2
IV.	**Answer the following questions :** **3 × 3 = 9**	
12.	State Ohm's law. On which factors does the resistance of a conductor depend ? Mention the SI unit of electric power. **OR** State Joule's law of heating. How is fuse connected in the circuits ? Name the metal used in the filament and the gas filled in electric bulb. *Ans.* : At constant temperature, the potential difference, *V*, across the ends of a given metallic wire in an electric circuit is directly proportional to the current flowing through it. 1 OR $V \propto I$ $V = IR$ The factors on which resistance of a conductor depends i) The length of the conductor $\frac{1}{2}$ ii) Area of cross-section of the conductor $\frac{1}{2}$ iii) The nature of the material $\frac{1}{2}$ iv) The temperature. (any *three*) ★ watt – W $\frac{1}{2}$ **OR**	3

Qn. Nos.	Value Points	Total
	Heat produced in a resistor is i) directly proportional to the square of current for a given resistance, $\frac{1}{2}$ ii) directly proportional to resistance for a given current, and $\frac{1}{2}$ iii) directly proportional to the time for which the current flows through the resistor $\frac{1}{2}$ *Note* : If the student writes directly $H = I^2Rt$ — 1 mark ★ Tungsten $\frac{1}{2}$ ★ Nitrogen / N_2 OR Argon / Ar 1 (Consider if He / Ne / Kr written)	3
13.	The resistors R_1, R_2 and R_3 have the values 10 Ω, 20 Ω and 60 Ω respectively, which have been parallelly connected to a battery of 24 V in an electric circuit. Then calculate the following : i) The current flowing through each resistor ii) The total current in the circuit iii) The total resistance of the circuit. *Ans.* : i) $I_1 = \frac{V}{R_1} = \frac{24\text{ V}}{10\ \Omega} = 2{\cdot}4\text{ A}$ $\frac{1}{2}$ $I_2 = \frac{V}{R_2} = \frac{24\text{ V}}{20\ \Omega} = 1{\cdot}2\text{ A}$ $\frac{1}{2}$ $I_3 = \frac{V}{R_3} = \frac{24\text{ V}}{60\ \Omega} = 0{\cdot}4\text{ A}$ $\frac{1}{2}$ ii) $I = I_1 + I_2 + I_3$ $= (2{\cdot}4 + 1{\cdot}2 + 0{\cdot}4)\text{ A}$ $= 4\text{A}$ $\frac{1}{2}$	

Qn. Nos.	Value Points	Total
	iii) $\frac{1}{R_p} = \frac{1}{10} + \frac{1}{20} + \frac{1}{60} = \frac{1}{6}$ $\frac{1}{2}$ $\frac{1}{R_p} = \frac{1}{6}$ $R_p = 6\ \Omega.$ $\frac{1}{2}$	3
14.	Draw the ray diagram for the image formation in a convex lens when the object is placed beyond $2F_1$. Mention the position and nature of the image formed. [F_1 : Principal focus of the lens] *Ans.* :  For ray diagram — 2 ★ Position of the image : Between F_2 & $2F_2$. $\frac{1}{2}$ ★ Nature of the image : Real and inverted. $\frac{1}{2}$	3
V.	**Answer the following question :** **1 × 4 = 4**	
15.	a) What is solenoid ? Write the properties of the magnetic field lines formed around a current carrying solenoid. b) What is alternating current ? Electric appliances having metallic body are connected to earth wire, why ? *Ans.* : a) ★ A coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder is called a solenoid. 1 ★ At the ends/poles of a solenoid, the magnetic field lines are appear in the form of concentric circles. $\frac{1}{2}$ ★ At the centre inside the solenoid the magnetic field lines are appear in the form of parallel straight lines. $\frac{1}{2}$	

Qn. Nos.	Value Points	Total
	b) ★ The current that changes direction after equal intervals of time is called an alternating current. 1 ★ The metallic body is connected to the earth wire provides a low resistance conducting path for the current. $\frac{1}{2}$ ★ Thus, it ensures that any leakage of current to the metallic body of the appliance keeps its potential to that of the earth and the user may not get a severe electric shock. $\frac{1}{2}$	4
VI.	**Answer the following question : 1 × 5 = 5**	
16.	a) How does rainbow form in the nature ? Explain. Mention the colour of the light that bends the most and that bends the least. b) How does the eye lens accommodate to see the distant objects and nearby objects ? Explain. *Ans.* : a) ★ It is caused by dispersion of sunlight by tiny water droplets present in the atmosphere. $\frac{1}{2}$ ★ The water droplets in the atmosphere act like small prisms. $\frac{1}{2}$ ★ They refract and disperse the incident sunlight, then reflect it internally and finally refract it again. $\frac{1}{2}$ ★ Due to the dispersion of light and internal reflection different colours reach observer's eye. $\frac{1}{2}$ ★ Violet colour bends the most. $\frac{1}{2}$ ★ Red colour bends the least. $\frac{1}{2}$	

Qn. Nos.	Value Points	Total
	b) ★ When ciliary muscles relax, the curvature of the lens decreases and becomes thin. Then focal length of the lens increases and distant objects are clearly visible. 1 ★ When ciliary muscles contract, the curvature of the lens increases and becomes thick. Then focal length of the lens decreases and nearby objects are clearly visible. 1	5

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S. S. L. C. EXAMINATION, MARCH/APRIL, 2023

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MODEL ANSWERS

ದಿನಾಂಕ : 10. 04. 2023] ಸಂಕೇತ ಸಂಖ್ಯೆ : **83-E (Chem.)**

Date : 10. 04. 2023] **Code No. : 83-E (Chem.)**

ವಿಷಯ : ವಿಜ್ಞಾನ

Subject : SCIENCE

(ಭೌತ ವಿಜ್ಞಾನ, ರಸಾಯನ ವಿಜ್ಞಾನ ಮತ್ತು ಜೀವ ವಿಜ್ಞಾನ / **Physics, Chemistry & Biology**)

(ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ / ಎನ್.ಎಸ್.ಆರ್. & ಎನ್.ಎಸ್.ಪಿ.ಆರ್.)

(Private Fresh / NSR & NSPR)

(ರಸಾಯನಶಾಸ್ತ್ರ / **Chemistry**)

(ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ / English Medium)

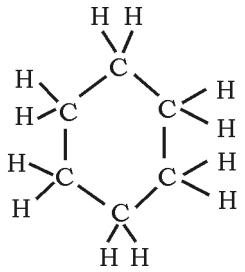
[ಗರಿಷ್ಠ ಅಂಕಗಳು : **100**

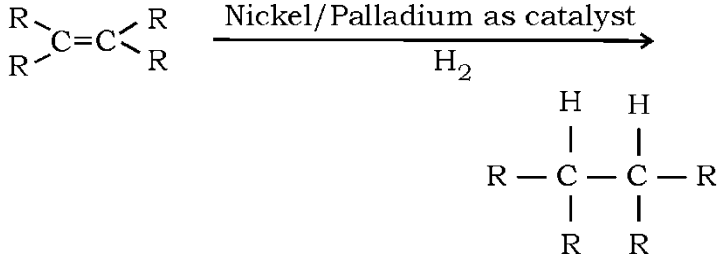
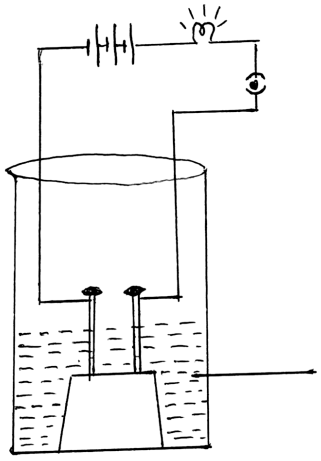
[Max. Marks : 100

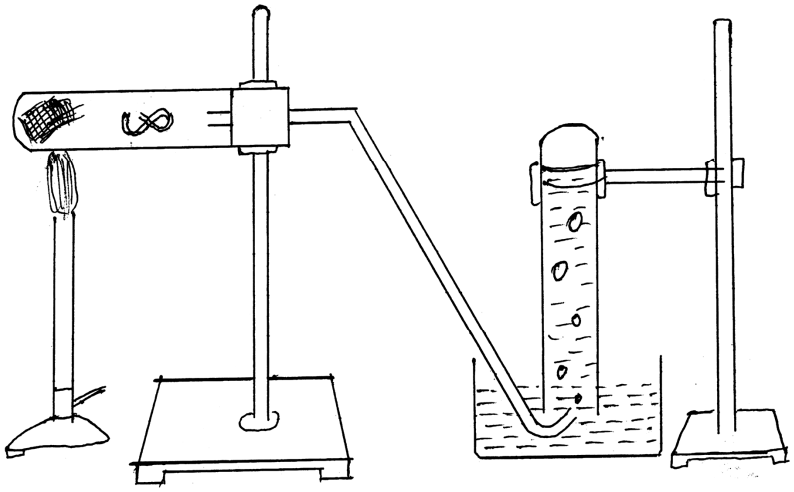
PART – B

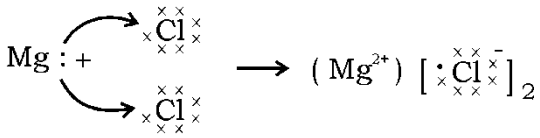
(Chemistry)

Qn. Nos.	Value Points	Total
VII.	**Multiple choice questions :** **2 × 1 = 2**	
17.	The reactants that exchange ions by reacting with each other and form a precipitate among the following are (A) $BaCl_2$ and Na_2SO_4 (B) Al_2O_3 and HCl (C) NaOH and H_2SO_4 (D) Na_2O and CO_2 *Ans.* : (A) $BaCl_2$ and Na_2SO_4	1

Qn. Nos.	Value Points	Total
18.	Among $_2X^4$, $_8Y^{16}$, $_{10}Z^{20}$; the elements having zero valency are [2, 8, 10 are atomic numbers of elements] (A) $_2X^4$ and $_8Y^{16}$ (B) $_8Y^{16}$ and $_{10}Z^{20}$ (C) $_2X^4$ and $_{10}Z^{20}$ (D) $_2X^4$, $_8Y^{16}$ and $_{10}Z^{20}$ *Ans.* : (C) $_2X^4$ and $_{10}Z^{20}$	1
VIII.	**Answer the following questions :** **4 × 1 = 4**	
19.	The general formula of cycloalkanes is C_nH_{2n} and its first member is cyclopropane (C_3H_6). Write the molecular formula and structural arrangement of the fourth member of this homologous series. *Ans.* : Molecular formula : C_6H_{12} $\frac{1}{2}$ Structural arrangement  $\frac{1}{2}$	1
20.	Packets of chips are flushed with nitrogen gas. Why ? *Ans.* : To prevent chips from getting oxidised / to prevent rancidity.	1
21.	An iron nail is dropped into a test tube having copper sulphate solution. The iron nail gradually turns to brownish colour. Why ? *Ans.* : Since iron is more reactive than copper, it displaces copper from copper sulphate solution / Displaced copper gets deposited on the iron nail.	1

Qn. Nos.	Value Points	Total
22.	What is hydrogenation ? *Ans.* : Hydrogen is added to unsaturated hydrocarbons in the presence of catalyst such as palladium or nickel to give saturated hydrocarbons. This is known as hydrogenation. OR Conversion of unsaturated oils into saturated fats by adding hydrogen in the presence of palladium / nickel like catalyst. **OR** ★  	1
IX.	**Answer the following questions :** **6 × 2 = 12**	
23.	Draw the diagram of arrangement of apparatus to show that acid solution in water conducts electricity and label dilute HCl solution. *Ans.* :  Drawing : $1\frac{1}{2}$ Labelling : $\frac{1}{2}$	2

Qn. Nos.	Value Points	Total
24.	"Calcium oxide and carbon dioxide are produced on heating calcium carbonate." Write the balanced chemical equation for this reaction. Mention the type of this chemical reaction. *Ans.* : $CaCO_3 \xrightarrow{Heat} CaO + CO_2$ 1 (Thermal) decomposition reaction/endothermic reaction 1	2
25.	Draw the diagram of arrangement of apparatus to show the action of steam on a metal. *Ans.* : 	2
26.	What are alloys ? Write the constituents of bronze. *Ans.* : ★ Alloys are the homogeneous mixture of two or more metals or metal and non-metal. 1 ★ Bronze — Copper and tin. $\frac{1}{2}+\frac{1}{2}$	2
27.	Carbon forms covalent compounds. Why ? Why do covalent compounds have low melting and boiling points ? *Ans.* : ★ Carbon shares its valence electrons with other atoms of carbon or with atoms of other elements. 1 ★ The force of attraction between the molecules are not very strong. 1	2

Qn. Nos.	Value Points	Total
28.	Explain the reason for applying baking soda on honeybee stung area. *Ans.* : ★ Honeybee sting has methanoic acid. ★ Baking soda (sodium hydrogen carbonate) is a mild base, it neutralises the acid and gives relief.	2
X.	**Answer the following questions : 3 × 3 = 9**	
29.	a) Depict the formation of magnesium chloride with the help of electron dot structure. b) Hydrogen gas is not liberated when a metal like zinc reacts with nitric acid. Why ? **OR** How are metals in the middle of the reactivity series extracted from their ores ? Explain. *Ans.* : a) $Mg \rightarrow Mg^{2+} + 2e^-$ $Cl + e^- \rightarrow Cl^-$  2 b) ★ Nitric acid is a strong oxidising agent $\frac{1}{2}$ ★ It oxidises the hydrogen produced to water and itself gets reduced to oxides of nitrogen. $\frac{1}{2}$ **OR** ★ Metals in the middle of the activity series are in the form of sulphide or carbonate ores. $\frac{1}{2}$ ★ The sulphide ores are converted into oxides by roasting. Roasting is heating the ores strongly in the presence of excess air. 1	3

Qn. Nos.	Value Points	Total
	★ The carbonate ores are converted into oxides by heating strongly in limited air in calcination. 1 ★ The metal oxides are then reduced to the corresponding metals by using reducing agents such as carbon. $\frac{1}{2}$	3
30.	a) Observe the given part of the modern periodic table and answer the following questions :	

Groups → / Periods ↓	1	2	13	17
2	—	Be	—	—
3	Na	Mg	Al	Cl
4	—	Ca	—	—

i) Which element is more electropositive ? Why ?

ii) Atoms of which element have minimum atomic radius ? Why ?

b) Mention the period and group number of the element that has atomic number 19.

Ans. :

a) i) Na $\frac{1}{2}$

Sodium has +1 valency / It loses one valence electron easily / electro-positivity decreases across the period. $\frac{1}{2}$

ii) Cl $\frac{1}{2}$

It is in the 3rd period and it has 3 orbits / shells. OR It has high effective nuclear charge on the valence shell and pull the electrons closer to the nucleus / across the period the atomic radius decreases. $\frac{1}{2}$

b) Period — 4 $\frac{1}{2}$

Group — 1 $\frac{1}{2}$ 3

Qn. Nos.	Value Points	Total
31.	Name the salts used in the following situations and write their molecular formula : a) To remove permanent hardness of water. b) To make drinking water free from germs. c) To support fractured bones in their right position. **OR** a) The pH values of four solutions are given in the below table. Classify these into acidic and basic solutions :	

Solution	***pH Value***
e	5
f	13
g	9
h	2

b) Name the antacid used to neutralise excess of acid in the stomach.

Ans. :

a) Washing soda / sodium carbonate $\frac{1}{2}$

Na_2CO_3 / $Na_2CO_3 . 10H_2O$ $\frac{1}{2}$

b) Bleaching powder / Calcium oxychloride $\frac{1}{2}$

$CaOCl_2$ $\frac{1}{2}$

c) Plaster of Paris / Calcium sulphate hemihydrate

$CaSO_4 . \frac{1}{2} H_2O$ 1

3

OR

a)

Acidic solutions	*Basic solutions*
e	f
h	g

$\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$

Qn. Nos.	Value Points	Total
	b) Milk of magnesia / Magnesium hydroxide / $Mg(OH)_2$ OR Sodium hydrogen carbonate / $NaHCO_3$ 1	3
XI.	**Answer the following question :** **1 × 4 = 4**	
32.	a) How will ethanol be oxidised ? b) Explain the cleaning action of soaps. *Ans.* : a) Ethanol is oxidised into ethanoic acid by heating with oxidising agents like alkaline potassium permanganate or acidified potassium dichromate / $CH_3CH_2OH \xrightarrow[\text{Or Acidified } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}} CH_3COOH$ 2 b) ★ Soaps are sodium or potassium salts of long-chain carboxylic acids. $\frac{1}{2}$ ★ Soap molecules form micelles, in which the ionic-end interacts with water and faces outside. $\frac{1}{2}$ ★ Carbon chain of the soap interacts with oil or dirt. $\frac{1}{2}$ ★ This forms emulsion in water. The soap molecules pull out the dirt and wash the clothes clean. $\frac{1}{2}$	4

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KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD, MALLESHWARAM, BENGALURU – 560 003

ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪರೀಕ್ಷೆ, ಮಾರ್ಚ್ / ಏಪ್ರಿಲ್ — **2023**

S. S. L. C. EXAMINATION, MARCH/APRIL, 2023

ಮಾದರಿ ಉತ್ತರಗಳು

MODEL ANSWERS

ದಿನಾಂಕ : 10. 04. 2023] ಸಂಕೇತ ಸಂಖ್ಯೆ : **83-E (Bio)**

Date : 10. 04. 2023] **Code No. : 83-E (Bio)**

ವಿಷಯ : ವಿಜ್ಞಾನ

Subject : SCIENCE

(ಭೌತ ವಿಜ್ಞಾನ, ರಸಾಯನ ವಿಜ್ಞಾನ ಮತ್ತು ಜೀವ ವಿಜ್ಞಾನ / **Physics, Chemistry & Biology**)

(ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ / ಎನ್.ಎಸ್.ಆರ್. & ಎನ್.ಎಸ್.ಪಿ.ಆರ್.)

(Private Fresh / NSR & NSPR)

(ಜೀವಶಾಸ್ತ್ರ / **Biology**)

(ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ / English Medium)

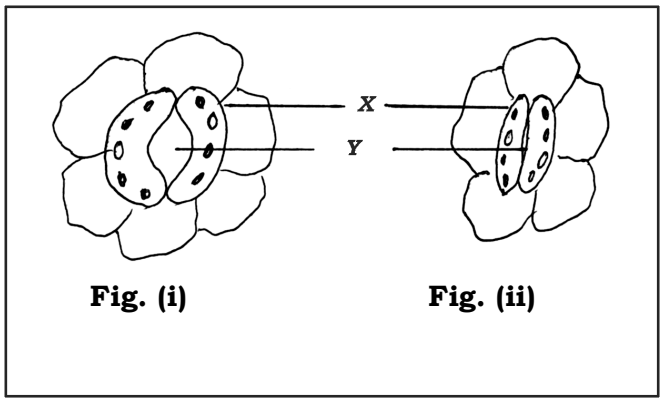
[ಗರಿಷ್ಠ ಅಂಕಗಳು : **100**

[Max. Marks : 100

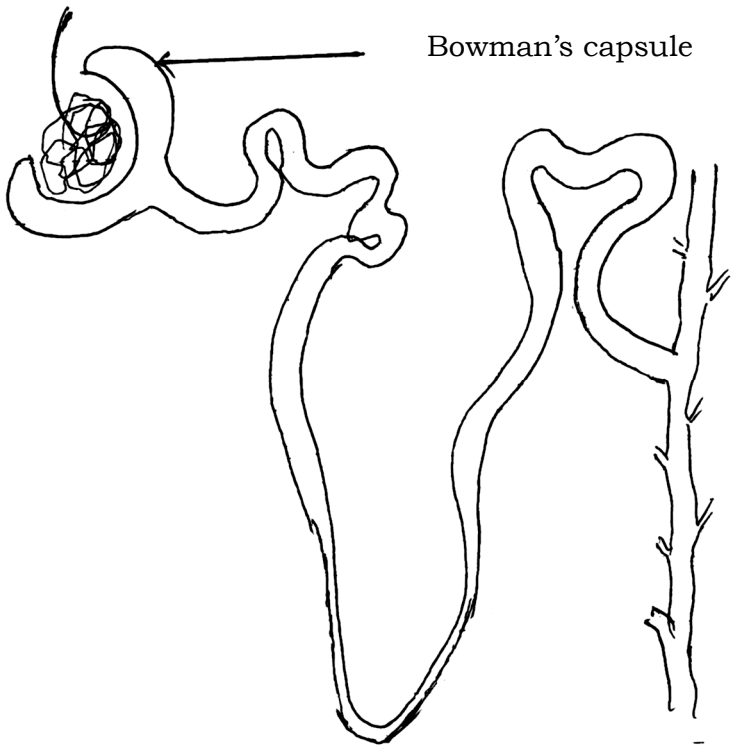
PART – C
(Biology)

Qn. Nos.	Value Points	Total
XII.	**Multiple choice questions :** **2 × 1 = 2**	
33.	"A person immediately starts running soon after observing a snake." The correct transmission path of reflex impulse in this situation is (A) Receptor → Sensory neuron → Brain → Relay neuron → Motor neuron → Effector	

Qn. Nos.	Value Points	Total
	(B) Receptor → Sensory neuron → Spinal cord → Relay neuron → Motor neuron → Effector (C) Effector → Spinal cord → Sensory neuron → Relay neuron → Motor neuron → Receptor (D) Effector → Motor neuron → Relay neuron → Brain → Sensory neuron → Receptor *Ans.* : (B) Receptor → Sensory neuron → Spinal cord → Relay neuron → Motor neuron → Effector	1
34.	In humans, the testes are located outside the lower abdomen in the scrotum because (A) to protect testes from mechanical shocks (B) to increase the production of sperms (C) to maintain the secretion of testosterone hormone (D) to maintain the temperature required for sperm production. *Ans.* : (D) to maintain the temperature required for sperm production.	1
XIII.	**Answer the following questions :** **2 × 1 = 2**	
35.	What is the role of abscisic acid in plants ? *Ans.* : Abscisic acid inhibits growth in plants.	1
36.	Write two examples for the organisms that reproduce by binary fission. *Ans.* : ★ Amoeba $\frac{1}{2}$ ★ Leishmania $\frac{1}{2}$	1

Qn. Nos.	Value Points	Total
XIV.	**Answer the following questions :** **7 × 2 = 14**	
37.	Mention the tools used for tracing the evolutionary relationships between the organisms. *Ans.* : ★ Excavating $\frac{1}{2}$ ★ Time-dating $\frac{1}{2}$ ★ Studying fossils $\frac{1}{2}$ ★ Determining DNA sequences. $\frac{1}{2}$	2
38.	Observe the given below figures :  **Fig. (i)** **Fig. (ii)** a) Which figure indicates the massive amount of exchange of gases ? Why ? b) Name the parts *X* and *Y*. What is the function of other part *X* ? *Ans.* : a) ★ Fig. (i) / Open stomata $\frac{1}{2}$ ★ It is because the stomatal pore is open. $\frac{1}{2}$	

Qn. Nos.	Value Points	Total
	b) ★ *X* — Guard cell *Y* — Stomatal pore ★ Regulates opening and closing of stomatal pore. 1	2
39.	Give an example for a food chain of grassland ecosystem. If there is an increase in the number of organisms in the second trophic level, how does this affect on that food chain ? *Ans.* : Grass → Grasshopper → Frog → Snake → Eagle (Any suitable food chain) 1 If the number of organisms in the second trophic level increases, then the number of organisms in the first trophic level decreases. $\frac{1}{2}$ Eventually population of the rest of the organisms in the trophic levels decreases and leads to ecological imbalance. $\frac{1}{2}$	2

Qn. Nos.	Value Points	Total
40.	Draw the diagram to show the structure of nephron and label Bowman's capsule. *Ans.* :  Diagram — $1\frac{1}{2}$ Labelling — $\frac{1}{2}$	2
41.	What is vegetative reproduction ? What are its advantages ? *Ans.* : The development of new plants from the parts like root, stem and leaves under appropriate conditions. 1 ★ These plants can bear flowers and fruits earlier than those produced from seeds. $\frac{1}{2}$ ★ Plants are genetically similar to the parent plant. $\frac{1}{2}$	2

Qn. Nos.	Value Points	Total
42.	Name the gland that secretes insulin hormone and mention the function of this hormone. *Ans.* : ★ Pancreas 1 ★ Regulates blood sugar level 1	2
43.	Write the differences between homologous organs and analogous organs. *Ans.* :	

Homologous organs	*Analogous organs*
★ Have similar structure / basic design	★ Have different structures / basic design
★ Perform different functions	★ Perform same function
★ Might be evolved from common ancestors	★ Might not be evolved from common ancestors

(Any 2 differences) 2×1 2

XV. Answer the following questions : $3 \times 3 = 9$

44. What is pollination ? What are the changes that occur in the flower after pollination ?

Ans. :

The transfer of pollen from the stamen to the stigma. 1

★ Germination of the pollen : Pollen tube develops. $\frac{1}{2}$

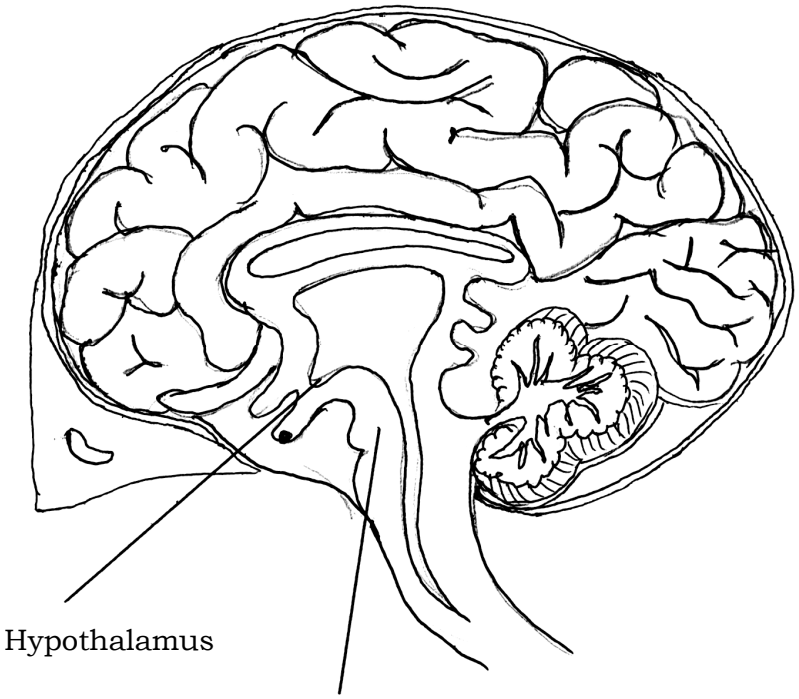
★ Fertilization : Pollen grain enters the ovary through pollen tube and fuses with the ovum / egg. Zygote is formed. $\frac{1}{2}$

★ Ovum develops into seed. Ovary grows rapidly and ripens into fruit. $\frac{1}{2}$

Petals, sepals, stamen, style and stigma may shrivel and fall off. $\frac{1}{2}$ 3

Qn. Nos.	Value Points	Total
45.	Coal and petroleum products should be used judiciously. Why ? *Ans.* : ★ Coal and petroleum contain carbon, hydrogen, nitrogen and sulphur. When these are burnt, carbon dioxide, water, oxides of nitrogen, oxides of sulphur and carbon monoxide are released. ★ All gases released result in air pollution. ★ Coal and petroleum are non-renewable / exhaustible sources of energy. ★ Excess of carbon dioxide released leads to greenhouse effect. ★ It also leads to global warming. ★ Oxides of nitrogen and sulphur lead to acid rain. ★ Carbon monoxide is a poisonous gas and harmful to lives of organisms. (Consider any 6 suitable points) $6 \times \frac{1}{2}$	3
46.	Tall pea plant producing red flowers (*TT RR*) is crossed with short pea plant producing white flowers (*tt rr*). i) Mention the type of plants produced from these plants in the F_1 generation. ii) Write the ratio of plants obtained in the F_2 generation by crossing the plants of F_1 generation and name the varieties of plants obtained. **OR**	

Qn. Nos.	Value Points	Total
	Analyse the situations given below. Answer the questions given : *Situation 1 :* The number of green grasshoppers in a green zone has been increasing from one generation to another generation. *Situation 2* : The number of brown grasshoppers in the same green zone has been reducing. Here, a) Where could genetic drift be happened more ? Why ? b) How can natural selection be considered as an important factor in organic evolution ? *Ans.* : i) Parents : *TT RR* × *tt rr* Gametes : *TR* × *tr* F_1 generation : *Tt Rr* / OR Hybrid / mixed red flowers producing tall pea plants. $\frac{1}{2}$ ii) Ratio = 9 : 3 : 3 : 1 $\frac{1}{2}$ Types of plants a) 9-Tall — Red flowers producing pea plants $\frac{1}{2}$ b) 3-Tall — White flowers producing pea plants $\frac{1}{2}$ c) 3-Short — Red flowers producing pea plants $\frac{1}{2}$ d) 1-Short — White flowers producing pea plant $\frac{1}{2}$ **OR** a) In situation (1) $\frac{1}{2}$ because, natural selection is positive. Among the organisms of new generation of green grasshoppers new combinations in genetic material have been accumulating and genetic drift increases. 1	3

Qn. Nos.	Value Points	Total
	b) In situation (2) $\frac{1}{2}$ because, natural selection is not positive. Due to this, the number of brown grasshoppers is reduced and may disappear in future. So the natural selection is an important event. 1	3
XVI.	**Answer the following questions :** **2 × 4 = 8**	
47.	Draw the diagram showing the structure of human brain. Label the following parts : i) Hypothalamus ii) Pons. *Ans.* :  Drawing — 3 Labelling — $\frac{1}{2}+\frac{1}{2}$	4

Qn. Nos.	Value Points	Total
48.	Explain the digestion of food materials in stomach and small intestine. **OR** Explain the role of xylem and phloem tissues in the transportation of materials in plants. *Ans.* : *Stomach* : ★ Gastric glands present in the wall of the stomach release hydrochloric acid, pepsin and mucus. $\frac{1}{2}$ ★ Hydrochloric acid creates an acidic medium which facilitates the action of pepsin. $\frac{1}{2}$ ★ Pepsin digests protein. $\frac{1}{2}$ *Small intestine* : ★ It receives pancreatic juice and bile juice. Bile juice makes the food alkaline. $\frac{1}{2}$ ★ Bile salts emulsify the fats in the small intestine. $\frac{1}{2}$ ★ Trypsin present in pancreatic juice helps to digest the proteins. $\frac{1}{2}$ ★ Lypase breaks down the emulsified fats. $\frac{1}{2}$ ★ Enzymes present in the small intestinal juice convert proteins into amino acids, complex carbohydrates into glucose and fats into fatty acids and glycerol. $\frac{1}{2}$ **OR** *Xylem* : Water conducting tissue. ★ In xylem tissue, vessels and tracheids of the roots, stem and leaves are interconnected to form a continuous system of water-conducting channel reaching all parts of the plant. 1	4

Qn. Nos.	Value Points	Total
	★ Transpiration (loss of water through stomata) creates suction pressure and creates a column of water. $\frac{1}{2}$ ★ This steadily pushes the water upward with dissolved minerals in it. $\frac{1}{2}$ *Phloem* : Food conducting tissue. ★ Phloem translocates soluble products of photosynthesis, amino acids and other substances from the leaves to storage organs of roots, fruits and seeds, and to the growing organs. 1 ★ Translocation takes place in sieve tube with the help of companion cell, both in upward and downward directions. $\frac{1}{2}$ ★ Osmotic pressure helps water to move into the phloem tissue and moves other materials from the phloem to other tissues. $\frac{1}{2}$	4