SHRI KRISHNA ACADEMY

NEET,JEE AND BOARD EXAM COACHING CENTRE
SBM SCHOOL CAMPUS,TRICHY MAIN ROAD,NAMAKKAL
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COMMON HALF YEARLY EXAMINATION - DEC- 2019

SSLC - SCIENCE - ANSWER KEY

MARKS : 75

Q.NO	PART – I	MARKS 12x1=12
1.	d) 8.31 J mol^{-1} K^{-1}	1
2.	c) electrical energy	1
3.	a) vibrate along the direction of the wave motion	1
4.	c) Iron -59	1
5.	a)17th	1
6.	c)(1)-(ii),(2)-(iv),(3)-(i),(4)-(iii)	1
7.	a)Large surface area	1
8.	b)Mitochondrial matrix	1
9.	c) Duramater	1
10.	a) ratina of eye	1
11	d)Large feathery stigma	1
12.	b)Metacentric	1
	PART – II **Answer any seven questions. (Q.No. 22 is compulsory)**	**7x2=14**
13.	In 1942,Chicago, USA	2
14.	**The action of copper with dill. HCl and H$_2$SO$_4$** **dilute HCl :** Dilute acids such as HCl and H$_2$SO$_4$ have no action on these metals in the absence of air. Copper dissolves in these acids in the presence of air. 2 Cu + $_4$ HCl + O$_2$ (air)$\rightarrow$ 2 CuCl$_2$ + 2 H$_2$O **dilute H$_2$SO$_4$** Cu + 2 H$_2$SO$_4$ $\rightarrow$ CuSO$_4$ + SO$_2$ ↑ + 2 H$_2$O	1 1
15.	**The molar mass of Ca $_3$(PO$_4$)$_2$** Ca$_3$(PO$_4$)$_2$ Atomic masses of Ca = 40, P = 30, O = 16. Gram molar mass of Ca$_3$(PO$_4$)$_2$ $\quad = (40 \times 3) + [30 + (16 \times 4)] \times 2$ $\quad = 120 + (94 \times 2)$ $\quad = 120 + 188$ Gram molar mass of Ca$_3$(PO$_4$)$_2$ = 308 g	2

16.	**PH play an important role in everyday life: (Explain any)**	
	❖ Our body works within the pH range of 7.0 to 7.8.	
	❖ Different body fluids have different pH values.	**2**
	❖ For example, pH of blood is ranging from 7.35 to 7.45.	
	❖ Any increase or decrease in this value leads to diseases.	
	❖ The ideal pH for blood is 7.4.	
	pH in our digestive system	
	pH changes as the cause of tooth decay	
	pH of soil .	
	pH of rain water	
17.	**The Stand for ANS:**	
	i) The Stand for ANS is called Autonomic nervous system (ANS)	**1**
	The Comprise of ANS	
	ii) The comprise of ANS is i) sympathetic and ii) parasympathetic systems. Autonomic nervous system (ANS) is also called as visceral nervous system as it regulates the function of internal visceral organs of our body through its two antagonistic (opposite) components **sympathetic** and **parasympathetic systems**. They enable the body to perform rapid and specific visceral activities in order to maintain steady state. It controls the involuntary functions of the visceral organs.	**1**
18.	**A note about any two methods of preventing corrosion: (any two)**	
	a) Galvanization: It is the process of coating zinc on iron sheets by using electric current.	**2**
	b) Electroplating: It is a method of coating one metal over another metal by passing electric current.	
	c) Anodizing: It is an electrochemical process that converts the metal surface into a decorative, durable and corrosion resistant. Aluminium is widely used for anodizing process.	
	d) Cathodic Protection: It is the method of controlling corrosion of a metal surface protected is coated with the metal which is easily corrodible. The easily corrodible metal is called Sacrificial metal to act as anode ensuring cathodic protection.	
19.	**The two importance of fossils:**	
	i They throw light on phylogeny and evolution of plants.	1
	ii Fossil plants give a historical approach to plant kingdom.	
	iii Fossils are useful in classification of plants.	1
	iv. Fossil plants can be used in the field of descriptive and comparative anatomy.	
20.	Genetic engineering is the manipulation and transfer of genes from one organism to another organisms to create a new DNA called as **recombinant DNA(rDNA)**.	**2**
21.	**The script editor has three main parts:**	
	Script area: Where you build scripts.	
	Block menu: Where you choose the category of blocks (programming statements) to use.	**2**
	Block palette: Where you choose the block to use.	

22.	Current through the conductor I= 2A	1
	Potential difference V= 30v	
	Ohm's law = R=$\frac{V}{I}$	1
	$\qquad$ R= $\frac{30}{2}$	
	$\qquad$ R= 15 Ω	

	PART – III Answer any seven questions. (Q.No. 32 is compulsory)	7x4=12

23.	**i) State Boyle's law**
	  When the temperature of a gas is kept constant, the volume of a fixed
	  mass of gas is inversely proportional to its pressure.
	$\qquad$ P α 1/V
		1
		
		1

	ii) Distinguish between ideal gas and real gas.	

Real gas	**Ideal gas**
(i) If the molecules or atoms of a gases interact with each other with a definite amount of intermolecular or inter atomic force of attraction, then the gases are said to be real gases.	(i) If the atoms or molecules of a gas do not interact with each other, then the gas is said to be an ideal gas or a perfect gas.
(ii) Real gas has volume	(ii) Ideal gas does not have volume

1

1

24.	**i) The role of the earth wire in domestic circuits:** The Earth wire provides a low resistance path to the electric current. The earth wire sends the current from the body of the appliance to the Earth, whenever a live wire accidentally touches the body of the metallic electric appliance. Thus, the earth wire serves as a protective conductor, which saves us from electric shocks	2

	ii) List the merits of LED bulb.
	  1) As there is no filament, there is no loss of energy in the form of heat. It is cooler than the incandescent bulb.
	  2) In comparison with the fluorescent light, the LED bulbs have significantly low power requirement.
	  3) It is not harmful to the environment.
		2

25.	**a) IUPAC Name and its structural formula :**	

S.No.	IUPAC Name	structural formula
1. CH_3CH_2OH	Ethanol	
2.CH_3 COOH	Ethanoic acid	

1

1

	b) Calculate the volume of ethanol Volume of aqueous solution = 200 ml Volume percentage = 20% $$\frac{\text{Volume}}{\text{percentage}} = \frac{\text{Volume of solute}}{\text{Volume of solution}} \times 100$$ $$20 = \frac{\text{Volume of ethanol}}{200} \times 100$$ $$\text{Volume of ethanol} = \frac{20 \times 200}{100} = 40 \text{ ml}$$	**2**
26.	**i) Oxysomes:** The inner mitochondrial membrane bear minute regularly spaced tennis racket shaped particles known as oxysomes (F1 particle). They involve in ATP synthesis. **ii)** carbon dioxide combines with water in the presence of sunlight and chlorophyll to form carbohydrates. During this process oxygen is released as a byproduct. $$6\,CO_2 + 12\,H_2O \xrightarrow[\text{Light}]{\text{chlorophyll}} C_6H_{12}O_6 + 6H_2O + 6O_2$$ Carbon dioxide + Water ⟶ Glucose + Water + Oxygen	**2** **2**
27.	**Explain how locomotion take places in Leech:** **I)** Locomotion in leech takes place by (i) looping or crawling movement ii) Swimming movement **i) Looping or Crawling movement** This type of movement is brought about by the contraction and relaxation of muscles. The two suckers serve for attachment during movement on a substratum. **(ii) Swimming movement** Leeches swim very actively and perform undulating movements in water. II) **The Medicinal value of Leech** Leeches are effective in increasing blood circulation and breaking up blood clots. It is surprising that they can be used to treat cardiovascular diseases. Biochemical substances derived from leech saliva are used for preparation of pharmaceutical drugs that can treat hypertension.	**2** **2**

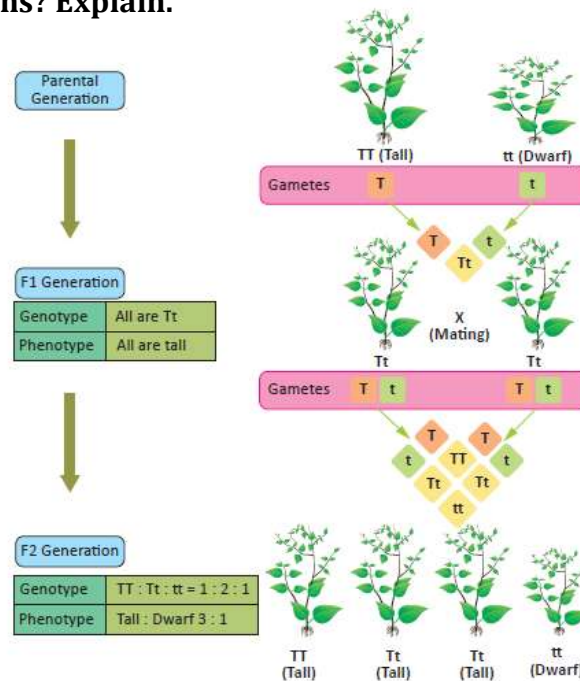| 28. | **Reflex action :**
A reflex is any response that occurs automatically without consciouness. There are two types of reflexes. | **2** |
	Types of Reflex action:	
	(i) **Simple or basic reflexes**: These reflexes are inbuilt and unlearned responses. Many of the actions we perform in our day to day life are simple reflexes. e.g., winking of eyes when any dust particles enters, sneezing, coughing, yawning, etc. We perform these actions without thinking.	**1**
	(ii) **Acquired or conditioned reflexes**: These reflexes are the result of practice and learning. Playing harmonium by striking a particular key on seeing a music note is an example of conditioned reflexes which required conscious training effort. Can you think of some more examples of conditioned reflexes?	**1**
29.	**A pure tall plant (TT) is crossed with pure dwarf plant (tt), what would be the F_1 and F_2 generations? Explain.** **Parental generation:** Pure breeding tall plant crossed with pure breeding dwarf plant **F1 generation:** F1 generation were tall and monohybrids. **F2 generation:** Selfing of the F_1 monohybrids resulted in tail and dwarf plant F2 generation 3 different types were obtained: Tall homozygous – TT Pure – 1 Tall heterozygous – Tt -2 Dwarf homozygous-tt Pure -1	**4**

30.	**Define Ethonotany**	**2**
	Ethnobotany is the **study of a region's plants** and their **practical uses** through the **traditional knowledge** of the local culture of people.	
	The Write its importance:	
	❖ It provides traditional uses of plant.	**1**
	❖ It gives information about certain unknown and known useful plants.	
	❖ The ethnomedicinal data will serve as a useful source of information for the chemists, pharmacologists and practitioners of herbal medicine.	
	❖ Tribal communities utilize ethnomedicinal plant parts like bark, stem, roots, leaves, flower bud, flowers, fruits, seeds, oils, resins, dyes, gum for the treatment of diseases like diarrhoea, fever, headache, diabetes, jaundice, snakebites, leprosy, etc.	**1**
31.	◆ Sometimes cells, tissues and organs in the body may be permanently damaged or lost due to genetic condition or disease or injury.	**4**
	◆ In such situations stem cells are used for the treatment of diseases which is called **stem-cell therapy**.	
	◆ In treating **neurodegenerative disorders** like Parkinson's disease and Alzheimer's disease **neuronal stem cells** can be used to replace the damaged or lost neurons.	
32.	**a) Identify the compounds 'A' and 'B'**	**1**
	A- Ethanoic acid	
	B- Ethyl ethanoate	
	b) The chemical equation	**2**
	$$C_2H_5OH + CH_3COOH \xrightarrow{conc.H_2SO_4} CH_3COOC_2H_5 + H_2O$$ Ethanol Ethanoic acid Ethyl ethanoate	
	c) Esterification	**1**

		PART – IV **Answer all the questions:** NOTE Craw diagram wherever necessary)	**3x7=21**
33.		**a) i) State and prove the law of conservation of linear momentum.** The principle of conservation of linear momentum states that "There is no change in the linear momentum of a system of bodies as long as no net external force acts on them.	**2**
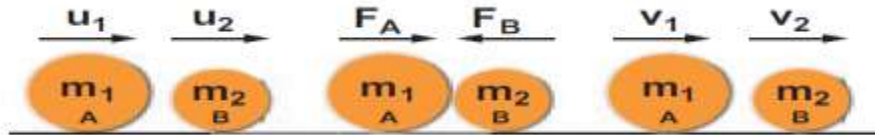
Proof:

Let two bodies A and B having masses m_1 and m_2 move with initial velocity u_1 and u_2 in a straight line. Let the velocity of the first body be higher than that of the second body. i.e., $u_1 > u_2$. During an interval of time t second, they tend to have a collision. After the impact, both of them move along the same straight line with a velocity v_1 and v_2 respectively.

Force on body B due to A, $F_B = m_2(v_2 - u_2)/t$

Force on body A due to B, $F_A = m_1(v_1 - u_1)/t$

By Newton's III law of motion,

Action force = Reaction force

$F_A = -F_B$

$m_1(v_1 - u_1)/t = -m_2(v_2 - u_2)/t$ → $m_1v_1 + m_2v_2 = m_1u_1 + m_2u_2$

The above equation confirms **in the absence of an external force, the algebraic sum of the momentum after collision is numerically equal to the algebraic sum of the momentum before collision.**

Hence the law of conservation linear momentum is proved.

ii) Linear momentum = mass x velocity

$$P = m \times v$$

$$V = \frac{P}{M}$$

$$V = \frac{2.5}{5} \times \frac{10}{10}$$

$$V = \frac{25}{50} = \frac{1}{2}$$

$$V = 0.5 \text{ ms}^{-1}$$

1

1

3

(OR)

b) i) Myopia and Hypermetropia

S. No	Myopia	Hypermetropia	
1	Myopia, also known as short sightedness, occurs due to the lengthening of eye ball.	Hypermeteropia, also known as long sightedness, occurs due to the shortening of eye ball.	**4**
2	With this defect, nearby objects can be seen clearly but distant objects cannot be seen clearly.	distant objects can be seen clearly but nearby objects cannot be seen clearly.	

		3	The focal length of eye lens is reduced or the distance between eye lens and retina increases.	The focal length of eye lens is increased or the distance between eye lens and retina decreases.	
		4	Due to this, the image of distant objects are formed before the retina	Due to this, the image of nearby objects are formed behind the retina	
		5	This defect can be corrected using a concave lens . The focal length of the concave lens to be used	This defect can be corrected using a convex lens . The focal length of the convex lens to be used is computed	

ii) convex lens and concave lens.

S. No	Convex Lens	Concave Lens	
1	A convex lens is thicker in the middle than at edges.	A concave lens is thinner in the middle than at edges.	**3**
2	It is a converging lens.	It is a diverging lens.	
3	It produces mostly real images.	It produces virtual images.	
4	It is used to treat hypermeteropia.	It is used to treat myopia.	

34.	**a) i) The ores of Aluminium:**

Ores of Aluminium   **Formula**

Bauxite $Al_2O_3.2H_2O$

Cryolite Na_3AlF_6

Corundum Al_2O_3

2

ii) a) **Conversion of bauxite into alumina – Baeyer's Process**

The conversion of Bauxite into Alumina involves the following steps:

Bauxite ore is finely ground and heated under pressure with a solution of concentrated caustic soda solution at 150° C to obtain sodium meta aluminate.

On diluting sodium meta aluminate with water, a precipitate of aluminium hydroxide is formed.

The precipitate is filtered, washed, dried and ignited at 1000°C to get alumina.

5

$$2Al(OH)_3 \xrightarrow{1000°c} Al_2O_3 + 3H_2O$$
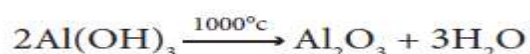
(b) Electrolytic reduction of alumina – Hall's Process

Aluminium is produced by the electrolytic reduction of fused alumina (Al_2O_3) in the electrolytic cell.

Cathode: Iron tank linked with graphite

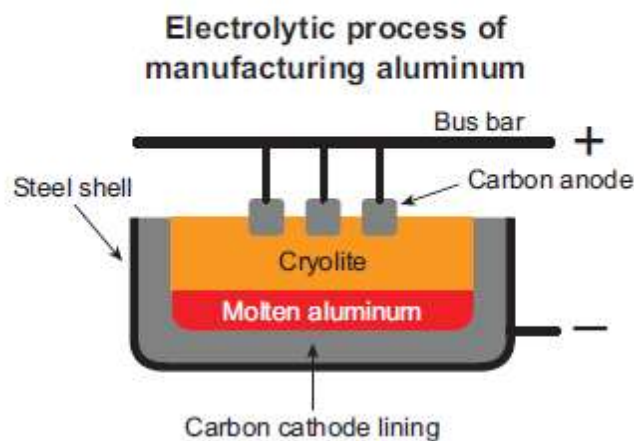**Anode**: A bunch of graphite rods suspended in molten electrolyte.

Electrolyte: Pure alumina+ molten cryolite + fluorspar (fluorspar lowers the fusion temperature of electrolyte)

Temperature: 900 - 950 °C

Voltage used: 5-6 V

Overall reaction: $2\ Al_2O_3 \rightarrow 4\ Al + 3\ O_2\uparrow$

Electrolytic process of manufacturing aluminum

Aluminium is deposited at the cathode and oxygen gas is liberated at the anode. Oxygen combines with graphite to form CO_2.

(OR)

b) i)

Hygroscopic substances	Deliquescence substances
When exposed to the atmosphere at ordinary temperature, they absorb moisture and do not dissolve.	When exposed to the atmospheric air at ordinary temperature, they absorb moisture and dissolve.
Hygroscopic substances do not change its physical state on exposure to air.	Deliquescent substances change its physical state on exposure to air.
Hygroscopic substances may be amorphous solids or liquids.	Deliquescent substances are crystalline solids.

3

ii) Diliquescent Substances – Copper sulphate pentahydrate, Calcium chloride and gypsum salt
Hygroscopic substances – Con. c Sulphuric acid, Silica gel.

2

iii)
A solution was prepared by dissolving 45 g of sugar in 100 g of water. Calculate the mass percentage of solute.
Mass of the solute = 45 g
Mass of the solvent = 180 g

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	$$\text{Mass Percentage} = \frac{\text{Mass of the sloute}}{\text{Mass of the solution}} \times 100$$ $$\text{Mass Percentage} = \frac{\text{Mass of the sloute}}{\text{Mass of the solute} + \text{Mass of the solvent}} \times 100$$ $$= \frac{45}{45+180} \times 100$$ $$= \frac{45}{225} \times 100$$ $$= 20\%$$	2

35.	**a)** **i) 'Life saving' hormone:** a) i) The life saving hormone is called **cortisol**	½	
	❖ The **cortisol** hormones of adrenal cortex serves to maintain the body in living condition and recover it from the severe effects of stress reactions. Thus an increased output of cortisol is "life saving" in "shock conditions". It is also known as life-saving hormone.	½	
	ii) The two Physiological effects of gibberellins ❖ Application of gibberellins on plants stimulate extraordinary elongation of **i**nternode. e.g. Corn and Pea. ❖ Treatment of rosette plants with gibberellin induces sudden shoot elongation followed by flowering. This is called bolting. ❖ Gibberellins promote the production of male flowers in monoecious plants (Cucurbits). ❖ Gibberellins break dormancy of potato tubers. ❖ Gibberellins are efficient than auxins in inducing the formation of seedless fruit - Parthenocarpic fruits (Development of fruits without fertilization) e.g. Tomato.	2	
	iii) The functions of blood: ❖Transport of respiratory gases (Oxygen and CO_2). ❖Transport of digested food materials to the different body cells. ❖Transport of hormones. ❖Transport of nitrogenous excretory products like ammonia, urea and uric acid. ❖It is involved in protection of the body and defense against diseases.	4	

	❖ It acts as buffer and also helps in regulation of pH and body temperature. ❖ It maintains proper water balance in the body.	
b) i)	Rainwater harvesting is a technique of **collecting and storing rainwater** for future use. It is a traditional method of storing rain water in underground tanks, ponds, lakes, check dams and used in future. The main purpose of rainwater harvesting is to make the rainwater percolate under the ground so as to recharge '**groundwater level'**. **Methods of rainwater harvesting** **(i) Roof top rainwater harvesting:** Roof-tops are excellent **rain catchers**. The rain water that falls on the roof of the houses, apartments, commercial buildings etc. is collected and stored in the surface tank and can be used for domestic purpose. **(ii) Recharge pit:** In this method, the rainwater is first collected from the roof tops or open spaces and is directed into the **percolation pits** through pipes for filtration. After filtration the rainwater enters the **recharge pits** or **ground wells**. People living in rural areas adopt a variety of water collecting methods to capture and store as rain water. Some of the methods used are **(i) Digging of tanks or lakes (Eris):** It is one of the **traditional water harvesting system** in Tamil Nadu. Eris are constructed in such a way that if the water in one eri overflows, it automatically gets diverted to the eri of the next village, as these eris are interconnected. **(ii) Ooranis:** These are **small ponds** to collect rainwater. The water is used for various domestic purposes (drinking, washing and bathing). These ponds cater the nearby villages.	**3½**
	ii) The POCSO Act : ❖ The Ministry of Women and Child Development championed the introduction of the Protection of Children from Sexual Offences (POCSO) Act, 2012. People who traffic children for sexual purposes are also punishable under the provisions relating to the Act.	**1**

	Objectives of the POCSO Act:	
	❖ To protect children from the offences of	2½
	i) Sexual assault	
	ii) Sexual harassment	
	iii) Pornography	
	❖ To establish Special Courts for speedy trial of such offences	

MARK ANALYSIS
(WITHOUT CHOICE)

PART	Questions	Total Questions	Book Back Questions	Interior Questions	Total Marks
I	1 Mark	12	9	3	12
II	2 Marks	10	1	9	20
III	4 Marks	10	7	3	40
IV	7 Marks	6	3	3	42
Total Marks			**60**	**54**	**114**
Percentage			53%	47%	100%

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? **CREATIVE QUESTIONS :**
    ONE MARKS, TWO MARKS & FIVE MARKS AVAILABLE FOR ALL SUBJECTS.
? **MATERIALS(GUIDE) FOR**
    V, VIII, X-STD, XI-STD, & XII- STD AVAILABLE FOR ALL SUBJECTS.
? **FULL TEST QUESTION PAPERS**
    V, VIII, X-STD,XII-STD, XII-STD AVAILABLE FOR ALL SUBJECTS.
? **ONE MARK TEST QUESTION PAPER**
    V, VIII, X-STD,XII-STD, XII-STD AVAILABLE FOR ALL SUBJECTS.

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