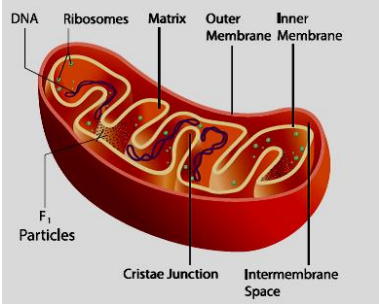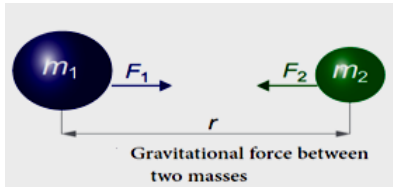# SHRI KRISHNA ACADEMY

NEET,JEE AND BOARD EXAM COACHING CENTRE
SBM SCHOOL CAMPUS,TRICHY MAIN ROAD,NAMAKKAL
CELL:9965531727-9443231727

COMMON QUARTERLY EXAMINATION - SEP- 2019
SSLC - SCIENCE - ANSWER KEY

MARKS : 75

Q.NO	PART – I	MARKS 12x1=12
1.	c) cycling	1
2.	c) zero	1
3.	c) ohm	1
4.	c) 32g	1
5.	c) $Fe_2O_3 . \times H_2O$	1
6.	b) Blue vitriol	1
7.	b)mitochondrial matrix	1
8.	b) canines	1
9.	a) retina of eye	1
10.	a) 12	1
11.	b) Meta centric	1
12.	a) Pancreas	1

	PART – II Answer any seven questions. (Q.No. 22 is compulsory)	7x2=14
13.	**Principles of Moments:** Principle of moments states that When a number of like or unlike parallel forces act on a rigid body and the body is in equilibrium, then the algebraic sum of the moments in the clockwise direction is equal to the algebraic sum of the moments in the anticlockwise direction. Moment in clockwise direction = Moment in anticlockwise direction $$F_1 \times d_1 = F_2 \times d_2$$	1 1

Convex lens and Concave lens:

Convex Lens	Concave Lens	
A convex lens is thicker in the middle than at edges.	A concave lens is thinner in the middle than at edges.	½
It is a converging lens.	It is a diverging lens.	½
It produces mostly real images.	It produces virtual images.	½
It is used to treat hypermeteropia.	It is used to treat myopia.	½

(Q.No. 14.)

15.	**Atomicity:** The number of atoms present in the molecule is called its 'atomicity'.	2

16.	**True or false:**	
	1. Moseley's periodic table is based on atomic mass. - **False**	
	Correct statement: Moseley's periodic table is based on **atomic number**	**1**
	2. An alloy is a heterogenous mixture of metals.- **False**	
	Correct statement: An alloy is a **homogeneous** mixture of metals	**1**
17.	**Match the following:**	
	1. Blue vitriol $-$ $CuSO_4 .5H_2O$	
	2. Gypsum $-$ $CaSO_4.2H_2O$	*2*
	3. Deliquescence $-$ NaOH	
	4. Hygroscopic $-$ CaO	
18.	**Structure of mitochondria:**	
		diagram-1 parts-1
19.	**a) Dental formula of rabbit:**	
	Dental formula is ($I\frac{2}{1}$, $C\frac{0}{0}$, PM $\frac{3}{2}$, M $\frac{3}{3}$) in rabbit which is written as $\frac{2033}{1023}$.	**1**
	Canines are absent.	
	b) Diastema formed in rabbit:	
	The gap between the incisors and premolar is called **diastema**.	**1**
20.	**Master gland:**	
	The **pituitary gland** or **hypophysis**	**1**
	Reason:	
	The pituitary gland forms the major endocrine gland in most vertebrates.	**1**
	It regulates and controls other endocrine glands and so is called as the	
	"**Master gland**".	
21.	**Allosomes:**	
	❖ Allosomes are chromosomes which are responsible for determining the	
	sex of an individual . They are also called as **sex chromosomes** or	**2**
	hetero-chromosomes. Theses 23rd chromosome of human being is an	
	allosome	
22.	Current (I) = 2A	**1**
	Potential difference (V) = 30V	
	Ohm's law = $R = \frac{V}{I}$	**1**
	$\therefore R = \dfrac{30}{2} = 15\Omega$	
	R=15Ω	

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		PART – III	**7x4=12**
		Answer any seven questions. (Q.No. 32 is compulsory)	
23.		**Universal law of gravitation:**	
		❖ This law states that every particle of matter in this universe attracts every other particle with a force.	
		❖ This force is directly proportional to the product of their masses and inversely proportional to the square of the distance between the centers of these masses.	**2**
		❖ The direction of the force acts along the line joining the masses.	
		❖ Force between the masses is always attractive and it does not depend on the medium where they are placed.	

Gravitational force between two masses

Let, m_1 and m_2 be the masses of two bodies A and B placed r metre apart in space **1**

Force $F \propto m_1 \times m_2$

$F \propto 1/r^2$

On combining the above two expressions

$F \propto \dfrac{m_1 \times m_2}{r^2}$, $F = \dfrac{Gm_1 m_2}{r^2}$ **1**

Where, G is the universal gravitational constant.
Its value in SI unit is 6.674×10^{-11} Nm^2kg^{-2}.

24.	**a) Five properties of light.**	
	1. Light is a form of energy.	½
	2. Light always travels along a straight line.	
	3. Light does not need any medium for its propagation. It can even travel through vacuum.	½
	4. The speed of light in vacuum or air is, $c = 3 \times 10^8$ ms^{-1}.	½
	5. Since, light is in the form of waves, it is characterized by a wavelength (λ) and a frequency (v), which are related by the following equation $c = v\,\lambda$ (c - velocity of light).	½
	b) Two advantages of telescopes:	
	❖ Elaborate view of the Galaxies, Planets, stars and other heavenly bodies is possible.	**1**
	❖ Camera can be attached for taking photograph for the celestial objects.	**1**

25.	**Ideal gas equation:**	
	(i) The ideal gas equation is an equation, which relates all the properties of an ideal gas.	
	V-volume, P-pressure, T-temperature	
	(ii) An ideal gas obeys Boyle's law and Charles' law and Avogadro's law	
	(iii) According to Boyle's law,	**4**
	PV = constant …………..(1)	
	(iv) According to Charles's law, V/T = constant…………… (2)	
	(v)According to Avogadro's law, V/n = constant ……………(3)	
	(vi)After combining equations (1), (2) and (3), you can get the following equation.	

PV/nT = constant .... (4)

The above relation is called the combined law of gases. If you consider a gas, which contains μ moles of the gas, the number of atoms contained will be equal to μ times the Avogadro number, N_A. i.e. $n = \mu N_A$. (5)

(vii) Using equation (5), equation (4) can be written as

$PV/\mu N_A T$ = constant

The value of the constant in the above equation is taken to be k_B, which is called as Boltzmann constant $(1.38 \times 10^{-23}$ $JK^{-1})$. Hence, we have the following equation:

$PV/\mu N_A T = k_B$, $PV = \mu N_A k_B T$

(viii) Here, $\mu N_A k_B = R$, which is termed as universal gas constant whose value is 8.31 J mol^{-1} K^{-1}.

$PV = RT$

It is called ideal equation of state because it gives the relation between the state variables and it is used to describe the state of any gas.

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26. **Smelting Process:**

Smelting is the process of reducing the roasted metallic oxide from the metal in its molten condition. In this process, impurities are removed as slag by the addition of flux.   **1**

Smelting (in a Blast Furnace): The charge consisting of roasted ore, coke and limestone in the ratio 8:4:1 is smelted in a blast furnace by introducing it through the cup and cone arrangement at the top. There are three important regions in the furnace.   **1**

(a) The Lower Region (Combustion Zone)- The temperature is at 1500°C. In this region, coke burns with oxygen to form CO_2 when the charge comes in contact with a hot blast of air.

$$C + O_2 \xrightarrow[\Delta]{1500°C} CO_2 + Heat$$
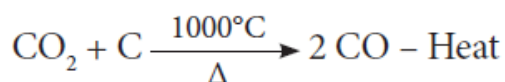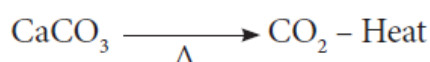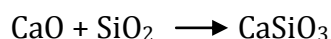
It is an exothermic reaction since heat is liberated.
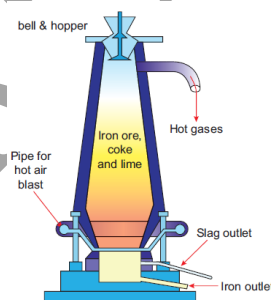
b) The Middle Region (Fusion Zone) – The temperature prevails at 1000°C. In this region, CO_2 is reduced to CO.   **2**

$$CO_2 + C \xrightarrow[\Delta]{1000°C} 2\,CO - Heat$$
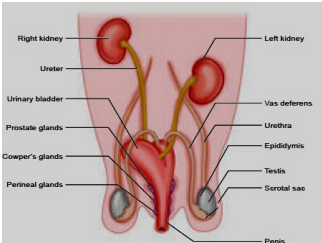
Limestone decomposes to calcium oxide and CO_2.

$$CaCO_3 \xrightarrow{\Delta} CO_2 - Heat$$
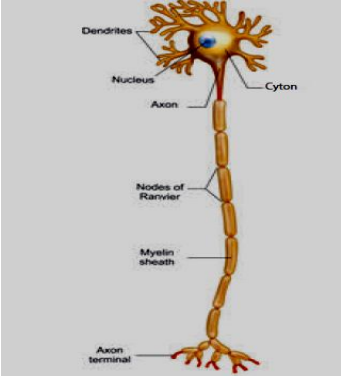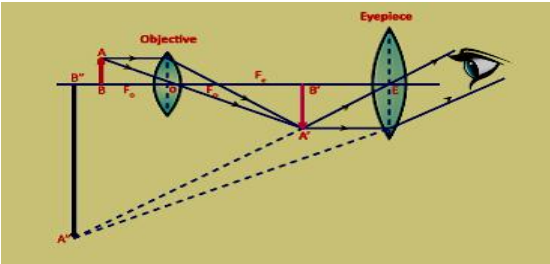
These two reactions are endothermic due to absorption of heat. Calcium oxide combines with silica to form calcium silicate slag.

$$CaO + SiO_2 \longrightarrow CaSiO_3$$
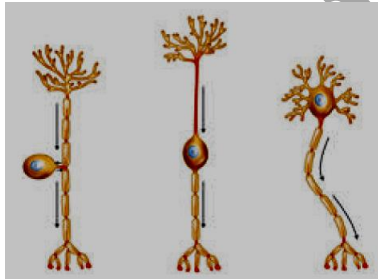

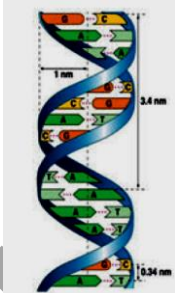|		
	(c) The Upper Region (Reduction Zone)- The temperature prevails at $400°C$. In this region carbon monoxide reduces ferric oxide to form a fairly pure spongy iron. $$Fe_2O_3 + 3CO \xrightarrow{400°C} 2Fe + 3CO_2$$ The molten iron is collected at the bottom of the furnace after removing the slag. The iron thus formed is called pig iron. It is remelted and cast into different moulds. This iron is called cast iron	
27.	(i) A is a blue coloured crystalline salt $\rightarrow$ Copper sulphate Penta hydrate $CuSO_4.5H_2O$ (blue vitriol) (ii) When blue coloured copper sulphate crystals are gently heated, it loses its five water molecules andbecomes colourless anhydrous copper sulphate. The equation is, $$CuSO_4 \cdot 5H_2O \underset{Cooling}{\overset{Heating}{\rightleftharpoons}} CuSO_4 + 5H_2O$$ (Copper sulphate pentahydrate) (Anhydrous copper sulphate) (Blue colour) (Colourless) A) Copper sulphate pentahydrate B) Anyhydrous copper sulphate	**1** **2** **1**
28.	**Male reproductive system of Rabbit:** ❖ The male reproductive system of rabbit consists of a pair of testes which are ovoid in shape. ❖ Testes are enclosed by scrotal sacs in the abdominal cavity. ❖ Each testis consists of numerous fine tubules called **seminiferous tubules**. ❖ This network of tubules lead into a coiled tubule called **epididymis,** which lead into the sperm duct called **vas deferens**. ❖ The vas deferens join in the urethra just below the urinary bladder. The urethra runs backward and passes into the penis. ❖ There are three accessory glands namely prostate gland, cowper's gland and perineal gland. Their secretions are involved in reproduction. 	**1** **1** **1** **1**
29.	**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.	**1** **1** **1**

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		❖ It acts as buffer and also helps in regulation of pH and body temperature. ❖ It maintains proper water balance in the body.	**1**
30.		**Structure and Functions of brain:** A human brain is formed of three main parts: (a) forebrain (b) midbrain and (c) hindbrain. **Forebrain:** The forebrain is formed of **cerebrum** and **diencephalon**. The latter consists of dorsal *thalamus* and ventral *hypothalamus*.	
		Cerebrum : ❖ It is the largest portion forming nearly two-third of the brain. The cerebrum is longitudinally divided into two halves as right and left **cerebral hemispheres** by a deep cleft called **median cleft**. Two cerebral hemispheres are interconnected by thick band of nerve fibres called **corpus callosum.** ❖ The cortex is extremely folded forming elevations called **gyri** with depressions between them termed as **sulci** that increase its surface area. ❖ The cerebrum is also responsible for the thinking, intelligence, consciousness, memory, imagination, reasoning and willpower.	**1**
		Thalamus : Thalamus present in cerebral medulla is a major conducting centre for sensory and motor signalling. It acts as a **relay centre.**	
		Hypothalamus : ❖ It lies at the base of the thalamus. ❖ It controls involuntary functions like hunger, thirst, sleep, sweating, sexual desire, anger, fear, water balance, blood pressure etc.	**1**
		Midbrain : ❖ It is located between thalamus and hind brain. ❖ the dorsal portion of the midbrain. ❖ It consists of four rounded bodies called **corpora quadrigemina** that control visual and auditory (hearing) reflexes.	
		Hindbrain : It is formed of three parts **cerebellum, pons** and **medulla oblongata**.	
		Cerebellum : It is second largest part of the brain formed of two large sized hemispheres and middle vermis. It coordinates voluntary movements and also maintains body balance.	**1**
		Pons: '*Pons*' a latin word meaning bridge. It is a bridge of nerve fibre that connects the lobes of cerebellum. It relay signals between the cerebellum, spinal cord, midbrain and cerebrum. It controls respiration and sleep cycle.	
		Medulla Oblongata : ❖ Medulla oblongata is the posterior most part of the brain that connects spinal cord and various parts of brain. ❖ It has cardiac centres, respiratory centres, vasomotor centres to control heart beat, respiration and contractions of blood vessels respectively. It also regulates vomiting and salivation.	**1**
31.		**a) Triple fusion:** One sperm fuses with the egg (syngamy) and forms a diploid zygote. The other sperm fuses with the secondary nucleus is called Triple fusion.	**2**

	b) Structure of neuron:	**2**
32.	**Given:** a) Mass of the solute = 1.5 g Mass of the solvent = 15 g Solubility of the solute $=\frac{\text{Mass of the solute}}{\text{Mass of the solvent}} \times 100$ Solubility of the solute $= \frac{1.5}{15} \times 100$ $\qquad = 10$ g b) Solutions which are made of one solute and one solvent (two components) are called binary solutions.	**2** **2**
	PART – IV **Answer all the questions.**	**3x7=21**
33.	**a) Construction & Working of Compound microscope:** ❖ Compound microscope is also used to see the tiny objects. ❖ Compound microscope consists of two convex lenses. The lens with the shorter focal length is placed near the object, and is called as 'objective lens' or 'objective piece'. ❖ The object (AB) is placed at a distance slightly greater than the focal length of objective lens ($u > f_o$). A real, inverted and magnified image (A'B') is formed at the other side of the objective lens. This image behaves as the object for the eye lens. ❖ The position of the eye lens is adjusted in such a way, that the image (A'B') falls within the principal focus of the eye piece. This eye piece forms a virtual, enlarged and erect image (A" B") on the same side of the object. ❖ Compound microscope has 50 to 200 times more magnification power than simple microscope	**1** **1** **1** **1** **1**

	b) Snell's law: The ratio of the sine of the angle of incidence and sine of the angle of refraction is equal to the ratio of refractive indices of the two media. This law is also known as Snell's law. $$\frac{\sin i}{\sin r} = \frac{\mu_2}{\mu_1}$$	**2**
	(OR)	
	a) Power (P) = 100W Voltage (V) = 200V Power (P) = VI Current (I) = P/V I= 100/200 = 0.5A Resistance (R) = V/I = 200/0.5 = 400Ω	**4**
	b) Fundamental laws of gases: The three fundamental laws which connect the relation between pressure, volume and temperature are as follows: 1) Boyle's Law 2) Charles's law 3) Avogadro's law	**3**
34.	**a) Salient features of Modern atomic theory:** ❖ **An atom is no longer indivisible** (after the discovery of the electron, proton, and neutron). ❖ Atoms of the same element may have different atomic mass. (discovery of **isotopes** $_{17}Cl^{35}$, $_{17}Cl^{37}$). ❖ Atoms of different elements may have same atomic masses (discovery of **Isobars** $_{18}Ar^{40}$, $_{20}Ca^{40}$). ❖ Atoms of one element can be transmuted into atoms of other elements. In other words, atom is no longer indestructible (discovery of **artificial transmutation**). ❖ Atoms may not always combine in a simple whole number ratio (E.g. Glucose $C_6H_{12}O_6$ C:H:O = 6:12:6 or 1:2:1 and Sucrose $C_{12}H_{22}O_{11}$ C:H:O = 12:22:11). ❖ Atom is the **smallest particle** t**hat takes part in a chemical reaction.** ❖ The mass of an atom can be converted into energy (E = mc^2).	**5**
	b) **Calculate the number of moles in 27g of Al** No. of moles = mass / atomic mass = 27/27 = **1mole**	**2**
	(OR)	
	a) Acid that renders aluminium passive: ❖ Dilute or concentrated nitric acid does not attack aluminium. ❖ But renders aluminium passive due to the formation of an oxide film on its surface.	**2**

b) Difference between Hygroscopic and Deliquescence substances:

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.	**5**
Hygroscopic substances do not	Deliquescent substances change	

	change its physical state on exposure to air.	its physical state on exposure to air.	
	Hygroscopic substances may be amorphous solids or liquids.	Deliquescent substances are crystalline solids.	

35.	**a) Neurons based on its structure:**	
	The neurons may be of different types based on their structure and functions.	
	Structurally the neurons may be of the following types:	
	i) **Unipolar neurons**: Only one nerve process arises from the cyton which acts as both axon and dendron.	**1**
	ii) **Bipolar neurons**: The cyton gives rise to two nerve processes of which one acts as an axon while another as a dendron.	**1**
	iii) **Multipolar neurons**: The cyton gives rise to many dendrons and an axon	**1**
	LOCATION : Found in cerebral cortex of brain	
	Types of Nerve Fibres	
	Nerve fibres are of two types based on the presence or absence of myelin sheath.	
	i) **Myelinated nerve fibre:** The axon is covered with myelin sheath	**1**
	ii) **Non-myelinated nerve fibre:** The axon is not covered by myelin sheath. Myelinated and non-myelinated nerve fibres form the white matter and grey matter of the brain.	
	 i. unipolar ii. bipolar iii. multipolar	**1**
	b) Haemoglobin: The RBCs impart red colour to the blood due to presence of respiratory pigment is called haemoglobin	**1**
	c) Pericardium	**1**
	(OR)	

	◆ DNA is a large molecule consisting of millions of nucleotides. Hence, it is also called a **polynucleotide**. Each nucleotide consists of three components.
	◆ A sugar molecules – Deoxyribose sugar.
	◆ A nitrogenous base.
	There are two types of nitrogenous bases in DNA. They are
	(a) Purines (Adenine and Guanine)
	(b) Pyrimidines (Cytosine and Thymine)
	A phosphate group
	Nucleoside and Nucleotide
	    Nucleoside = Nitrogen base + Sugar
	    Nucleotide = Nucleoside + Phosphate
		3

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	- DNA molecule consists of two **polynucleotide** chains. - These chains form a **double helix** structure with two strands which run **anti-parallel** to one another. **Nitrogenous bases** in the centre are linked to **sugar-phosphate** units which form the backbone of the DNA. - Pairing between the nitrogenous bases is very specific and is always between purine and pyrimidine linked by hydrogen bonds.
	  * Adenine (A) links Thymine (T) with two hydrogen bonds (A = T)
	  * Cytosine (C) links Guanine (G) with three hydrogen bonds(C≡ G) - Hydrogen bonds between the nitrogenous bases make the DNA molecule stable. - Each turn of the double helix is 34 A° (3.4 nm). There are ten base pairs in a complete turn. - The nucleotides in a helix are joined together by phosphodiester bonds. **Significance of DNA**
	   - It is responsible for the transmission of hereditary information from one generation to next generation - It contains information required for the formation of proteins. - It controls the developmental process and life activities of an organism.
		2
		
		2

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