Class :10

Register Number

COMMON HALF YEARLY EXAMINATION - 2024-25

SCIENCE

Time Allowed : 3.00 Hours] [Max. Marks : 75

PART – I

Note: (i) Answer all the questions **12x1=12**

(ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer

1. Impulse is equal to
   a) Rate of change of momentum b) rate of force and time
   c) Change of momentum d) rate of change of mass
2. Power of a lens is -4D, then its focal length and type of lens is
   a) -0.25m , Concave b) -0.25m ,Convex c) -4m Concave d) -4m Convex
3. Kilowatt hour is the unit of
   a) Resistivity b) conductivity c) electrical energy d) electrical power
4. Which of the following represents 1 amu?
   a) Mass of a C–12 atom b) Mass of a Hydrogen atom
   c) 1/12th of the mass of a C–12 atom d) Mass of O–16 atom
5. The number of components in a binary solution is ---------
   a) 2 b) 3 c) 4 d) 5
6. Rectified spirit is an aqueous solution which contains about -------- of ethanol.
   a) 95.5 % b) 75.5 % c) 55.5 % d) 45.5 %
7. Kreb"s cycle takes place in
   a) Chloroplast b) mitochondrial matrix (Stroma)
   c) Stomata d) inner mitochondrial membrane
8. Which is sequence of correct blood below
   a) Ventricle→ atrium → vein → arteries b) Atrium → ventricle → veins → arteries
   c) Atrium → ventricle → arteries → vein d) Ventricles → vein → atrium → arteries
9. Which one is referred as “Time messanger”.
   a) Growth harmone b) Thyroxine c) Melatonin d) parathormone.
10. The theory of natural selection for evolution was proposed by ----------
    a) Charles Darwin b) Ernst Haeckel c) Jean Baptiste Lamarck d) Gregor Mendel
11. Greenhouse effect refers to
    a) Cooling of earth b) trapping of u-v rays c) Cultivation of plants d) Warming of earth
12. Which is used to build scripts?
    a) Script area b) Block palette c) Stage d) sprite

PARI- II

II. Answer any SEVEN of the following questions. Question no 22 is compulsory. 7x2=14

13. State Newton"s second law.
14. Difference between sound and light waves
15. Mr.Ramu is working as an X-ray technician in a hospital. But, he does not wear the lead aprons. What suggestion will you give to Mr.Ramu?
16. State two conditions necessary for rusting of Iron.
17. Define combination reaction. Give one example for an exothermic combination reaction.
18. Draw and label the structure of Oxysomes
19. Why is euploidy considered to be advantageous to both plants and animals?

20. **Assertion :** All drugs act on the brain.
Reason : Drugs disturb the functioning of the body and mind.
a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion
b) If both Assertion and Reason are true that Reason is not the correct explanation of Asssertion
c) Assertion is true but Reason is false
d) Both Assertion and Reason are false
21. Write a short note on editor and its types?
22. Calculate the current of a 100 W, 200 V electric bulb in an electric circuit.

PARI-III

III. Answer any SEVEN of the following questions.Question no 32 is compulsory. 7X4=28

23. Derive the ideal gas equation.
24. a) Mention three cases in which there is no Doppler effect in sound?
b) What do you understand by the term „ultrasonic vibration"?
25. What is a nuclear reactor? Explain its any Three essential parts with their functions.
26. a) What happens when $MgSO_4 .7H_2O$ is heated? Write the appropriate equation.
b) Define solubility
27. Mention the used of ethanol
28. a) Write the dental formula of rabbit
b) How does locomotion take place in leech?
29. Name the secondary sex organs in male
30. **a) Match it**

	PART-I	PART-II
A	Thyroxine	Acromegaly
B	Insulin	Tetany
C	Parathormone	Simple goitre
D	Growth hormone	Diabetes mellitus

b) **State whether true or false. If false, correct the statement.**
i) Molecular scissors refer to DNA ligases.
ii) Golden rice is a hybrid.
31. a) Mention any two diseases caused by tobacco smoke.
b) What precautions can be taken for preventing heart diseases?
32. Calculate the % of each element in calcium carbonate.
(Atomic mass: C-12, O-16, Ca -40)

PART-IV

IV. Answer all the questions. 3X7=21

33. a) i) List any five properties of light.
ii) Why does the sky appear in blue colour? **(OR)**
b) i) What is meant by electric current?
ii) Name and define its unit.
iii) Which instrument is used to measure the electric current?
iv) How should it be connected in a circuit?
34. a) i) What are the reasons for alloying?
ii) What is rust? Give the equation for formation of rust? **(OR)**
b) i) How does p^H play an important role in everyday life?
ii) Differentiate soap and detergents (Any two)
35. a) Illustrate the structure and functions of brain **(OR)**
b) i) Enumerate the importance of forest
ii) What will happen if trees are cut down? (Any two)

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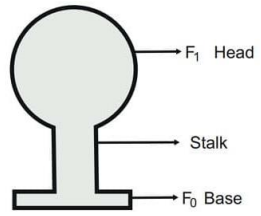
Q.NO	ANSWERS	MARKS
1	(c) Chang of momentum	1
2	(a) Concave lens	1
3	(c) Electrical energy	1
4	(c) 1/12th of the mass of a C-12 atom	1
5	(a) 2	1
6	(a) 95.5%	1
7	(b) Mitochondrial matrix	1
8	(c) Atrium → ventricle → arteries → vein	1
9	(c) Melatonin	1
10	(a) Charles Darwin	1
11	(d) Warming of earth	1
12	(a) Script area	1
13	The force acting on a body is directly proportional to the rate of change of linear momentum of the body and the change in momentum takes place in the direction of the force. F=m x a	2
14	<table><tr><th>S.No.</th><th>SOUND</th><th>LIGHT</th></tr><tr><td>1</td><td>Medium is required for the propagation.</td><td>Medium is not required for the propagation.</td></tr><tr><td>2</td><td>Sound waves are longitudinal.</td><td>Light waves are transverse.</td></tr><tr><td>3</td><td>Wavelength ranges from 1.65 cm to 1.65 m.</td><td>Wavelength ranges from 4×10^{-7} m to 7×10^{-7} m.</td></tr><tr><td>4</td><td>Sound waves travel in air with a speed of about 340 ms^{-1} at NTP.</td><td>Light waves travel in air with a speed of 3×10^{8} ms^{-1}.</td></tr></table>	Any 2 points 2
15	➢ Use lead coated aprons and lead gloves. ➢ Avoid eating while handling radioactive elements. ➢ Use remote control device or tongs. ➢ Worn Dosimeter to check the level of radiation.	2 (any two)
16	Air, Water and Moisture	2
17	➢ A combination reaction is a reaction in which two or more reactants combine to forms a compound. ➢ Most of the combination reactions are exothermic reactions. ➢ Any one example	1 1

18		Diagram -1 mark Parts -1 mark
19	Organisms with multiples of the basic chromosome set are called euploid. Plants with euploidy condition have increased fruit and flower size. Plants and animals with euploidy condition are typically sterile.	2
20		2
21	Script editor / costume editor: Where you edit your programs or your sprite's pictures. The script editor has three main parts: Script area Block menu Block palette	2
22	Power P = 100 W and Voltage V = 200 V Power P = V I So, Current, $I = \frac{P}{V} = \frac{100}{200} = 0.5$ A Resistance, $R = \frac{V}{I} = \frac{200}{0.5} = 400\ \Omega$	 1 1
23	The ideal gas equation is an equation, which relates all the properties of an ideal gas. An ideal gas obeys Boyle's law and Charles' law and Avogadro's law. According to Boyle's law, PV = constant According to Charles's law, V / T = constant According to Avogadro's law, V/n = constant After combining equations we can get the following equation. PV/nT = constant PV / μNA T = constant $n = \mu N$ PV / μNA T = KB PV = μNA KB T $\mu NA\ K_B = R$ PV = RT Ideal gas equation is also called as equation of state because it gives the relation between the state variables and it is used to describe the state of any gas.	4 marks
24	(a) When source (S) and listener (L) both are at rest. When S and L move in such a way that distance between them remains constant. (b) The vibrations whose frequencies are greater than 20,000 Hz are called Ultrasonic Vibrations.	2 2
25	➢ A Nuclear reactor is a device in which the nuclear fission reaction takes place in a self-sustained and controlled manner to produce electricity. ➢ The first nuclear reactor was built in 1942 at Chicago, USA. **Essential material:** ➢ Fuel : Fissile material (E.g: Uranium) ➢ Moderator : Slow down the high energy neutrons to provide slow neutrons. (E.g: Graphite)	4

	➢ Control rod : control the number of neutrons in order to have sustainable chain reaction ▪ (E.g: Boron and cadmium). ➢ Coolant : To remove heat produced in the reactor core to produce steam. (E.g: Water, air and helium) ➢ Protection wall: concrete lead wall to prevent the leakage of harmful Radiations.	
26	➢ Its water of crystallisation is 7. When magnesium sulphate hepta hydrate crystals are genetly heated, it loses seven water molecules and becomes an hydrous magnesium sulphate. $MgSO_4.7H_2O \underset{\text{Cooling}}{\overset{\text{Heating}}{\rightleftharpoons}} MgSO_4 + 7H_2O$ (Magnesium sulphate heptahydrate) (Anhydrous Magnesium sulphate) ➢ Solubility is defined as the number of grams of solute that can be dissolved in 100 g of a solvent to form its saturated solution at a given temperature and pressure. (or) $\text{Solubility} = \frac{\text{Mass of the solute}}{\text{Mass of the solvent}} \times 100$	1 1 2
27	Ethanol is used ➢ in medical wipes, as an antiseptic. ➢ as an anti-freeze in automobile radiators. ➢ for effectively killing micro organisms like bacteria, fungi, etc., by including it in many hand sanitizers. ➢ as an antiseptic to sterilize wounds in hospitals. ➢ as a solvent for drugs, oils, fats, perfumes, dyes, etc.	Any four points 4 marks
28	(a) (Canines- 2/0, Incisors – 0/0, Pre Molar – 3/2, Molar – 3/3). ➢ (b) Locomotion in leech takes place by (i) Looping or crawling movement and (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.	2 2
29	Vas deferens, epididymis, seminal vesicle, prostate gland and penis.	4
30	(a) Thyroxine - Simple goitre (b) Insulin - Diabetes mellitus (c) Parathormone - Tetany (d) Growth hormone - Acromegaly (b) (i) False (restriction endo nuleases) (ii) True	2 2

31	(a) Lung cancer, Bronchitis, Pulmonary tuberculosis, Emphysema, etc. (b) ➢ Intake of low carbohydrate, cholesterol food, etc. ➢ Diet rich in polyunsaturated fatty acid (PUFA). ➢ Regular exercise. ➢ Avoid alcohol consumption. ➢ Increase the intake of fruits and vegetables.	2 2 (any two)
32	$CaCO_3$. Molar Mass of $CaCO_3$ = 1 (Ca) + 1 (C) + 3 (O) = 1 (40) + 1 (12) + 3 (16) = 40 + 12 + 48 = 100 g. % of Ca in $CaCO_3$ = $\frac{\text{Mass of Ca}}{\text{Molar Mass of } CaCO_3} \times 100$ = $\frac{40\ g}{100\ g} \times 100$ = 40%. % of C in $CaCO_3$ = $\frac{\text{Mass of Carbon}}{\text{Molar Mass of } CaCO_3} \times 100$ = $\frac{12\ g}{100\ g} \times 100$ = 12%. % of O in $CaCO_3$ = $\frac{\text{Mass of Oxygen}}{\text{Molar Mass of Calcium}} \times 100$ = $\frac{48\ g}{100\ g} \times 100$ = 48%.	2 2
	Part- IV	
33	➢ (a) (i) Light is a form of energy. ➢ Light always travels along a straight line. ➢ The speed of light in vacuum or air is, $c = 3 \times 10^8$ ms $^{-1}$. ➢ Different coloured light has different wavelength and frequency. ➢ Among the visible light, violet light has the lowest wavelength and red light has the highest wavelength. ➢ light is in the form of waves $c = \nu \lambda$. (c - velocity of light, wavelength (λ), frequency (ν)). When light is incident on the interface between two media, it is partly reflected and partly refracted. ➢ (ii) When sunlight passes through the atmosphere, the **blue colour** (shorter wavelength) is **scattered to a greater extent** than the red colour (longer wavelength). This scattering causes the sky to appear in blue colour.	5 Any 5 points 2 marks
33	(b) (i) Electric current is defined as the rate of flow of charges in a conductor. If Q is the charge flowing for a time of t seconds in a conductor, then I = Q/t (ii) ➢ The SI unit of electric current is ampere (A).	2

	➢ The current flowing through a conductor is said to be one ampere, when a charge of one coulomb flows across any cross-section of a conductor, in one second. ➢ Hence, 1 ampere = 1 coulomb/ 1 second. (iii) ➢ An ammeter is a device used to measure the electric current in a circuit. ➢ An ammeter is always connected in series with a device to measure its current.	3 2
34	(a) (i) ➢ To modify appearance and colour ➢ To modify chemical activity. ➢ To lower the melting point. ➢ To increase hardness and tensile strength. ➢ To increase resistance to electricity. (ii) When iron is exposed to moist air, it forms a layer of brown hydrated ferric oxide on its surface. This compound is known as rust and the phenomenon of formation of rust is known as rusting. $4Fe + 3O_2 + xH_2O \longrightarrow 2Fe_2O_3.xH_2O$ (Rust)	4 3
34	(b) ➢ (i) Living organisms can survive only in a narrow range of pH change. Different body fluids have different pH values. ➢ **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. ➢ It helps in the digestion of food without harming the stomach. **pH of the stomach fluid is approximately 2.0**. pH of the saliva normally ranges between 6.5 to 7.5. ➢ When the pH of the mouth saliva falls below 5.5, the enamel gets weathered. ➢ **The pH of rain water is approximately 7**, which means that it is neutral and also represents its high purity. If the pH of rain water is less than 7, then it is called acid rain. ➢ In agriculture, the pH of soil is very important. It depends upon the nature and the range of different soil, different crops are cultivated.	5

(ii)

Soap	Detergent
It is a sodium salt of long chain fatty acids.	It is sodium salts of sulphonic acids.
It is prepared from animal fats or vegetable oils.	It is prepared from hydrocarbons obtained from crude oil.
Soaps are biodegradable.	Most of the detergents are non-biodegradable.

2

35

- (a) 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 part portion.
- It is divided into two halves of cerebral hemisphere.
- The **outer part** is formed of **white** matter called cerebral cortex.
- The **inner part** is formed of **grey** matter called cerebral medulla.
- It is responsible for thinking, intelligence, memory, imagination and reasoning.

7

Thalamus:

- It is present in cerebral medulla.
- It is a centre of sensory and motor signaling.
- It acts as relay centre.

Hypothalamus:

- It lies at the base of thalamus.
- It controls hunger, thirst, sleep, sweating, sexual desire, anger, fear, etc.

Mid brain:

- It is located between fore brain and hind brain
- It controls visual and hearing reflexes.

Hind brain:

- It is formed of 3 parts cerebellum, pons and medulla oblongata.

Cerebellum:

- It is second largest part of brain.
- It coordinates voluntary movements and maintance body balance.

Pons:

- It connects the lobes of cerebellum.
- It controls respiration and sleep cycle.

	Medulla oblongata: ➢ It connects spinal cord and various parts of brain. ➢ It controls vomiting and salivation	
	(b) ➢ (i) Forests are vital for human life ➢ it is a source for a wide range of renewable natural resource. ➢ They provide wood, food, fodder, fibre and medicine. ➢ They act as carbon sink, regulate climatic conditions, increase rainfall, reduce global warming, prevent natural hazards like flood and landslides, protect wildlife and also act as catchments for water conservation. ➢ They also play a vital role in maintaining the ecological balance ➢ (ii) Ecological problems like floods and drought ➢ Soil erosion ➢ Loss of wild life ➢ Extinction of species ➢ Imbalance of Biogeochemical cycles. ➢ Desertification.	Any 4 points 4 marks Any 3 points 3 marks