NATIONAL PUBLIC SCHOOL
INDIRANAGAR, BENGALURU
PREPARATORY EXAMINATION – 2019-20
SCIENCE

Class: 10
No. of pages: 8

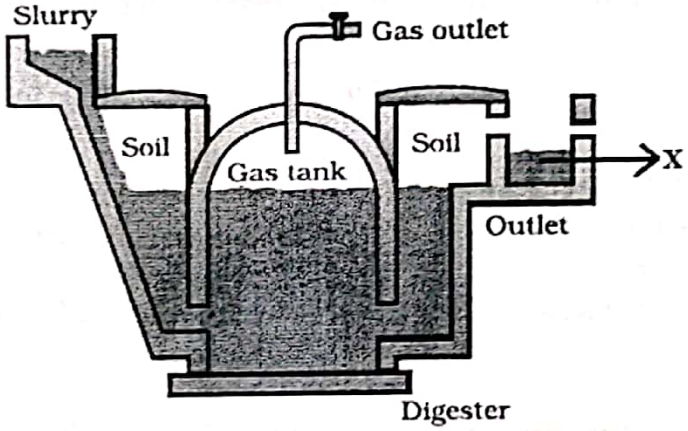
Max. Marks: 80
Time: 3 hrs

General Instructions:

- ***The question paper comprises of three sections A, B and C. Attempt all the sections.***
- ***All questions are compulsory.***
- ***Internal choice is given in each section.***
- ***All questions in Section A are one-mark questions comprising of MCQ, VSA type and assertion-reason type questions. These are to be answered in one word or in one sentence.***
- ***All questions in Section B are three-mark, short answer type questions. These are to be answered in about 50 – 60 words each.***
- ***All questions in Section C are five-mark, long answer type questions. These are to be answered in about 80 - 90 words each.***
- ***This question paper consists of a total of 30 questions.***

SECTION A

1. What do you mean by functional groups? (1)
2. How does atomic radius vary across a period and why? (1)
3. Answer question numbers 3(a) - 3(d) on the basis of your understanding of the working of a bio-gas plant as shown below:



(a) How does the layer of soil in the digester help in the production of bio-gas? (1)
(b) What is the composition of bio-gas? (1)
(c) Why is bio-gas considered to be an excellent fuel? (1)
(d) Identify **X** marked in the diagram. What is it used for? (1)

4. Question numbers 4(a) - 4(d) are based on the two tables given below. Study these tables related to thyroxine levels and answer the questions that follow.

Table A- Thyroxine levels in men

Age Range	Normal	Low
18-30years	0.5-4.15mU/L	< 0.5mU/L
31-50years	0.5-4.15mU/L	<0.5mU/L
51-70years	0.5-4.59mU/L	<0.5mU/L
71-90years	0.4-5.49mU/L	<0.4mU/L

Table B- Blood report of Ramesh, Shyam and John

Name	Age	Thyroxine level
Ramesh	32years	0.4mU/L
Shyam	55years	3.45mU/L
John	80years	0.4mU/L

(a) Refer to the table B showing the blood reports of Ramesh, Shyam and John. Who according to you needs doctor's advice and why? (1)

(b) Name the gland which is responsible for the release of thyroxine hormone. (1)

(c) Mention the role of this hormone. (1)

(d) Name the mineral essential for its synthesis. What might happen in case of deficiency of this mineral in our diet? (1)

5. The amount of light entering the human eye is controlled by (1)

(a) Ciliary muscles (b) Pupil

(c) Cornea (d) Iris

OR

The focal length of the eye lens increases when eye muscles

(a) are relaxed and the lens becomes thinner. (b) contract and the lens becomes thicker.

(c) are relaxed and the lens becomes thicker. (d) contract and the lens becomes thinner.

6. When one unit of electric charge moves from one point to another point in an electric circuit, then the amount of work done in joules is known as? (1)

(a) electric current (b) resistance

(c) resistivity (d) potential difference

7. A current of 1 A is drawn by a filament of an electric bulb. Number of electrons passing through a cross-section of the filament in 16 seconds would be roughly ____ (1)

(a) 10^{20} (b) 10^{16}

(c) 10^{18} (d) 10^{23}

8. To which context was Amrita Devi Bishnoi National award given (1)

(a) Water conservation (b) Animal life conservation

(c) Wild life conservation (d) Ganga action plan

OR

Forests are a store house of biodiversity. The measure of biodiversity of an area is –

(a) Flora found there (b) Number of animals found there

(c) Total land occupied (d) Type and number of species of flora and fauna found there

9. Soaps are - (1)

(a) Sodium or potassium salts of higher fatty acid (b) Sulphonates salts of long chain carboxylic acids

(c) Sodium salt of carboxylic acid (d) Potassium salt of alkyl benzene sulphonates

10. Which of the following is not an exothermic reaction? (1)

(a) Burning of coal (b) Dissolution of ammonium nitrate in water

(c) Process of respiration (d) Addition of quick lime to water

11. Identify the acidic salt from the following: (1)

(a) Na_2CO_3 (b) $(NH_4)_2 SO_4$

(c) $NaNO_3$ (d) KCl

12. On the basis of the table given below, which element is most likely to form basic oxide? (1)

Period/ Groups	1	2	3-12	13	14	15	16	17	18
2	A					C			D
3				B					

(a) A (b) B

(c) C (d) D

OR

Given below are some elements of the modern periodic table. Atomic number is given in parenthesis. A(4), B(9) , C (14) , D (19) , E (20). Which two elements belong to the same group?

(a) A and B (b) B and C

(c) A and E (d) D and E

For question numbers 13 and 14, two statements are given-one labelled assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii),(iii) and (iv) as given below.

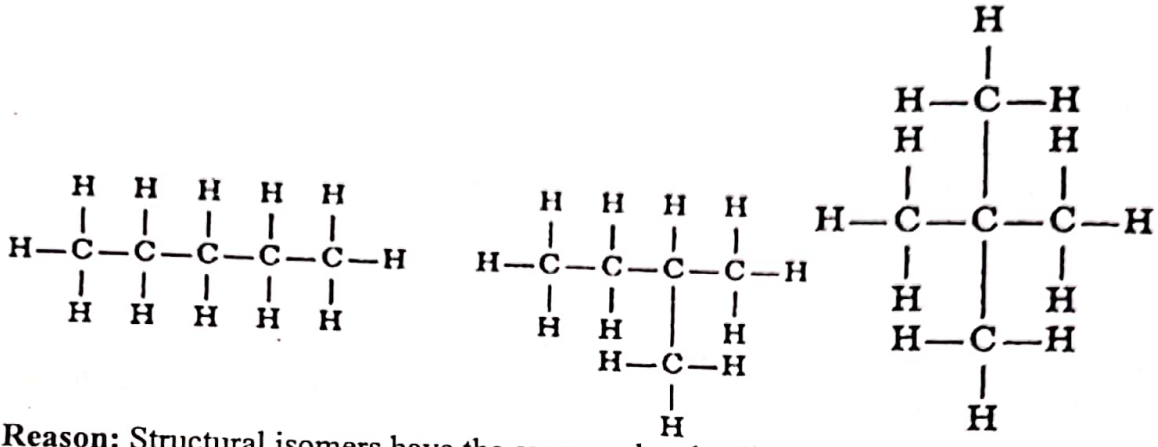
i) Both A and R are true and R is the correct explanation of the assertion.

ii) Both A and R are true but R is not the correct explanation of the assertion.

iii) A is true but R is false.

iv) A is false but R is true.

13. **Assertion:** Structural isomers of pentane have the following structures. (1)



Reason: Structural isomers have the same molecular formula but differ in their structures.

14. **Assertion**: A 200 W bulb glows with more brightness than a 100 W bulb. (1)
Reason: A 100 W bulb has more resistance than a 200 W bulb.

SECTION B

15. i) Write two observations when ferrous sulphate is heated in a test tube. (3)
ii) Name the type of reaction
iii) Write a balanced chemical reaction to represent the above reaction.

16. A white powder A is a mild non corrosive base which is used in the preparation of cakes. When the powder is heated it gives another powder B. Powder B is recrystallized to get substance C which has detergent like properties. Identify A, B, and C and also write reactions for the conversion of A to B. (3)

OR

A milk man adds a very small amount of baking soda to fresh milk.

a) Why does he shift the pH of the fresh milk to make it slightly alkaline?

b) Why does this milk take long time to set as curd?

c) Fresh milk has pH of 6. How do you think pH will shift as it sets into curd?

17. An element X belongs to the 3rd period and group 16 of the modern periodic table. (3)

a) Determine the number of valence electrons and valency of X.
b) Write the molecular formula of the compound when X reacts with H_2 and write the electron dot structure for its formation.
c) Name the element X and state whether it is metallic or non-metallic.

18. Observe the food chain: (3)

Plant (1000KJ) ⟶ Goat ⟶ Lion

(a) If autotrophs occupying the first trophic level are called producers, what are the herbivores called as?
(b) How much energy does the lion get in above food chain?

OR

What is an ecosystem? List its two main components. Give examples of an artificial and a natural ecosystem.

19. State three common features of respiratory organs of animals. (3)

20. (a) A florist sprinkled a plant hormone to prevent wilting of leaves. Name the hormone he must have used. (3)

(b) How do auxins promote the growth of a tendril around a support?

21. How is the sex of a child determined in human beings? Support with the help of a flow chart. (3)

22. A spherical mirror produces an image of magnification -1 on a screen placed at a distance of 50 cm from the mirror. (3)
(a) Identify the type of mirror and find its focal length.
(b) Draw the ray diagram to show the image formation in this case.
(c) Predict the nature and size of the image formed if the object is placed at a distance of 10 cm from the mirror?

23. Akshay observes the pattern of the magnetic field produced by a long straight wire carrying a current. (3)
(a) Draw the pattern of the magnetic field that Akshay would have observed.
(b) Explain the rule that can be used to determine the direction of the magnetic field produced in this case.
(c) Akshay places a magnetic compass close to the straight wire and then gradually moves it away from the wire. What would he observe? Justify the observation(s).

24. A person suffering from an eye defect can see clearly only up to a distance of 2 m. (3)
(a) Identify the eye defect.
(b) Draw a diagram to show how this defect can be corrected.
(c) Calculate the power of the lens needed to rectify this defect.

OR

The near point of a person suffering from an eye defect is 50 cm.
(a) Identify and explain the eye defect.
(b) Draw a diagram to show how this defect can be corrected.
(c) List two reasons that may have caused this defect.

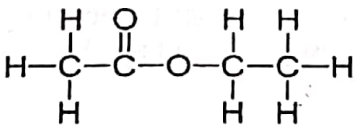
SECTION C

25. a) What type of ores are calcined? Illustrate giving suitable equation. (5)
b) In what form the calcined ore is obtained and how it can be reduced? Give chemical equation for the reduction process involved for the example given by you.
c) Name two metals used as reducing agent by displacing metals of lower reactivity by their compounds.
d) How is cinnabar ore used to obtain mercury?

OR

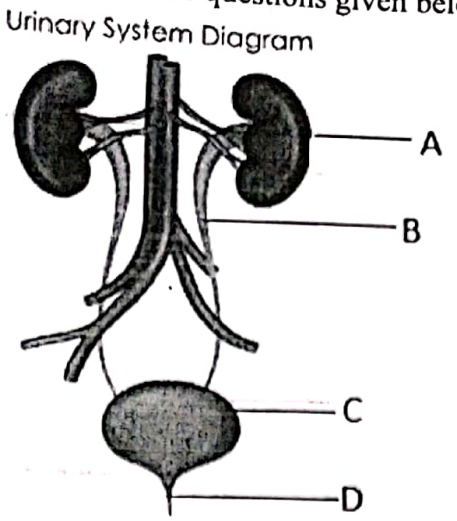
State the reason for the following:
i) Solder is used for welding electrical wires.
ii) Tarnished copper vessels are cleaned with tamarind juice.
iii) Sodium or potassium metals are kept under kerosene.
iv) Nitric acid can be transported in aluminium containers.
v) Melting and boiling points of covalent compounds are low.

26. a) An organic compound **A** with molecular formula C_2H_6O gives compound **B**, on oxidation with alkaline $KMnO_4$. **A** on heating with conc. H_2SO_4 gives **C**. Compound **C** gives addition product with Br_2 and H_2. Identify **A**, **B**, **C** and write chemical equations. (5)
b) Structural formula of ester is given as follows:



Write the structural formula and IUPAC name of the alcohol and the corresponding acid from which it is formed.

27. Observe the diagram and answer the questions given below: (5)



(a) Identify the parts A, B, C and D.

(b) Name the part which (i) forms urine (ii) stores urine until it is passed out.

(c) Describe the process of urine formation.

28. (a) Illustrate the process of regeneration in Planaria with the help of suitable diagrams. (5)

(b) Why do multicellular organisms use complex ways of reproduction?

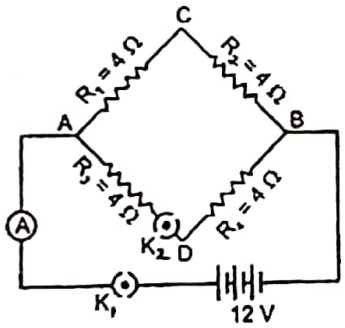
OR

(a) Draw neat and labelled diagram of female reproductive system of human beings.

(b) Describe in brief, the changes the uterus undergoes

(i) to receive the zygote (ii) if zygote is not formed.

29. Study the following circuit diagram and answer the following questions: (5)



(a) Calculate the ammeter reading when key K_1 is closed and simultaneously key K_2 is open.

(b) What is the effective resistance offered if both keys are closed?

(c) Find the current flowing through the circuit if R_1, R_2, R_3 and R_4 are connected in series with the same battery.

(d) Redraw this circuit to show R_1, R_2 and R_3 connected in series, and this combination in parallel with R_4 across the same voltage source.

30. A convex lens forms a magnified, inverted image of an object placed in front of it. (5)

(a) Draw a ray diagram to justify this statement, stating the position of the object with respect to the lens.

(b) If the above lens has a focal length of 16 cm and an object of height 4 cm is placed at a distance of 20 cm from the lens, determine the position, size and nature of the image formed.

OR

The emergent ray is parallel to the direction of the incident ray when an oblique ray of light passes through a rectangular glass slab.

(a) Draw a labelled diagram to justify this statement, and explain why the incident ray and the emergent ray are parallel to each other.

(b) If the absolute refractive index of the glass slab is 1.65, calculate the speed of light in the glass slab.

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