

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO



GRADE - 10

SCIENCE

SAMPLE PAPER

IOA SCIENCE OLYMPIAD – 2019 - 20

Test Booklet Series

Set - 0

DO NOT OPEN THIS BOOKLET UNTIL ASKED TO DO SO

Roll No.:

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Student's Name:

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Maximum Time: 75 Minutes

Maximum Marks: 100

INSTRUCTIONS

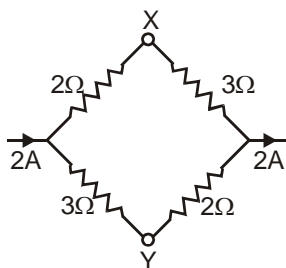
1. Please **DO NOT OPEN** the contest booklet until the proctor has given permission to start.
2. There are 40 questions in this paper. 2 points, 3 points will be awarded for each correct question in Foundation, and Exploration respectively. 1 point will be deducted for each incorrect answer, and no penalty for skipping a question.
3. All questions are compulsory. There is only ONE correct answer to each question.
4. No electronic devices capable of storing and displaying visual information are allowed during the exam.
5. Use of **calculator** is strictly prohibited in the exam.
6. Fill your **Name, Roll No., Grade and School Name** in the answer sheet.
7. To mark your choice of answers by darkening the circles in the Answer Sheet, use an HB Pencil or a **Blue/Black Ball Point Pen** only.
8. Shade your answer clearly as per the example is shown below:

| CORRECT | INCORRECT |
|--|---|
| <input type="radio"/> A <input checked="" type="radio"/> B <input type="radio"/> C <input type="radio"/> D | <input checked="" type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input checked="" type="radio"/> D |

Foundation: (2 POINTS)

- Which of the following statements is correct?
(A) Electrons are gained by oxidizing agent as it undergoes reduction
(B) Electrons are gained by oxidizing agent as it undergoes oxidation
(C) Electrons are gained by the reducing agent as it undergoes oxidation
(D) Electrons are gained by the reducing agent as it undergoes reduction
- How much energy will 2 kg of a fuel yield on complete combustion, if its calorific value is 50 kJ/g?
(A) 10^5 KJ (B) 10^7 KJ (C) 10^9 KJ (D) 10^4 KJ
- Which of the following is a reversible reaction?
(A) $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$ (B) $2 \text{Mg} + \text{O}_2 \rightarrow 2 \text{MgO}$
(C) $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$ (D) $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$
- The magnetic field lines due to a straight wire carrying a current are
(A) Straight (B) circular (C) parabolic (D) elliptical
- What is the word for the kind of animal that is active at dawn and dusk?
(A) Diurnal (B) Crepuscular (C) Nocturnal (D) Matutinal
- Crude common salt is hygroscopic because of impurities of
(A) CaSO_4 and MgSO_4 (B) CaCl_2 and MgCl_2 (C) CaBr_2 and MgBr_2 (D) None of these
- The charge on an electron is known to be 1.6×10^{-19} coulomb. In a circuit the current flowing is 1A. How many electrons will be flowing through the circuit in a second?
(A) 1.6×10^{19} (B) 1.6×10^{-19} (C) 0.625×10^{19} (D) 0.625×10^{12}
- The energy of a neutron released during a fission process should be reduced by about _____ part to convert it into a thermal neutron.
(A) 10^2 (B) 10^5 (C) 10^8 (D) 10^{-5}
- Which of the following is the strongest base?
(A) $\text{Ca}(\text{OH})_2$ (B) $\text{Sr}(\text{OH})_2$ (C) $\text{Ba}(\text{OH})_2$ (D) $\text{Mg}(\text{OH})_2$
- Magnetic field strength due to a short bar magnet on its axial line at a distance x is B. What is its value at the same distance on the equatorial line?
(A) B/2 (B) B (C) 2 B (D) 4B

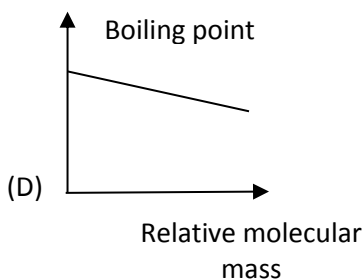
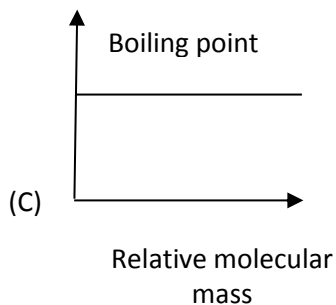
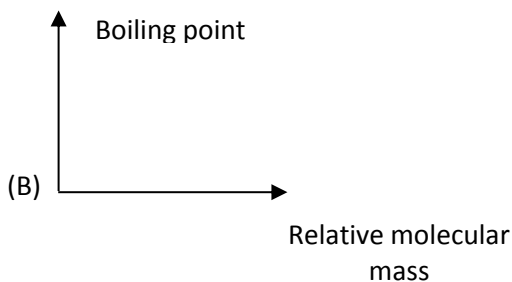
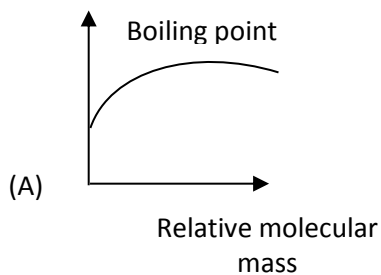
11. For the following circuit, the potential difference between X and Y in volt is



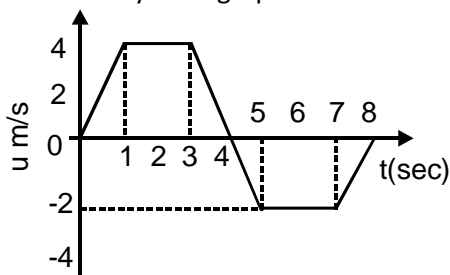
- (A) 1
(C) 2

- (B) -1
(D) -2

12. Which of the following graphs show that the boiling point changes the homologous series alkenes?



13. The velocity-time graph of a linear motion is shown below:



The displacement from the origin after 8 seconds is

- (A) 18 m (B) 16 m (C) 6 m (D) 6 cm

14. A zig-zag line separates the metals from non-metals almost in the middle of the modern periodic table.

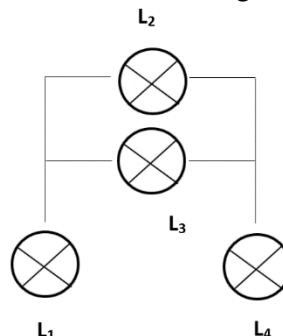
These elements placed borderline have properties like

- I. The electro negativities are between those of the metals and nonmetals

- II. Reactivity depends on properties of other elements in reaction
III. They often make good semiconductors
IV. Their ionization energies are between those of the metals and nonmetals
(A) I and II (B) II and III (C) I, II, III and IV (D) II and IV
15. In group VIII of Mendeleev's periodic table, why does cobalt with atomic mass 58.93 appears before nickel having atomic mass 58.71?
I. Cobalt has the properties similar to rhodium
II. In order to group elements with similar properties together, cobalt was placed before nickel
III. Elements in this group was placed according to their electropositive character
(A) I, II and III (B) I and II (C) Only II (D) Only III
16. Coagulopathies are the conditions characterized by the inability of blood to clot. Identify the protein whose deficiency causes coagulopathies.
I. Albumin
II. Fibrinogen
III. Prothrombin
IV. Thrombokinase
(A) I and III (B) I, II, III, and IV (C) II, III and IV (D) III and IV
17. What types of pollination is the flower shown in the given figure is likely to be adapted for?
- The diagram shows a cross-section of a flower. In the center, there is a single, elongated stigma. Surrounding the stigma are several long, thin filaments, each topped with a small, oval-shaped anther. This arrangement is typical of a chasmogamous flower, which is adapted for both insect and wind pollination.
- (A) Insect- pollination and self-pollination
(B) Insect-pollination and cross-pollination
(C) Wind-pollination and self-pollination
(D) Wind-pollination and cross-pollination
18. If a plant is showing the phenomenon of apical dominance, then the processes that can enhance growth of lateral buds is
(A) The removal of pith of the stem (B) Application of auxins at the root end
(C) The removal of all leaves from plant (D) Girdling of the stem
19. What is the function of sympathetic stimulation?
(A) It Inhibits heart beat
(B) It accelerates heart beat
(C) It performs both the above functions under different conditions
(D) It does neither of the above function
20. The pituitary gland is often described as "The Leader of Endocrine Orchestra" because it
I. Controls activities of all other endocrine organs in vertebrates
II. Controls activities of thyroid gland, gonads and adrenal cortex
III. Controls growth in vertebrates
IV. IS responsible for gigantism
(A) Only I (B) II and III (C) I and IV (D) Only II

28. A wire has a resistance 16Ω . If it is melted and drawn into a wire of half its length. Calculate the resistance of the new wire. What is the percentage change in its resistance?
 (A) 80% (B) 72% (C) 70% (D) 75%

29. In the circuit L1, L2, L3, and L4 are four light bulbs. L1 and L2 are labeled "220 V, 25 W". L3 and L4 are labeled "220 V and 60 W". What will be the sequence of the brightness of the four bulbs starting from the brightest to the dimmest, when voltage U is applied?



- (A) 2, 3, 4, 1
 (B) 4, 2, 1, 3
 (C) 3, 4, 1, 2
 (D) 1, 4, 3, 2

30. A '0 to 300 V' voltmeter has a guaranteed accuracy of 1% of full-scale reading. The voltage measured by the instrument is 83 V. The percentage limiting error is
 (A) 95% (B) 4.85% (C) 3.62% (D) 1.81%

31. It is desired to photograph the image of an object placed at a distance of 3 m from a plane mirror. The camera, which is at a distance of 4.5 m from the mirror. Should be focused for a distance of
 (A) 3 m (B) 4.5 m (C) 6 m (D) 7.5 m

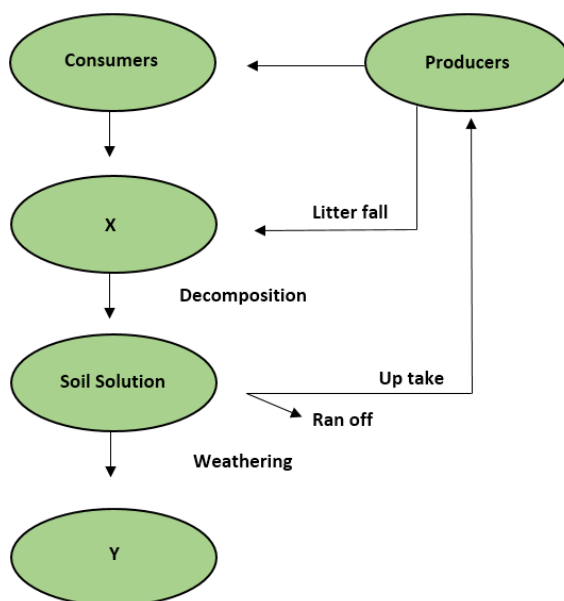
32. A thin uniform ring of radius r carrying uniformly distributed charge q and m rotates about its axis with angular velocity. The ratio of its magnetic moment and angular momentum is
 (A) q/m (B) $q/2m$ (C) m/q (D) $m/2q$

33. Which of the following is the best way to demagnetize a magnet using the heating method?
 (A) Heat the magnet in boiling water and allow it to cool in the north-south direction
 (B) Heat the magnet to become red hot and allow it to cool in the east-west direction
 (C) Heat the magnet to become red hot and allow it to cool in the north-south directions
 (D) Heat the magnet in boiling water and allow it to cool in the east-west direction

34. Three identical bulbs are connected in parallel with a battery. The current drawn from the battery is 6A. If one of the bulbs gets fused, what be the total current drawn from the battery?
 (A) 4 A (B) 2 A (C) 6 A (D) 8

35. Involuntary actions including blood pressure, salivation and vomiting are controlled by the _____ in the hind-brain.
 (A) Medals (B) Cerebellum (C) Medulla (D) Cerebrum

36. Which of the following forms energy leads to least environmental pollutions in the process of its harnessing and utilization?
 (A) Thermal energy (B) Nuclear energy (C) Solar energy (D) Geothermal energy
37. Which of the following represents way to strike a balance between environment and development?
 I. Recycling of the non-biodegradable wastes like plastic, glass etc.
 II. Replenishment of the forest resources along with industrialization
 III. Increasing the number of decomposers in the environment
 (A) Only I (B) Only II (C) Only III (D) Both I and II
38. Marks is a worker of cotton textile industry. He is susceptible to X disease. Which of the following is correct about X diseases?
 I. It is not the cotton dust that directly causes that disease
 II. It is endotoxins that come from the cell walls of gram-negative bacteria that grow on the cotton causing That disease
 III. Here X represents byssinosis, or "brown lung disease"
 (A) Only I (B) Only II (C) I, II and III (D) I and II
39. What is the nature of the flow of energy and flow of carbon through an ecosystem?
 (A) Flow of energy – cyclical Flow of carbon – one - way
 (B) Flow of energy – cyclical Flow of carbon - cyclical
 (C) Flow of energy – one-way Flow of carbon - cyclical
 (D) Flow of energy – one – way Flow of carbon – one -way
40. The given diagram shows the phosphorous cycling in a terrestrial ecosystem. Identify correct option for X and Y.



- (A) X – Detritus Y – rock minerals (B) X- Rock minerals Y - humus
 (C) X – Sand Y – Rock particles (D) None of the above