

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



GRADE-9 & 10

EDISON

INTERNATIONAL SCIENCE OLYMPIAD - 2023

Test Paper

Test Booklet Series

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: 90 Minutes

Maximum Marks: 120

INSTRUCTIONS

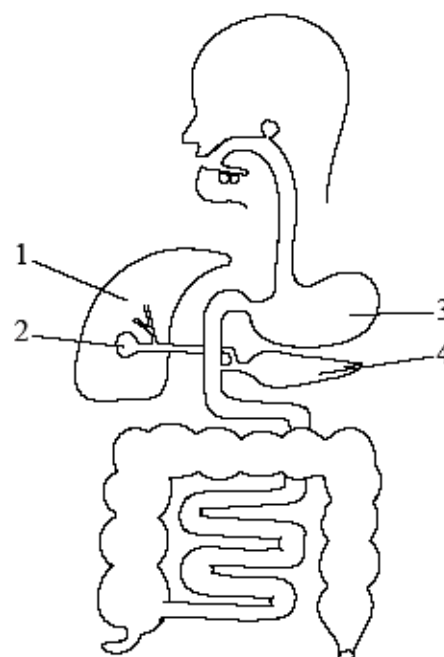
- Please **DO NOT OPEN** the contest booklet until the proctor has given permission to start.
- There are 30 questions in this paper. **Easy:** 3 points for each correct answer. **Medium:** 4 points for each correct answer. **Hard:** 5 points for each correct answer. 1 point will be deducted for each incorrect answer, and no penalty for skipping a question.
- There is only ONE correct answer to each question.
- No electronic devices capable of storing and displaying visual information are allowed during the exam.
- Use of **calculator** is strictly prohibited in the exam.
- Fill your **Name, Roll No., Grade and School Name** in the answer sheet.
- 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.
- 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 checked="" type="radio"/> C <input checked="" type="radio"/> D |

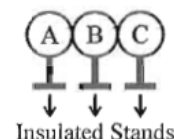
Email: exam@internationalolympiadacademy.com, Website: www.internationalolympiadacademy.com,
www.mathkangaroo.in, Phone: +91-8368118421, +91-9810336335

SECTION – A (3 POINT PROBLEMS)

1. When a ripe tomato is pricked with a needle a watery fluid comes out. This fluid is stored in
(A) Cytoplasm (B) Plastid (C) Vacuole (D) Nucleus
2. What causes third heart sound?
(A) Rapid early systole onto a stiff non-compliant ventricle
(B) Rapid early diastole onto a stiff non-compliant ventricle
(C) Rapid late systole onto a stiff non-compliant ventricle
(D) Rapid late diastole onto a stiff non-compliant ventricle
3. Sun is called the biggest chunk of plasma because
I. It consists of hydrogen and helium ions along with the electrons liberated during the production of these ions
II. Most of the atoms in the sun are ionized
Which of the two statements shown above explain the answer well?
(A) I only (B) II only (C) Both I and II (D) None of these
4. 21 % by volume of oxygen is present in one litre of air. What should be the number of moles in oxygen?
(A) 0.186 (B) 0.21 (C) 2.10 (D) 0.93
5. A crystal may have one or more planes and one or more axes of symmetry but it possesses
(A) Two centres of symmetry (B) One centre of symmetry
(C) No centre of symmetry (D) None
6. A molecule which cannot exist theoretically is
(A) SF_4 (B) OF_2 (C) OF_4 (D) O_2F_2
7. This question refers to the following diagram of the digestive system.
Which organs are associated with the transformation of glucose into glycogen?

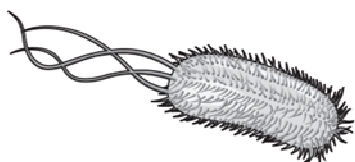


8. An organic compound (A) contains only C, H and O atoms. On reaction with excess of CH_3MgI , (A) gives a gas (X) whose volume under STP conditions was found to be 67.2 litre. The number of hydroxyl groups in the compound (A) are
 (A) 1 (B) 2 (C) 3 (D) 4
9. A car starts from rest acquires a velocity v with uniform acceleration 2m/s^2 then it comes to stop with uniform retardation 4m/s^2 . If the total time for which it remains in motion is 3 sec, the total distance travelled is:
 (A) 2m (B) 3m (C) 4m (D) 6m
10. Three identical (in all aspects) metal spheres A, B and C supported on separate insulated stands and placed in contact as shown in the figure, A charged glass rod rubbed by a silk cloth is kept near the metal sphere A, then charges on A, B and C respectively are:
 (A) Positive charge, Neutral, Neutral
 (B) Negative charge, positive charge, Neutral
 (C) Negative charge, Neutral, positive charge
 (D) Positive charge, Neutral, Negative charge



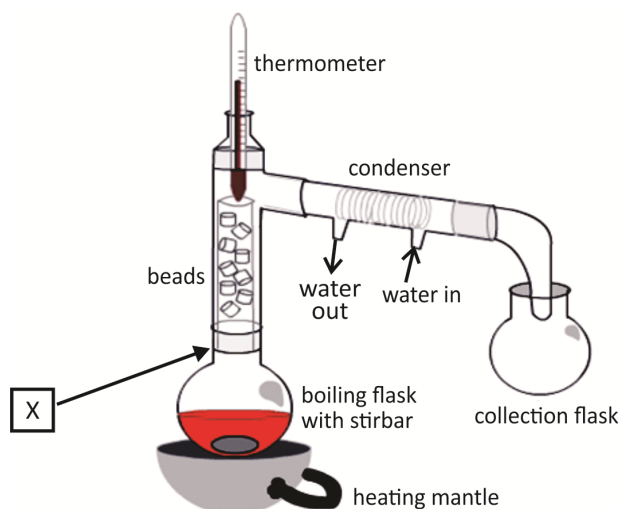
SECTION – B (4 POINT PROBLEMS)

11. The illustration below shows the external features of a prokaryotic organism.



Which of the following can be concluded about the internal cellular contents of this prokaryote?

- (A) The cell does not contain ribosomes. (B) The cell does not contain a nucleus.
 (C) The cell contains mitochondria. (D) The cell contains a vacuole.
12. Sometimes the solution becomes milky on passing H_2S gas in the second group, this shows the presence of
 (A) An acidic salt (B) An oxidizing substance
 (C) Thiosulphate (D) A reducing agent
13. Which of the following is correct about X shown in below diagram?
 I. The liquid to be distilled is placed in this
 II. It should not be more than two-thirds full at the start of the distillation
 III. Boiling stones are kept in it to promote even boiling
 (A) I
 (B) II
 (C) I, II and III
 (D) None of the above

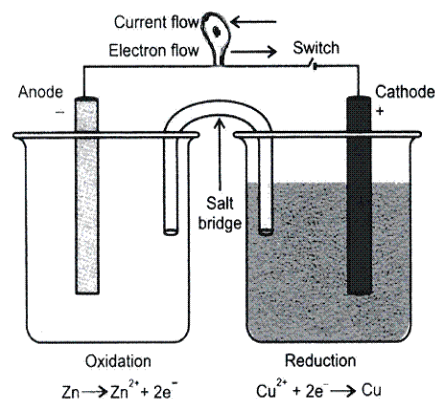


14. Two balls A and B are thrown with same velocity u from the top of a tower. Ball A is thrown vertically upwards, and the ball B is thrown vertically downwards. Choose the correct statement
- (A) Ball B reaches the ground with greater velocity
 (B) Ball A reaches the ground with greater velocity
 (C) Both the balls reach the ground with same velocity
 (D) Cannot be interpreted

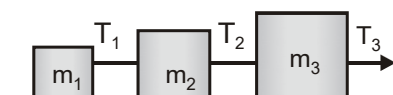
15. Observe the below shown experimental set up and answer the following question.

Under what condition the bulb in the experiment will stop glowing?

- (A) When copper rod is replaced by rod of silver
 (B) When copper rod is replaced by rod of lead
 (C) When copper rod is replaced by rod of zinc
 (D) When copper rod is replaced by rod of tin



16. Three blocks are connected as shown in figure, on a horizontal frictionless table and pulled to the right with a force $T_3 = 60$ N. If $m_1 = 10$ kg, $m_2 = 20$ kg, $m_3 = 30$ kg then the tension T_2 is -



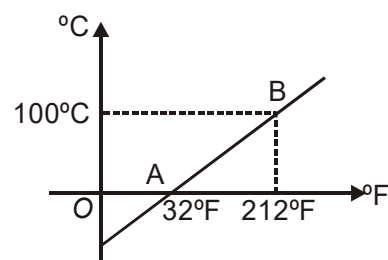
- (A) 10 N (B) 20 N (C) 30 N (D) 60 N

17. The accuracy of a cesium clock is 1 part in 10^{11} . What can be the maximum difference between two such clocks operating for about 3200 years ($\sim 10^{11}$)?

- (A) Practically no difference (B) 1 second
 (C) 4 seconds (D) 2 seconds

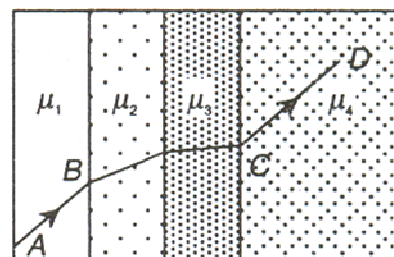
18. The graph AB shown in figure is a plot of the temperature of a body in degree Celsius and degree Fahrenheit. Then the slope of the line AB is

- (A) $9/5$
 (B) $5/9$
 (C) $1/9$
 (D) $3/9$



19. A ray of light passes through four transparent media with refractive indices and as shown in the figure. The surfaces of all media are parallel. If the emergent ray CD is parallel to the incident ray AB, we must have

- (A) $\mu_1 = \mu_2$
 (B) $\mu_2 = \mu_3$
 (C) $\mu_3 = \mu_4$
 (D) $\mu_4 = \mu_1$

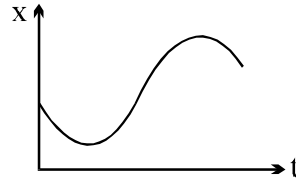


20. In the uranium radioactive series, the initial nucleus is ${}_{92}\text{U}^{238}$, and the final nucleus is ${}_{82}\text{Pb}^{206}$. When the uranium nucleus decays to lead, the number of α – particles and the number of β -particles emitted are respectively
- (A) 6, 8 (B) 8, 6 (C) 16, 6 (D) 32, 12

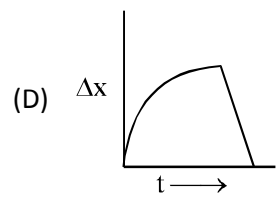
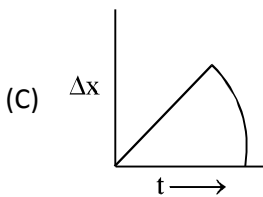
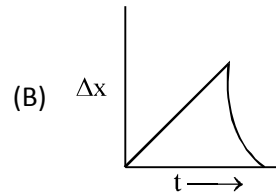
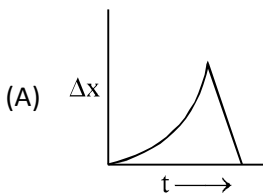
SECTION – C (5 POINT PROBLEMS)

21. The graph of position x versus time t represents the motion of a particle. If b and c are both positive constants, which of the following expressions best describes the acceleration a of the particle?

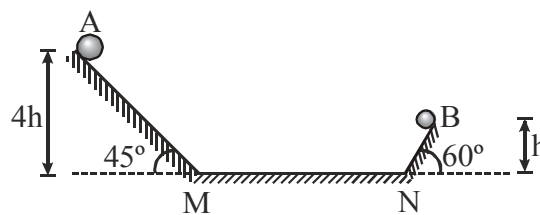
- (A) $a = b - ct$
 (B) $a = +b$
 (C) $a = -c$
 (D) $a = b + ct$



22. Two stones are thrown up vertically and simultaneously but with different speeds. Which graph correctly represents the time variation of their relative positions Δx . Assume that stones do not bounce after hitting ground.



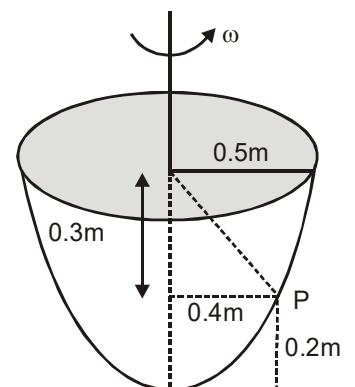
23. Two identical balls A and B are released from the positions shown in figure. They collide elastically on horizontal portion MN . The ratio of heights attained by A and B after collision will be (neglect friction).



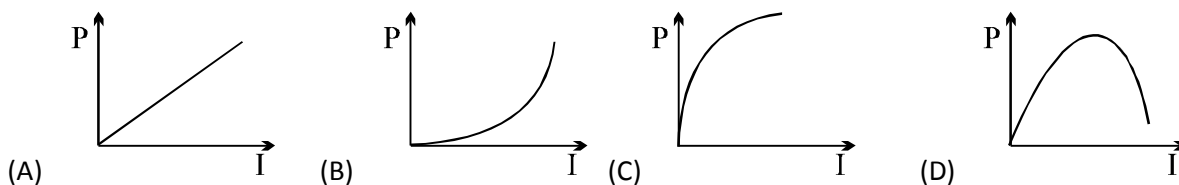
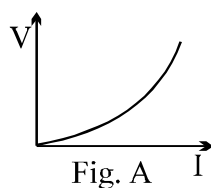
- (A) 1 : 4 (B) 2 : 1 (C) 4 : 13 (D) 2 : 5

24. A particle P will be in equilibrium inside a hemispherical bowl of radius 0.5 m at a height 0.2 m from the bottom when the bowl is rotated at an angular speed ($g = 10 \text{ m/sec}^2$)

- (A) $10/\sqrt{3}$ rad/sec
 (B) $10\sqrt{3}$ rad/sec
 (C) 10 rad/sec
 (D) $\sqrt{20}$ rad/sec



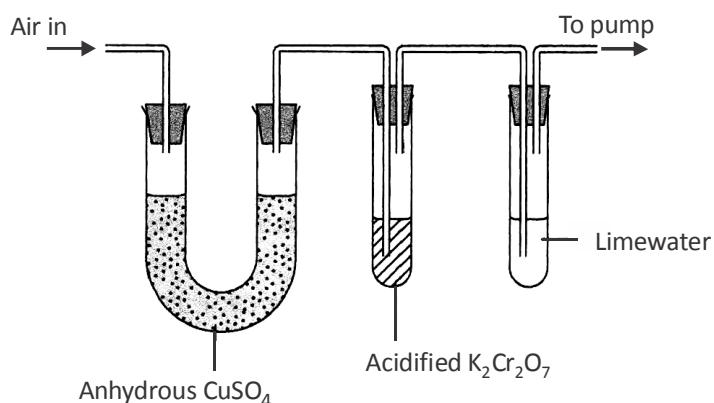
25. The variation of current (I) and voltage (V) is as shown in figure A. The variation of power P with current I is best shown by which of the following graph



26. A 20 g bullet pierces through plate of mass $m_1 = 1\text{ kg}$ and then comes to rest inside a second plate of mass $m_2 = 2.98\text{ kg}$. It is found that the two plates, initially at rest, now move with equal velocities. The percentage loss in the initial velocity of bullet when it is between m_1 and m_2 . (Neglect any loss of material of the besides, due to action of bullet.) will be

- (A) 20% (B) 25% (C) 30% (D) 45%

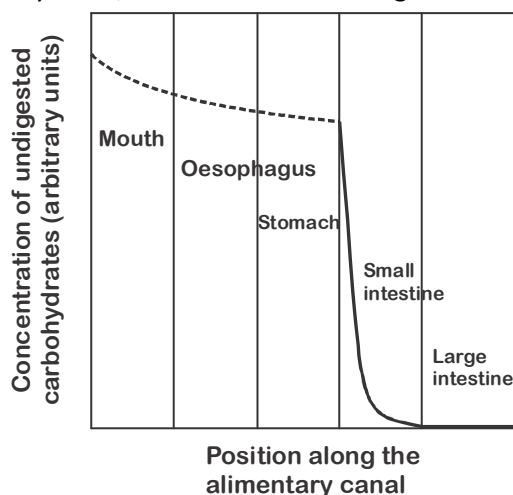
27. The following setup was used to investigate the air around a school.



It was found that the copper (II) sulfate turned blue, the acidified potassium dichromate (VI) turned green and a white precipitate was formed in the limewater. What was present in the sample of air as indicated by the respective reagents?

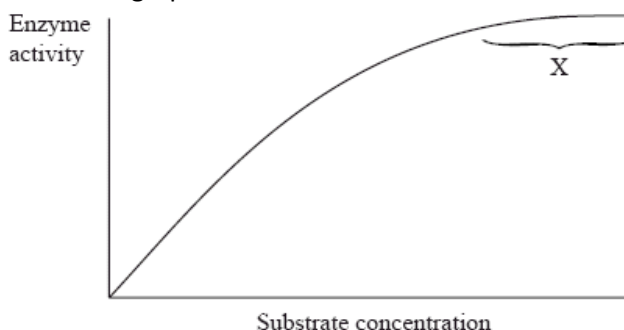
| | Anhydrous CuSO_4 | Acidified $\text{K}_2\text{Cr}_2\text{O}_7$ | Limewater |
|-----|---------------------------|---|---------------|
| (A) | SO_2 | SO_2 | CO_2 |
| (B) | O_2 | SO_2 | CO_2 |
| (C) | H_2 | CO_2 | SO_2 |
| (D) | H_2O | SO_2 | CO_2 |

28. The graph below shows the change in concentration of undigested carbohydrates as a piece of food passes through the alimentary canal, small intestine and large intestine.

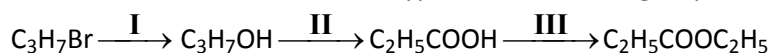


What is correct about the above graph?

- (I) The amount of undigested carbohydrate remained almost constant in the stomach
 (II) Digestion and absorption of carbohydrate is completed in the small intestine
 (III) Digestion and absorption of carbohydrate is completed in the large intestine
 (A) I and II (B) II only
 (C) I and III (D) I, II and III
29. The graph below shows the effect of substrate concentration on enzyme activity. What conclusion can be drawn about section X of the graph?



- (A) The enzyme has started to denature and the reaction slows down.
 (B) The reaction has finished and the substrate has been used up.
 (C) The enzyme is saturated and is working at its maximum reaction rate.
 (D) Some of the enzyme has been consumed and the reaction has reached a plateau.
30. What is the correct order of reaction types in the following sequence?



| | I | II | III |
|-----|--------------|--------------|--------------|
| (A) | substitution | oxidation | condensation |
| (B) | addition | substitution | condensation |
| (C) | oxidation | substitution | condensation |
| (D) | substitution | oxidation | substitution |

