20th GLORIOUS YEAR

SILVERZONE FOUNDATION

New Delhi, India

STEM OLYMPIAD

Science | Technology | Engineering | Mathematics

SILVERZONE FOUNDATION
New Delhi, India

STEM
OLYMPIAD

Geniuses are ~~born, not~~ made.

About

SilverZone STEM Innovation Olympiads (STEM) is a noble pursuit encouraging our bright youth to take part in a cause that is much bigger than themselves. A forward-thinking movement to achieve excellence in the field of Science, Technology, Engineering and Mathematics.

Structure of the Olympiad

The Olympiad is open for Classes from 3rd to Class 10th and will be conducted in two stages.

Stage 1: National Stage

In this stage the student will compete with their counterpart from their home country. They will qualify for Stage 2 only after scoring a cutoff marking of 75%.

Stage 2: Inernational Stage

In this stage the student will compete with all the students from other countries along with their home country. The top 100 winners scoring more than 75% in Stage 1 from every class of each country will be taking part in stage 2.

Test Paper

The language medium is English only. The examination is being conducted for all classes from 3rd to 10th with the following details.
For Classes 1-2: There will be 25 questions and the duration will be 40 Minutes.
For Classes 3-5: There will be 35 questions and the duration will be 40 Minutes.
For Classes 6-10: There will be 40 questions and the duration will be 50 Minutes.

The questions will be of objective type in nature with multiple choice answers. There is no negative marking.

Syllabus & Sample Questions

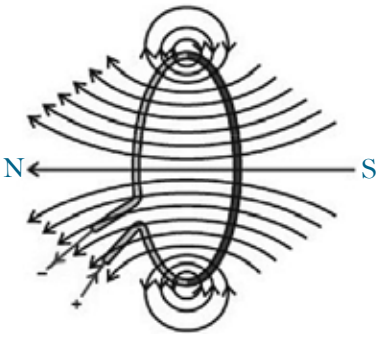
Science: Chemical elements and their properties; Life Processes; Light and Image formation; Flow of electrons and magnetism; Energy and its sources.

Technology & Engineering: AI- Foundational Concepts of AI, Understanding AI Project Cycle, Computer Vision, Natural Language Processing; Coding - Coding with Python - Advance; Intelligence assessment with Logical Reasoning - Direction Test, Venn Diagram, Logical Sequence, Mathematical Operations, Coding & Decoding.

Mathematics: Real Numbers and Number Series; Algebra and Co-ordinate geometry; Geometry; Trigonometry and its Application; Mensuration; Statistics and Probability.

Science

1 Which statement is correct with respect to the figure given below?



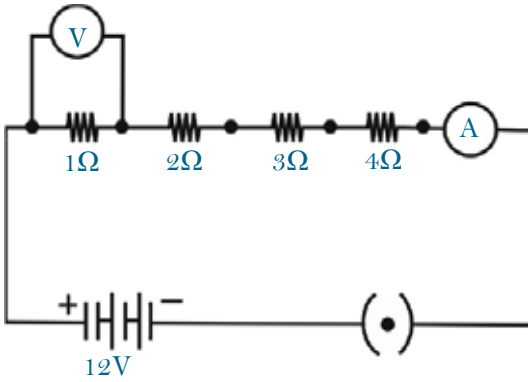
A. The concentric circles are representing the magnetic filed lines near the wire.

B. A circular loop does not produce magnetic filed lines at the centre of the loop.

C. Right hand thumb rule cannot be used to find the direction of magnetic filed lines produced by a circular loop.

D. None of these

2 Find out the reading of ammeter and voltmeter in the circuit given below.



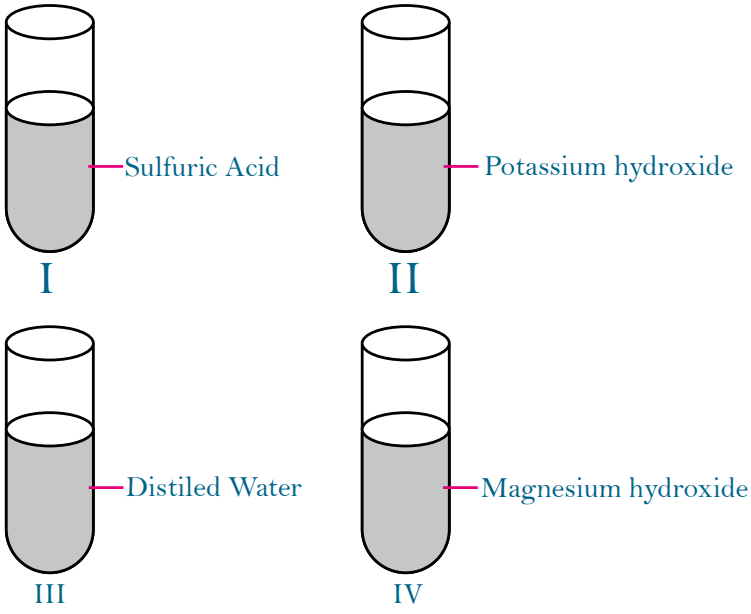
A. Ammeter reading = 1.2 A,
Voltmeter reading = 1V

B. Ammeter reading = 1 A,
Voltmeter reading = 0.5V

C. Ammeter reading = 1.2 A,
Voltmeter reading = 1.2V

D. Ammeter reading = 3 A,
Voltmeter reading = 5V

3 Look at the following figure carefully and choose the correct option.



A. pH of I is greater than that of II and III

B. pH of IV is less than that of I and III

C. pH of I is less than that of III and IV

D. pH of III is greater than that of II and IV

4 Which combination of terms is correct for P, Q, R, S and T to fill in the blanks?

Electronic configuration of some elements				
Element	Number of electrons in shells			
	K	L	M	N
Sodium	2	8	1	
Carbon	2	P		
Q	2	8	R	
Aluminium	2	S	3	
Potassium	2	8	8	T

A. P→8, Q→Argon, R→8, S→8, T→2
B. P→7, Q→Phosphorus, R→5, S→8, T→1
C. P→4, Q→Argon, R→8, S→8, T→1
D. P→4, Q→Argon, R→7, S→8, T→2

Technology & Engineering

5 Amazon Alexa is a voice-controlled digital or virtual assistant software that takes voice commands to make to-do lists, place online orders, schedule reminders and answer queries through internet searches. Alexa uses_____ .

A. Decision Tree
B. NLP
C. Classification
D. Data Visualization

6 Life support systems and ventilators are equipped with multiple sensors that are designed to monitor and observe body signals in order to activate the device's features. For example, as soon as it senses a drop in the level of oxygen in a person's body, it turns on the artificial oxygen supply. Ventilators are an example of:

A. Machine with emotional intelligence
B. Artificial general intelligence
C. Automated machine
D. Computer vision technology

7 What would the following code do?

```
Newlist = [1,2,3,5]
Newlist.remove(2)
print(Newlist)
```

A. [1,2,5]
B. [1,3,5]
C. [1,5]
D. [3,5]

8 A person started walking towards West and covered a distance of 15 m, he turned right and walked 10 m. Again he turned right and walked 5 m and in the end, he turned left and walked 15 m. In which direction this person is now?

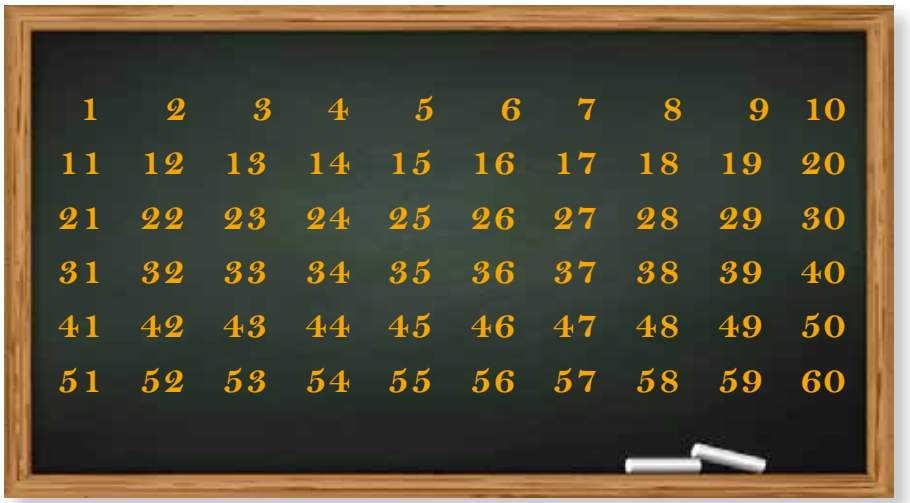
A. North
B. South
C. East
D. West

Mathematics

9 Sahil writes integers 1 to 60 on a blackboard. He then does following operation and repeats it 59 times.

In each repetition, any two numbers say m and n, currently on the blackboard are erased by him and a new number $m + n - 2$ is written.

What will be the number he get at last?



A. 1771
B. 1712
C. 1713
D. 1770

10 A city has a park shaped as a right angled triangle. The length of the longest side of this triangular park is 52m. The Mayor of the city wants to construct three paths from the corner point opposite to the longest side such that these three paths divide the longest side in to four equal segments. Determine the numerical value of the sum of the squares of the lengths of these three paths. [Assuming that these three paths have no width.]

A. 2400
B. 2556
C. 2476
D. 2366

11 The lower window of a house is at a height of 3 m above the ground and its upper window is 2 m vertically above the lower window. At certain instant the angles of elevation of a balloon from these windows are observed to be 60°and 30° respectively. Find the height of the balloon from above the ground.

A. 6 m
B. 8 m
C. 9 m
D. 10 m

12 In a X-Y-plane, there are four points P,Q, R and S lie on a straight line such that PQ = QR = RS = 4 metres. A sugar particle is placed at point S. An ant at P wants to reach at the sugar particle at S, but there are insect repellents kept at points Q and R. The ant would not go within 4 metres of any insect repellent. Find the minimum possible distance (in metres) the ant must traverse to reach the sugar particle.

A. $4 + \pi$
B. $4(\pi + 1)$
C. $8 + \pi$
D. $8(\pi + 1)$

ANSWERS

1.	(A)	2.	(C)	3.	(C)	4.	(C)	5.	(B)	6.	(C)
7.	(B)	8.	(A)	9.	(B)	10.	(D)	11.	(A)	12.	(B)

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