

SMART SOCIETY INTERNATIONAL SCIENCE OLYMPIAD (SSISO)



Organized by

Department of Basic Science and Humanities
INSTITUTE OF ENGINEERING & MANAGEMENT,
IEM-UEM GROUP and SMART SOCIETY, USA



TOTAL QUESTIONS: 50

DURATION: 1 HOUR

INSTRUCTIONS TO THE CANDIDATES:

1. The question booklet is divided into 3 sections.
 - Section A - Logical Reasoning (15 Questions)
 - Section B - Science (10 Questions)
 - Section C- Achiever's Level Science (25 Questions)
2. In section A, each question carries 1 mark. In Section B, each question carries 1 mark. In section C, each question carries 3 marks.
3. All questions are compulsory. There is no negative marking. Use of calculator is not permitted.
4. There is only one correct answer.
5. To mark your choice of correct answers, darken the circles on the OMR sheet. For this purpose, use HB Pencil or Black ball point pen.
6. Rough work should be done in the blank space provided at the end of the booklet.
7. Return the OMR sheet to the invigilator at the end of examination.
8. Please fill in your personal details in the space provided below.

NAME:

SCHOOL NAME:

CONTACT DETAILS OF GUARDIAN:

SECTION A

LOGICAL REASONING

1. In the following question, there is a certain relationship between the two given numbers on one side of (:) and one number is given on another side of (:) where another number is to be found from the given alternatives, having the same relationship with this number as the numbers of the given pair bear. Choose the best alternatives.

25 : 625 :: 35 : ?

- a) 1575 b) 1225
c) 845 d) 635

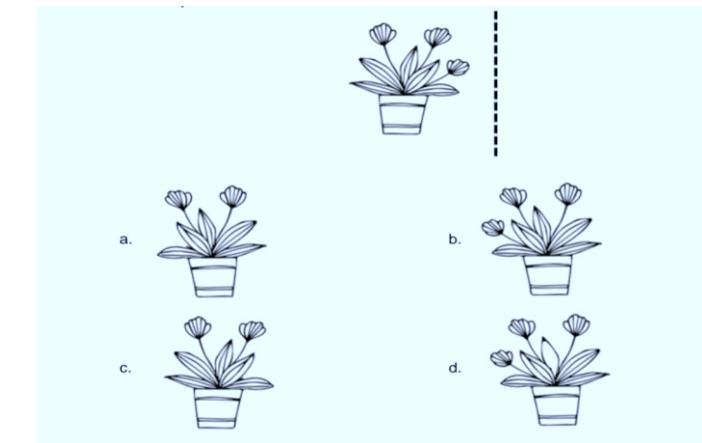
2. If 'GERMANY' is written as '7, 5, 18, 13, 1, 14, 25', how can 'FRANCE' be written in that code?
a) 6, 18, 1, 14, 3, 5
b) 6, 3, 18, 14, 1, 5
c) 8, 2, 14, 5, 13, 6
d) 8, 16, 14, 3, 1, 5

3. In the following question, one number is wrong in the series. Find out the number
3, 12, 36, 144, 431, 1728, 5184
a) 5184 b) 36
c) 144 d) 431

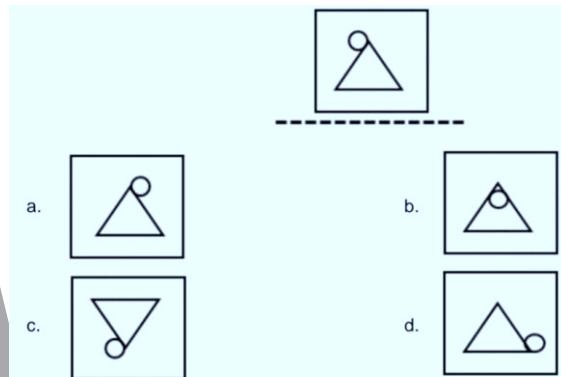
4. What comes in place of the question mark (?) in the following letter series?

PMK, MPK, MKP, KMP, ?
a) PMK b) KMP
c) MPK d) KPM

5. In the following question, choose the correct mirror image from the alternatives, when the mirror is placed on the dotted line shown



6. Choose the correct mirror image from the answer figures in the following question



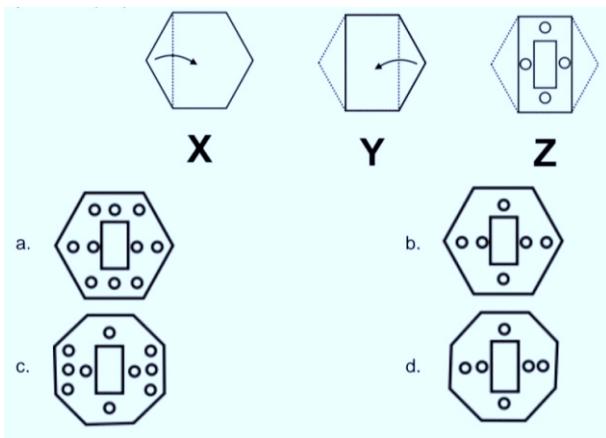
Study the following information carefully to answer the question.

- i. 'A \$ B' means 'A is the mother of B'.
ii. 'A # B' means 'A is the father of B'.
iii. 'A @ B' means 'A is the husband of B'.
iv. 'A % B' means 'A is the daughter of B'.

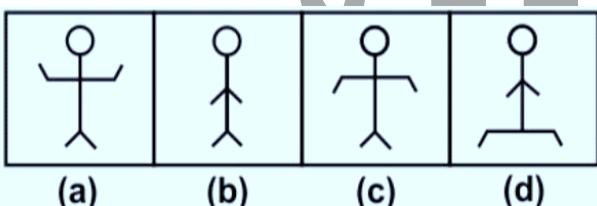
If F @ D % K # H, then how is F related to H?

- a) Brother-in-law
b) Sister
c) Brother
d) Can't be determined

8. In the following question a piece of paper is folded in the manner shown in the question figure(s). Select the figure out of the answer choices showing the unfolded pattern after the punches (cut).



9. In the following question, four figures are given. Three are similar in a certain way and so form a group. Find out which one of the figures does not belong to that group.



- a) a b) b
c) c d) d

10. In the following question, there is a certain relationship between two given words on one side of (::) Find the word on the other side so that the second pair has the similar relationship with The first pair.

HCM : FAK :: SOD : ?

- a) QMB b) QIB
c) ESQ d) GES

11. If 'K' denotes 'x', 'B' denotes '÷', 'T' denotes '-' and 'M' denotes '+', then $40 \text{ B } 8 \text{ T } 6 \text{ M } 3 \text{ K } 4 = ?$

- a) 19 b) 11
c) -31 d) 23

12. In this question, relationship between different elements is shown in the statements. The statements are followed by two conclusions.

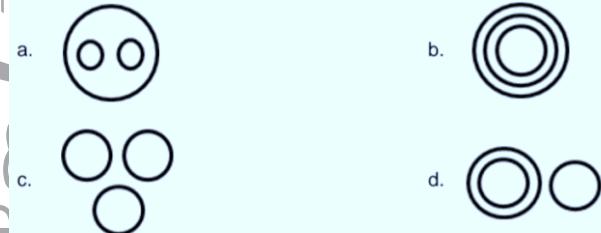
Statements: $A > B$, $B = H$, $H > G$

Conclusions: I. $A > G$, II. $A > H$

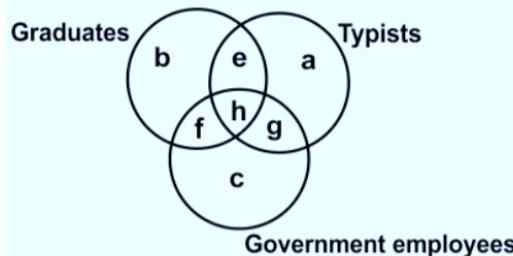
- a) Only conclusion I follow
b) Only conclusion II follow
c) Both conclusion I and conclusion II follow
d) Neither conclusion follow

13. The question given below contains three groups of items. You are required to choose one of four option diagrams that depict the correct relationship among the three groups of items in the given question.

India, Pakistan, Asia



14. The figure given below is made of three circles intersecting one another. These circles represent graduates, typists and government employees. The intersecting regions have been denoted by a, b, c, e, f, g and h, respectively. Study the diagram carefully and answer the question that follows. Which of the following letters represents the typists are only graduates?



- a) e
- b) h
- c) g
- d) a
- c) between focus and center of curvature
- d) beyond the center of curvature

15. Determine the term that would come in place of the question mark.



- a) 10
- b) 13
- c) 12
- d) 14

SECTION B

SCIENCE

16. How much more heat is produced if the current is doubled?

- a) Twice the original amount
- b) Thrice the original amount
- c) Four times the original amount
- d) Five times the original amount

17. The resistance of a 10-meter long wire is 5 ohms. What will be the resistance of a 20-meter long wire of the same material and thickness?

- a) 2.5 ohms
- b) 5 ohms
- c) 10 ohms
- d) 20 ohms

18. A body of mass 1kg is attracted by the earth with a force which is equal to

- a) 9.8 N
- b) 6.67×10^{11} N
- c) 1 N
- d) 9.8 m/s

19. In order to obtain a magnification of, - 0.6 (minus 0.6) with a concave mirror, the object must be placed:

- a) at the focus
- b) between pole and focus

20. Which of these characteristics can help us recognise a good source of fuel?

- a) physical state
- b) availability in all regions
- c) cost-effective for all countries
- d) produces a large amount of energy

21. A student studying the chemical properties of metals finds incomplete chemical reactions in his book, as shown below:



Which option completes the reaction?

- a) $MgO + HNO_3 \rightarrow Mg_3N_2 + 4H_2O$
- b) $MgO + HNO_3 \rightarrow Mg + NO_2 + O_2$
- c) $MgO + HNO_3 \rightarrow Mg(OH)_2 + 2NO_2$
- d) $MgO + HNO_3 \rightarrow Mg(NO_3)_2 + H_2O$

22. Aqua regia is a freshly prepared mixture of concentrated HNO_3 and concentrated HCl in the ratio of:

- a) 1:3, respectively
- b) 2:3, respectively
- c) 3:1, respectively
- d) 3:2, respectively

23. What are the products obtained by anaerobic respiration in plants?

- a) Lactic acid + Energy
- b) Carbon dioxide + Water + Energy
- c) Ethanol + Carbon dioxide + Energy
- d) Pyruvate

24. Which of the following is the correct sequence of events of sexual reproduction in a flower?

- a) pollination, fertilization, seedling, embryo
- b) seedling, embryo, fertilization, pollination

- c) pollination, fertilization, embryo, seedling
d) embryo, seedling, pollination, fertilization
25. A pregnant woman has an equal chance of her baby being blood group A or blood group AB. Which one of the following shows the possible genotypes of the woman and the father of her child?
- a) IA IA and IB IO
b) IA IB and IB IO
c) IA IO and IB IO
d) IO IB and IA IO

SECTION C

ACHIEVER'S LEVEL

26. A ray of light that strikes a plane mirror PQ at an angle of incidence of 30° , is reflected from the plane mirror and then strikes a second plane mirror QR placed at right angles to the first mirror. The angle of reflection at the second mirror is:

- a) 30° b) 45°
c) 60° d) 90°

27. An object is placed 20 cm in front of a plane mirror. The mirror is moved 2 cm towards the object. The distance between the positions of the original and final images seen in the mirror is:

- a) 2 cm b) 4 cm
c) 10 cm d) 22 cm

28. The mains power supply of a house is through a 20 A fuse. When a 1500 W heater is used in this house, how many 100 W bulbs can be used simultaneously? (The supply is at 220 V and the appliances are rated for 220V)

- a) 35 b) 29
c) 30 d) 19

29. Which of the given options correctly describes the magnetic field near a long current carrying straight wire?

- a) The field consists of straight lines perpendicular to the wire
b) The field consists of straight lines parallel to the wire
c) The field consists of radial lines originating from the wire
d) The field consists of concentric circles centred on the wire

30. The shape of the earth's magnetic field resembles that of an imaginary:

- a) U-shaped magnet
b) straight conductor carrying current
c) current-carrying circular coil
d) bar magnet

31. The phenomena of light responsible for the working of the human eye is

- a) reflection
b) refraction
c) power of accommodation
d) persistence of vision

32. Rahul conducts an experiment using an object of height of 10 cm and a concave lens with a focal length of 20 cm. The object is placed at a distance of 25 cm from the lens. Can the image be formed on a screen?

- a) Yes, as the image formed will be real
b) Yes, as the image formed will be erect
c) No, as the image formed will be virtual
d) No, as the image formed will be inverted

33. To get equivalent resistance of $11/5$ ohm, resistors of 10 ohm, 2 ohm and 3 ohm are combined in what way?

- a) 1 ohm and 2 ohm in parallel and then 3 ohm in series
 b) 1 ohm and 3 ohm in parallel and then 2 ohm in series
 c) 2 ohm and 3 ohm in parallel and then 1 ohm in series
 d) All are in parallel

34. The atom of an element has electronic configuration 2, 8, 7. Which of the following elements would it be chemically similar?

- a) N(7) b) P(15)
 c) Na(11) d) F(9)

35. Consider the following elements

^{20}Ca , ^{16}O ^{18}Ar , ^{16}S , ^4Be , ^2He

Which of the above elements would you expect to be in group 16 of the Periodic Table?

- a) ^{20}Ca and ^{16}S
 b) ^{20}Ca and ^8O
 c) ^{18}Ar and ^{16}S
 d) ^8O and ^{16}S

36. Electrolysis of water is a decomposition reaction. The mole ratio of hydrogen and oxygen gases liberated during electrolysis of water is:

- a) 1 : 1 b) 2 : 1
 c) 4 : 1 d) 1 : 2

37. Which one of the following statements is not correct about the trends in the properties of the elements of a period on going from left to right?

- a) The oxides become more acidic
 b) The elements become less metallic
 c) There is an increase in the number of valence electrons
 d) The atoms lose their electrons more easily

38.

The IUPAC name of $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_2 - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$ is

- a) 2-ethyl-2-methyl propane
 b) 2, 2-dimethyl butane
 c) 1,1,1-trimethyl propane
 d) 2, 2-methyl butane

39. Which of the following is the correct arrangement of the given metals in ascending order of their reactivity?

Zinc, Iron, Magnesium, Sodium

- a) Zinc > Iron > Magnesium > Sodium
 b) Sodium > Magnesium > Iron > Zinc
 c) Sodium > Zinc > Magnesium > Iron
 d) Sodium > Magnesium > Zinc > Iron

40. Which one of the following salts does not contain water of crystallisation?

- a) Blue vitriol b) Baking soda
 c) Washing soda d) Gypsum

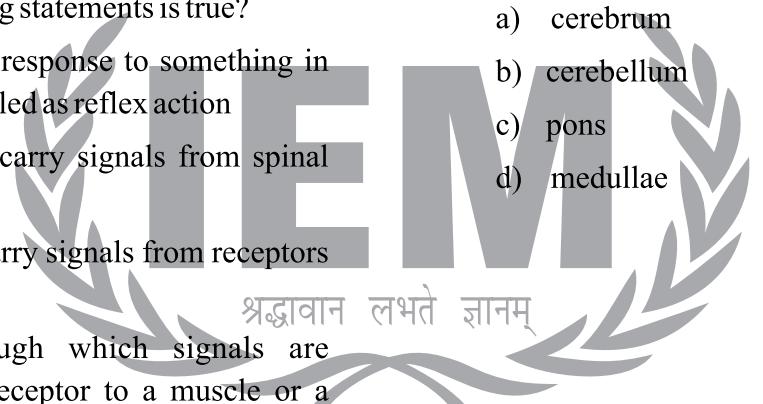
41. In terms of acidic strength, which one of the following is in the correct increasing order?

- a) Water < Acetic acid < Hydrochloric acid
 b) Water < Hydrochloric acid < Acetic acid
 c) Acetic acid < Water < Hydrochloric acid
 d) Hydrochloric acid < Water < Acetic acid

42. When SO_2 gas is passed through saturated solution of H_2S , which of the following reaction occurs?

- a) $\text{SO}_2 + 2\text{H}_2\text{S} \rightarrow 2\text{H}_2\text{O} + \text{S}$
 b) $\text{SO}_2 + 2\text{H}_2\text{S} \rightarrow 2\text{H}_2\text{O} + 3\text{S}$
 c) $\text{SO}_2 + \text{H}_2\text{S} \rightarrow \text{H}_2\text{O} + \text{S}$
 d) $\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{SO}_3 + \text{H}_2$

43. A round green seeded pea plant (RRyy) is crossed with wrinkled yellow seeded pea plant (rrYY), the seeds produced in F₁ generation are:
- round yellow
 - round green
 - wrinkled green
 - wrinkled yellow
44. A cross between a tall pea-plant (TT) and a short pea-plant (tt) resulted in progenies that were all tall plants because
- tallness is the recessive trait.
 - shortness is the dominant trait.
 - height of pea-plant is not governed by gene T or t.
 - tallness is the dominant trait.
45. Which of the following statements is true?
- sudden action in response to something in the environment is called as reflex action
 - sensory neurons carry signals from spinal cord to muscles
 - motor neurons carry signals from receptors to brain
 - the path through which signals are transmitted from a receptor to a muscle or a gland is called as reflex arc.
46. Plants like banana, rose, jasmine, orange have lost the capacity to produce
- seeds
 - buds
 - flower
 - roots
47. The period during adolescence when the reproductive tissues begin to mature is called
- reproduction
 - puberty
 - germination
 - propagation
48. Which of the following method of contraception protects from acquiring sexually transmitted diseases?
- Surgery
 - Condoms
 - Copper-T
 - Oral-pills
49. Which of these events will not take place if the semilunar valves did not function?
- ventricular contraction
 - atrial contraction
 - blood flow
 - production of heart sound
50. Coughing and sneezing centre of brain is present in:
- cerebrum
 - cerebellum
 - pons
 - medullae



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