

MENTAL ABILITY

1. The given number of paid subscriptions for four magazine types are shown in this table.

Total Paid Subscriptions

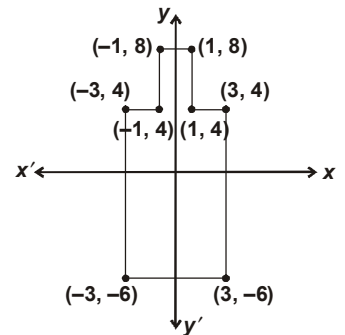
Magazine Type	Circulation
Business	9.5×10^5
Family	5.0×10^6
Style	9.0×10^5
Teen	2.4×10^6

Which of the following lists these magazine types by circulation from greatest to least ?

- (A) Business, Style, Family, Teen
 (B) Family, Teen, Business, Style
 (C) Style, Business, Teen, Family
 (D) Teen, Family, Style, Business
-
2. Five persons are sitting in a row. One of the two persons at the extreme ends is intelligent and other one is fair. A fat person is sitting to the right of the weak person. A tall person is to the left of the fair person and the weak person is sitting between the intelligent and the fat person. Tall person is at which place counting from right ?
- (A) First (B) Second (C) Third (D) Fourth

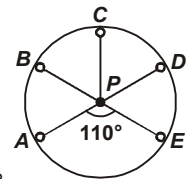
3. A formula for computing the value r is $r = \frac{mx + my}{wz}$, where m, x, y, w and z are positive integers. An increase in which variable would result in a corresponding decrease in r ?
- (A) m (B) x (C) y (D) z

4. The design for a machine part is shown here. Which of the following is a correct statement about the symmetry of the design?



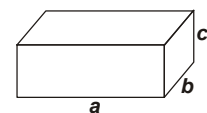
- (A) The design is symmetrical only about the y -axis
 (B) The design is symmetrical only about the x -axis
 (C) The design is symmetrical about both the y and the x -axes
 (D) There is no symmetry in the design

5. Abhay works at his father's electronics shop after school. He needs to drill a hole at each of the points A, B, C, D and E on the circle centred at P , as shown. If Abhay drills the holes so that $\angle APE$ measures 110° and the other 4 central angles are congruent to each other, what will be the measure of $\angle CPD$?



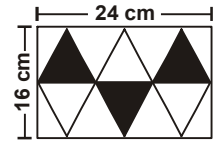
- (A) 62° (B) 62.5° (C) 63° (D) 64°
-
6. A sum of money (P) doubles in 10 years. In how many years it will be treble at the same rate of simple interest ?
- (A) 20 years (B) 12 years (C) 15 years (D) 25 years
-
7. The ratio of speeds of P and Q is $4 : 7$ and P loses the race by 270 m, then what is the length of the race course ?
- (A) 530 m (B) 420 m (C) 500 m (D) 630 m

8. A rectangular solid is shown here. Which of the following expressions represents the sum of the lengths of the 12 edges on this rectangular solid ?



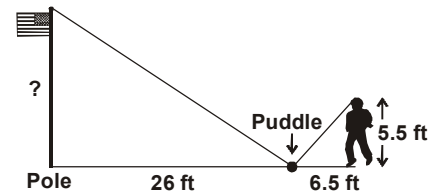
- (A) $2(a + b + c)$ (B) $3(a + b + c)$ (C) $4(a + b + c)$ (D) $12(a + b + c)$

9. An artist is designing a pattern of triangular tiles to cover a wall. Each section of the pattern is identical to the section shown here. If the wall is 576 cm long and 384 cm high, how many black tiles will the artist need to use on the wall ?



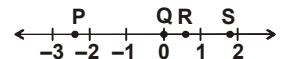
- (A) 72 (B) 576 (C) 1,152 (D) 1,728

10. As shown in the drawing, Kabir used similar triangles (sides of triangles are proportional) to find the height of a pole. When he stood 6.5 feet away from a small puddle, he could see the reflection of the top of the pole in the puddle. The puddle was 26 feet away from the pole, and Kabir's height was 5.5 feet above the ground. What is the height of the pole in feet ?



- (A) 20 (B) 22 (C) 24 (D) 25

11. Which point on the number line represents a number that, when cubed, will result in a number greater than itself ?



- (A) P (B) Q (C) R (D) S

12. Players of a game at the school carnival will be allowed to draw a token for a prize. The prizes include 8 yo-yos, 9 key chains, 12 stuffed toys, 11 movie passes, 16 video rentals and 14 flying disks. For each prize, there is one token available to be drawn. What is the probability that the first winner to draw a token will win a stuffed toy ?

- (A) $\frac{6}{29}$ (B) $\frac{6}{35}$ (C) $\frac{1}{6}$ (D) $\frac{1}{12}$

13. Two dice are tossed. The probability that the total score is a prime number is

- (A) $\frac{1}{6}$ (B) $\frac{5}{12}$ (C) $\frac{1}{2}$ (D) $\frac{7}{9}$

14. A circle that has a radius of 5 cm has an area of 25π sq. cm. If the radius is doubled, what is the area of the new circle?

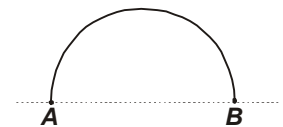
- (A) 10π sq. cm (B) 50π sq. cm (C) 100π sq. cm (D) 200π sq. cm

15. If $x + y + z = 0$, then the value of $\frac{x^2y^2 + y^2z^2 + z^2x^2}{x^4 + y^4 + z^4}$ is

- (A) 0 (B) 2 (C) 1 (D) $\frac{1}{2}$

SCIENCE

16. A boy, standing at point A, throws a stone, which travels its path upto B as shown below.



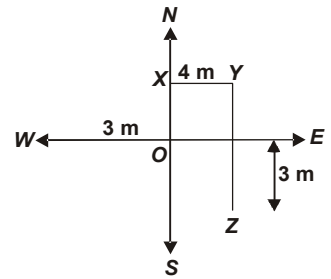
At the top of its path, the stone has ____.

- (A) No acceleration
 (B) Acceleration in upward direction
 (C) Acceleration in downward direction
 (D) Acceleration in horizontal direction

17. A girl swims in a swimming pool of length 100 m. She swims from one end to another end and reaches the starting point again in 2 minutes. The average velocity of the swimmer is ____.

- (A) 100 m s^{-1} (B) 0.83 m s^{-1} (C) 1.67 m s^{-1} (D) Zero

18. Figure here shows the path OXYZ followed by a man, starting from O. The displacement of the man is _____.



- (A) 6 m
- (B) 4 m
- (C) 5 m
- (D) 3 m

19. The speed of a body is 1 m s^{-1} . The angle between the distance-time graph of the body and the time axis is _____.

- (A) 0°
- (B) 30°
- (C) 45°
- (D) 60°

20. Mass of a body is doubled. Its acceleration under a given force is _____.

- (A) Doubled
- (B) Halved
- (C) Quadrupled
- (D) Remains same

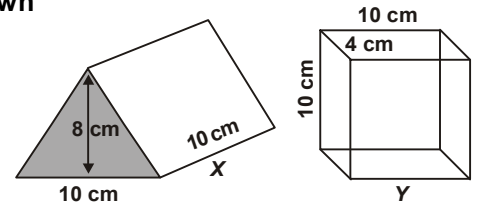
21. The value of G depends upon _____.

- (A) Place
- (B) Time
- (C) Masses of the bodies
- (D) None of these

22. Two wooden blocks X and Y, of shapes and dimensions shown below are made to immerse in water.

The buoyant force exerted by water is _____.

- (A) More for block X
- (B) More for block Y
- (C) Equal for both the blocks
- (D) Data insufficient



23. Read the given statements carefully, and mark the correct option.

Statement I : The energy used in one hour at the rate of 1 kW is called 1 kWh.

Statement II : Rate of energy consumption gives power.

- (A) Both statements I and II are true and statement II is correct explanation of statement I.
- (B) Both statements I and II are true but statement II is not correct explanation of statement I.
- (C) Statement I is true but statement II is false.
- (D) Statement I is false but statement II is true.

24. Match column I and column II and select the correct option from the codes given below.

Column I		Column II
(a) 1 kW		(i) $3.6 \times 10^6 \text{ J}$
(b) 1 kWh		(ii) 1 Nm
(c) 1 J		(iii) 1000 Js^{-1}
(a)	(b)	(c)
(A) (i)	(iii)	(ii)
(B) (iii)	(i)	(ii)
(C) (ii)	(iii)	(i)
(D) (i)	(ii)	(iii)

25. A train starts from a station and accelerates during first 10 minutes. A boy sitting in the train throws up a ball during this interval. The ball will _____.

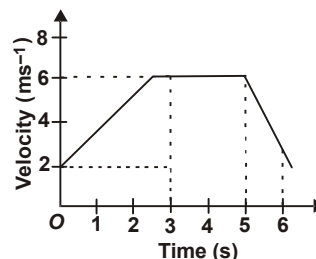
- (A) Come back to the boy's hands
- (B) Fall in front of the boy
- (C) Fall behind the boy
- (D) Any of these

26. State of motion is described by _____.

- (A) Position of rest
- (B) Position of motion
- (C) Both by the state of rest and motion
- (D) None of these

27. The velocity time graph of a car moving on a straight road is shown here. The displacement of the car from third second to sixth second of its journey is _____.

- (A) 12 m (B) 4 m
(C) 16 m (D) 8 m



28. Read the given statements carefully, and mark the correct option.

Statement I : It can be dangerous to wear synthetic clothes while working in the kitchen.
Statement II : Synthetic fibres melt very soon on heating and can stick to the body of the person wearing it.

- (A) Both statements I and II are true and statement II is the correct explanation of statement I.
(B) Both statements I and II are true but statement II is not a correct explanation of statement I.
(C) Statement I is true and statement II is false. (D) Statement I is false and statement II is true.

29. I am easy to wash, absorb very little water and have a very lustrous appearance. I am used to make bristles of toothbrushes, combs, etc. Since I am so versatile, you must know me. Who am I ?

- (A) Rayon (B) Dacron (C) Terylene (D) Nylon

30. List I has metals/non-metals and List-II has their properties. Match the lists.

- | List- I | List- II |
|---------------|--|
| (1) Wood | (p) Alloys are used for making aircraft parts |
| (2) Graphite | (q) Stored in kerosene |
| (3) Potassium | (r) Forms acidic oxide on reaction with oxygen. |
| (4) Sulphur | (s) Has high melting & boiling points in spite of being a non-metal. |
| (5) Zinc | (t) Reacts with NaOH to liberate hydrogen gas |
| (6) Aluminium | (u) Does not produce a sound on being struck. |
- (A) (1) – (u); (2) – (s, u); (3) – (q); (4) – (r,u); (5) – (t); (6) – (p,t)
(B) (1) – (p); (2) – (q); (3) – (r); (4) – (p,s); (5) – (r,q); (6) – (p,q)
(C) (1) – (r); (2) – (q, p); (3) – (r,s); (4) – (q, u); (5) – (s,t); (6) – (r, u)
(D) (1) – (s,p); (2) – (q, r); (3) – (s,u); (4) – (q, u); (5) – (s,t); (6) – (q)

31. It is used for inflating air balloons and is found in its elemental form in air. It is ____.

- (A) Helium (B) Nitrogen (C) Oxygen (D) Carbon

32. The useful products of destructive distillation of coal are ____.

- (A) Coke, coal tar, coal gas and ammonia compounds (B) Coke, charcoal, coal tar and coal gas
(C) Coal tar, coal gas and LPG (D) Petrol, coke, coal tar and coal gas.

33. Sleeping in a closed room with burning aneethi can prove to be fatal, because ____.

- (A) Coal is a poisonous substance
(B) Poisonous gas, carbon monoxide, is produced due to the incomplete combustion of coal
(C) Burning of coal in a closed room evolves carbon dioxide and water vapour, which are harmful
(D) None of the above

34. A student was given three powdered materials in packets labelled I, II and III. To identify them he performed the following experiment.

Beaker I + Packet I + Boiling water = Translucent solution
Beaker II + Packet II + Boiling water = Transparent solution
Beaker III + Packet III + Boiling water = Suspension

- | Packet I | Packet II | Packet III |
|---------------------|-----------------|-----------------|
| (A) Starch powder | Mud | Sodium chloride |
| (B) Starch powder | Sodium chloride | Mud |
| (C) Mud | Starch powder | Sodium chloride |
| (D) Sodium chloride | Mud | Starch powder |

35. Read the given statements carefully, and mark the correct option.

Statement I : When 10 g of CaCO_3 is decomposed, 5.6 g of residue is left and 4.4 g of CO_2 escapes.

Statement II: Law of constant proportions is being followed.

- (A) Statements I and II are true and statement II is the correct explanation of statement I.
- (B) Statements I and II are true but statement II is not the correct explanation of statement I.
- (C) Statement I is true but statement II is false.
- (D) Statement I is false but statement II is true.

36. The boiling points of some gases found in air are given in the table. If the liquid mixture is fractionally distilled, the order in which the gases distill out is ____.

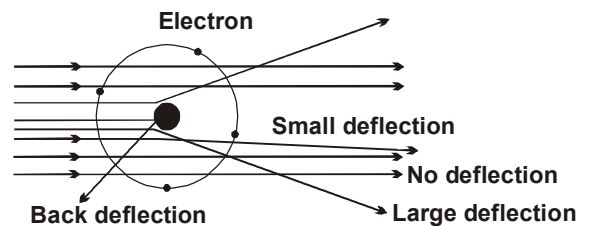
Name	Boiling point °C
Krypton	-152
Neon	-246
Nitrogen	-196
Oxygen	-183

- (A) Krypton, neon, nitrogen, oxygen
- (B) Neon, nitrogen, oxygen, krypton
- (C) Nitrogen, neon, oxygen, krypton
- (D) Oxygen, neon, nitrogen, krypton

37. The given diagram shows Rutherford's experiment which established the nuclear model of the atom.

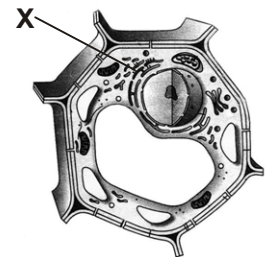
In this experiment Rutherford used a beam of ____.

- (A) β -particles, which impinged on a metal foil and got absorbed
- (B) γ -rays, which impinged on a metal foil and ejected electrons
- (C) Helium atoms, which impinged on a metal foil and got scattered
- (D) Helium nuclei, which impinged on a metal foil and got scattered



38. Which of the following functions is performed by the part marked 'X' in the given figure of plant cell?

- (A) Manufacture of lipids and fats
- (B) Detoxify many poisons and drugs
- (C) Manufacture of proteins
- (D) Both (B) & (C)



39. Match column I with column II and select the correct option from the codes given below:

- | Column I | Column II |
|---------------------|--------------------------|
| (a) Leeuwenhoek | (i) Bacteria |
| (b) Robert Brown | (ii) Cell |
| (c) Robert Hooke | (iii) Nucleus |
| (d) Purkinje | (iv) Electron microscope |
| (e) Knoll and Ruska | (v) Protoplasm |

- (A) (a) - (i), (b) - (iii), (c) - (ii), (d) - (iv), (e) - (v)
- (B) (a) - (i), (b) - (iii), (c) - (ii), (d) - (v), (e) - (iv)
- (C) (a) - (iv), (b) - (ii), (c) - (i), (d) - (v), (e) - (iii)
- (D) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv), (e) - (v)

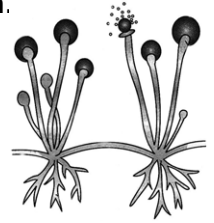
40. The microorganism in the given figure is ____.

- (A) Phase in the life cycle of bacteria
- (B) Bacteria that eats other bacteria
- (C) Virus that uses bacteria as a host
- (D) None of the above



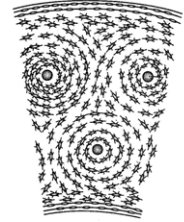
41. Identify the microorganism in the given figure and the method of its reproduction.

- | Microorganism | Method of reproduction |
|---------------|------------------------|
| (A) Viruses | Binary fission |
| (B) Fungi | Budding |
| (C) Algae | Conjugation |
| (D) Fungi | Spore formation |



42. Which of the following statements are true for the given figure?

- (i) It is a strong, non-flexible connective tissue.
- (ii) Its matrix consists of proteins.
- (iii) Its cells are composed of calcium and phosphorus.
- (iv) It consists of living cells called chondrocytes which are present in fluid filled spaces known as lacunae.



- (A) (i) & (iv) (B) (ii) & (iii) (C) (i), (ii) & (iii) (D) All of these

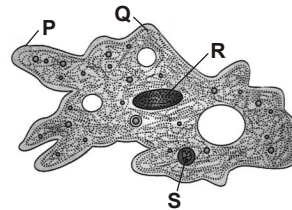
43. Given below are the differences between collenchyma and sclerenchyma tissues. Which of the following is incorrect ?

- | Collenchyma | Sclerenchyma |
|--|--------------------------------------|
| (A) It consists of living cells | It consists of dead cells. |
| (B) The thickening of cell wall is uniform | Cell wall thickening is not uniform. |
| (C) Lumen of the cell is wide. | Lumen of the cell is narrow. |
| (D) Its cell walls are cellulose | Its cell walls are lignified. |

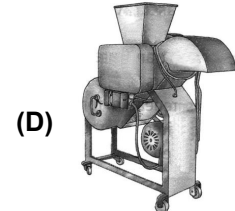
44. Identify the parts labelled P, Q, R and S in the given figure from the list (i - viii) and select the correct option.

- | | | |
|---------------------|-------------------------|-----------------------------|
| (i) Ectoplasm | (ii) Endoplasm | (iii) Advanced pseudopodium |
| (iv) Nucleus | (v) Contractile vacuole | (vi) Food vacuole |
| (vii) Water vacuole | (viii) Crystals | |

- | | P | Q | R | S |
|-----|-------|------|------|--------|
| (A) | (iii) | (i) | (iv) | (vi) |
| (B) | (ii) | (i) | (v) | (viii) |
| (C) | (i) | (ii) | (v) | (vii) |
| (D) | (iii) | (ii) | (iv) | (v) |



45. Identify the machine from the following which is used for combined harvesting and threshing.



46. The organization which protects the trade in endangered species at international level is

- (A) IBWL (B) CITES (C) WHO (D) WWF

47. Which of the following statements are true for renewable exhaustible natural resources?

- (i) These can replenish themselves by quick recycling.
- (ii) These are likely to be exhausted by the human activities or their use.
- (iii) These occur in unlimited quantity.
- (iv) Minerals and fossil fuels are examples of such natural resources.

- (A) (i) & (ii) (B) (ii) & (iii) (C) (iii) & (iv) (D) (i) & (iv)

48. It is a type of cropping pattern which makes better use of the natural resources of sunlight, land and water and ensures maximum utilization of the nutrients supplied, as crops growing in definite row pattern have different nutrient requirements. Identify it.

- (A) Mixed cropping (B) Intercropping (C) Crop rotation (D) Norflok rotation
-

49. Agents or substances that pollute the water are called water pollutants. These may be physical, chemical or biological pollutants. Identify physical pollutants out of the following list and select the correct option.

- (i) Protozoa (ii) Radioactive wastes (iii) Bacteria (iv) Heat
(v) Cadmium (vi) Oil spills
(A) (i) & (iii) (B) (ii) & (v) (C) (iv) & (vi) (D) (ii) & (iv)
-

50. Read the following statements and select the correct option.

Statement I : The atmosphere acts as a protective blanket for the Earth.

Statement II : It absorbs most of the harmful radiations coming from the Sun.

- (A) Both statements I and II are true and statement II is the correct explanation of statement I.
(B) Both statements I and II are true but statement II is not the correct explanation of statement I.
(C) Statement I is true but statement II is false. (D) Statement I is false but statement II is true.
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SPACE FOR ROUGH WORK

