UNIFIED COUNCIL
Foundation for Success

UNIFIED COUNCIL OLYMPIADS

nstse
Test • Assess • Achieve

NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION

CLASS - 6

Question Paper Code : UN478

KEY

1. A	2. C	3. A	4. B	5. A	6. C	7. D	8. A	9. B	10. B
11. A	12. B	13. C	14. B	15. D	16. C	17. C	18. C	19. A	20. C
21. B	22. D	23. B	24. C	25. A	26. D	27. A	28. A	29. A	30. B
31. B	32. B	33. D	34. D	35. B	36. C	37. C	38. D	39. A	40. B
41. D	42. C	43. B	44. D	45. B	46. D	47. B	48. B	49. D	50. D
51. C	52. D	53. D	54. B	55. B	56. A	57. A	58. D	59. C	60. A

SOLUTIONS

MATHEMATICS

01. (A) If a = b then a – b = b – a

02. (C) Given $\frac{2}{7}$ A = $\frac{1}{5}$ D

$\therefore$ $\frac{A}{D} = \frac{1}{5} \times \frac{7}{2} = \frac{7}{10}$

$\therefore$ A : D = 7 : 10 = $7x$: $10x$

Given $10x - 7x = \frac{1}{3} \times$ ₹ 180 = ₹ 60

$3x$ = ₹ 60

x = ₹ $\frac{60}{3}$ = ₹ 20

$\therefore$ Total amount = $7x + 10x +$ ₹ 180 = $17x +$ ₹ 180

= ₹ (17 × 20 + 180)

= ₹ 520

03. (A) Given lb = 375 cm^2

25 cm × b = 375 cm^2

b = $\frac{375 \text{ cm}^2}{25 \text{ cm}}$

= 15 cm

Perimeter = 2(l + b) = 2(25 cm + 15 cm)
= 80 cm

04. (B) Total ice-creams = 160

Number of ice-creams brought by

P & S = (3 + 5)10 = 80

Number of ice-creams brought by

Q & R = 160 – 80 = 80

Number of ice-creams brought Q = $\frac{80}{2}$ = 40

05. (A) Given 6, x, 18, 36 are in proportion

$\therefore 18x = 6 \times 36$

$x = \frac{6 \times \cancel{36}^{2}}{\cancel{18}_{1}}$

x = 12

06. (C) Option (C) has most lines of symmetry

07. (D) Complete angle

08. (A) Let the required number be 'x'

$-16 - x = 4$

$\Rightarrow -16 - 4 = x$

$\therefore x = -20$

09. (B) Given algebraic equation is $\frac{x}{3} - 7 = 2$

10. (B) Given PR : RS = 5 : 3 = $5x$: $3x$

But PR + RS = 40 cm

$\therefore 5x + 3x$ = 40 cm

$8x$ = 40 cm

$x = \frac{40}{8}$ cm = 5 cm

PR = $5x$ = 5 × 5 cm = 25

QR = PR – 2 cm = 23 cm

11. (A) Given 2(l × b) = 86 m

l + b = $\frac{86}{2}$ m = 43 m

$l + 15\frac{1}{3}$ m = 43 m

l = 43 m – $15\frac{1}{3}$ m

= 42 m + 1 m – 15 m – $\frac{1}{3}$ m

$l = 27\frac{2}{3}$ m

Area of the rectangle = l × b

$= 27\frac{2}{3} \times 15\frac{1}{3}$ m

$= \frac{83}{3} \times \frac{46}{3}$ m^2

$\Rightarrow \frac{3818}{9}$ m^2 = $424\frac{2}{9}$ m^2

12. (B) Radius = $\frac{\text{diameter}}{2} = \frac{8.12 \text{ cm}}{2}$

= 4.06 cm

13. (C) $\frac{0.567 \times 0.567 - 0.433 \times 0.433}{0.567 - 0.433}$

$= \frac{0.321489 - 0.187489}{0.134}$

$= \frac{0.134}{0.134} = 1$

14. (B) Centre of the circle always lie in the interior of major segment

15. (D) Amount spent = $\left(\frac{1}{9} + \frac{2}{5}\right)$ of ₹ 450

$= \left(\frac{5+18}{45}\right) \times$ ₹ 450

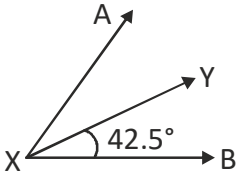
= ₹ 230

Remaining money

= ₹ 450 – ₹ 230 = ₹ 220

16. (C) Given $\angle$Y × B = $\angle$A × Y = 42.5°

$\therefore \angle$A × B = 42.5 + 42.5 = 85°



17. (C) Given k – 7 is the HCF of 56 & 88

$\therefore$ k – 7 = 8

k = 7 + 8 = 15

18. (C) HCF of 540 cm & 480 cm is 60 cm

Minimum number of square tiles required

$$= \frac{540\text{ cm} \times 480\text{ cm}}{60 \times 60\text{ cm}}$$

$= 9 \times 8 = 72$

19. (A) $$\frac{19}{43} \div \frac{1}{2+\frac{1}{3+\frac{1}{1+\frac{1}{4}}}} = \frac{19}{43} \div \frac{1}{2+\frac{1}{3+\frac{1}{\left(\frac{5}{4}\right)}}}$$

$$= \frac{19}{43} \div \frac{1}{2+\frac{1}{\left(3+\frac{4}{5}\right)}}$$

$$= \frac{19}{43} \div \frac{1}{2+\frac{1}{\left(\frac{19}{5}\right)}} = \frac{19}{43} \div \frac{1}{\left(2+\frac{5}{19}\right)}$$

$$= \frac{19}{43} \div \frac{1}{\left(\frac{43}{19}\right)} = \frac{19}{43} \div \frac{19}{43} = 1$$

20. (C)

$$\text{LHS} = \left(\frac{3-1}{3}\right)\left(\frac{4-1}{4}\right)\left(\frac{5-1}{5}\right).....\left(\frac{99-1}{99}\right)\left(\frac{100-1}{100}\right)$$

$$= \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times ..... \times \frac{98}{99} \times \frac{99}{100}$$

$$\Rightarrow \frac{2}{100} = \frac{1}{50}$$

21. (B) $759 = 500 + 100 + 100 + 50 + 9 = \text{DCCLIX}$

22. (D) From options 53 is 22 more than 31 and 53 is 22 less than 75

23. (B) 75 is a factor of 757575

$$= \frac{757575}{75} = 10101$$

24. (C) $1 - 2 - 3 + 4 = 5 - 5 = 0$

$5 - 6 - 7 + 8 = 13 - 13 = 0$

$9 - 10 - 11 + 12 = 21 - 21 = 0$

$2021 - 2022 - 2023 + 2024 = 4045 - 4045 = 0$

$\therefore$ Total sum $= 0 + 0 + 0 + ... + 0 = \text{zero}$

25. (A) Total money collected

$= 40 \times ₹\ 25.25 = ₹\ 1010$

Remaining money $= \frac{7}{10} \times ₹\ 1010$

$= ₹\ 707$

PHYSICS

26. (D) Statements (A), (B) and (C) are true. The dry cell is the only source of electrical energy. When the dry cell is removed, the bulbs will not light up because no electric current flows through them.

Bulb G shines as brightly as bulb H.

If Bulb G is blown bulb H will not light up because there is a gap in the circuit.

When the number of bulbs connected in the circuit increases, the brightness of each bulb decreases.

[The number of bulbs used in a circuit affects the amount of electric current flowing through each bulb.]

27. (A) The span is not suitable for measuring the length as they differ from student to student. Statements (B), (C) and (D) are not true.

28. (A) Shadows are formed when light is blocked by objects. As no shadow was formed by the two sheets P and Q, no light was blocked. Hence, we can conclude that both the sheets P and Q allowed all the light to pass through.

29. (A) Needles are made up of metals, Generally, metals are electrical conductors.

Magnets are made up of magnetic materials such as iron, steel, nickel or cobalt. These materials are metals. Metals can conduct electricity.

Ceramic tiles are made from baked clay. Clay is a non-conductor of electricity.

30. (B) $\frac{5\text{ cm}}{25\text{ divisions}} = 0.2\text{cm} = 2\text{mm}$

31. (B) The following conclusion can be made based on the figures drawn by the boy:

Material X is transparent as the cat is clearly visible. Material X allowed all the light to pass through it.

Material Y is opaque as the cat is not visible, Material Y did not allow the light to pass through it.

Material Z is translucent as a faint figure of the cat is visible. Material Z being translucent allows the light partially through it.

32. (B) Option (A): The dry cells are not connected properly, so the bulbs will not light up.

Option (B): The metal casing and metal tip of each bulb are connected to the circuit, so both the bulbs will light up.

Option (C): The bulb on top will not light up because its metal casing is not connected to the circuit.

Option (D): The bulb on the left side will not light up because its metal casing is not connected to the circuit..

33. (D) Student P measured the most accurate length because he used a 5 m long measuring tape which is longer than the table. So, he can measure the length of the table in one go accurately. While in the other cases the chance of making an error is higher due to multiple measurements. In case of Student M, only those lengths can be measured which are exact multiples of half a metre.

34. (D) The amount of light reflected by an object depends on all the given factors.

35. (B) Statements (A), (C) and (D) are true. The brightness of the bulb in each circuit is dependent on the amount of electric current flowing through it. A bulb is brighter if more electric current flows through it. A bulb in circuit R glows more brightly followed by Q and P.

CHEMISTRY

36. (C) Conditions given in options I, II and IV enable a mother to keep a bottle of milk hot to feed her baby during winter.

37. (C) Burning of magnesium ribbon in air forms a new substance magnesium oxide. It is an irreversible change. Rest of them are reversible changes.

38. (D) The correct sequence of different stages of water cycle are (ii), (iii), (vi), (i), (v) and (iv).

39. (A) The student is testing the hardness of both the materials. He used Material P to scratch Material Q and vice versa. From his experiment, he can conclude that Material Q is harder as it can scratch Material P but does not get any scratches when being scratched by Material P.

40. (B) Badam flakes are insoluble in milk. Sand is insoluble in water. Hence, both the mixtures can be separated by filtration process.

41. (D) The smaller iron rim expands on heating and fits into the wooden wheel. On cooling it contracts to fit into the wooden wheel tightly and does not come out.

42. (C) The bar of soap will not float on water. The Styrofoam cup is less dense (lighter) than water so, it floats on water. The porcelain mug will sink when it is placed in water. The pencil is made up of wood and wood floats on water because it is less dense than water.

43. (B) Soils becomes dry during droughts not floods.

44. (D) Statements (A) and (B) are correct. A solution which can dissolve more of solute is called Unsaturated solution.

45. (B) P can be any material as long as it is not plastic, wood or metal. The hand kerchief P is made up of cloth. Q the chain is made from metal. R the tooth pick, is made from wood. S the pail, is made from plastic.

BIOLOGY

46. (D) The plant may not be able to survive in ice-cold water.

Increasing the distance from the lamp would reduce the light intensity falling on the plant.

Reducing the electricity flowing through the lamp would decrease the light intensity falling on the plant.

Photosynthesis requires carbon dioxide.

47. (B) In the given figure I - pivot, II - ball and socket, III - saddle, IV - hinge.

48. (B) Raji is suffering from night blindness which results due to the deficiency of vitamin A. Carrot is a good source of vitamin A that maintains normal night vision. So, Raji is taking capsules that contains Carrot.

49. (D) Sita's hand bag is made of cotton. Cotton is obtained from cotton balls. Cotton smells like burning paper because both cotton and paper are extracted from plants constitute mainly cellulose.

50. (D) Edible part of ginger and potato is stem. Turnip and Radish are roots, lettuce and cabbage is leaf. Rice and almond are seed.

51. (C) Organic matter such as leftover food and bones can be decomposed by bacteria or fungi into Mineral nutrients that can be absorbed and used by plants for healthy growth.

52. (D) Gas X is oxygen. It supports combustion. It is given out by plants during photosynthesis. It is taken in by animals during respiration.

53. (D) Snakes have internal skeleton.

54. (B) (ii) and (iii) only

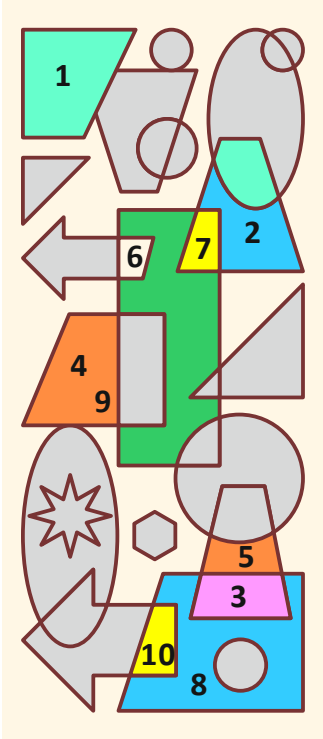
55. (B) The diagram shows the transfer of energy from the Sun to the plants, and from the plants to the animals directly or indirectly. Hence we can infer that plants are sources of food and energy for animals. [The Sun is our main source of heat and light energy.]

CRITICAL THINKING

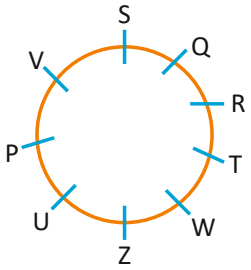
56. (A) To the extent that a bicycle is practical, it is convenient.

57. (A) LOGO in option (A) is sony tv logo

58. (D) 10



59. (C) Z



60. (A)