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NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION

CLASS - 6
Question Paper Code : UN494

KEY

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

SOLUTIONS

MATHEMATICS

01. (C) $90 = 9 \times 10$

02. (B) $(a+b) - (a-b) = 2$
$a + b - a + b = 2$
$2b = 2$
$b = 1$ then a & b are coprimes

03. (C) A regular pentagon has '5' lines of symmetry

04. (A) $\dfrac{2023 \times 2023 - 2024 \times 2024}{4047}$
$= \dfrac{40,92,529 - 40,96,576}{4047}$
$= \dfrac{4047}{4047} = -1$

05. (B) 10 millions = 10 × 1 million
= 10 × 10 lakhs = 100 lakhs = 1 crore

06. (D) PQ || RS

07. (B) III is perpendicular to AB.

08. (D) X = 5 ; Y = –20
X – Y = 5 – (–20) = 5 + 20 = 25

09. (A) Only 2 pupils in 6 Lotus scored 5As

10.	(B)	$3000 \times 30 = 90,000$

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11. (B) Radius $= \dfrac{\text{diameter}}{2} = \dfrac{8.12 \text{ cm}}{2}$

$= 4.06$ cm

12. (C) No. of waiters $= 25 + 10 + 25 + 10 = 70$

13. (D) $\dfrac{6+12+18+........+60}{120+108+96+.......+36+24+12}$

$= \dfrac{6\left(1+2+3+........+10\right)}{12\left(10+9+8+........+2+3+1\right)} = \dfrac{1}{2}$

14. (B)

15. (A) $5x + 8x = 91$

$13x = 91$

$x = 7$

$8 \times 7 = 56 \; ; \; 5 \times 7 = 35$

$56 - 35 = 21$

16. (D) $47 \times 53 = 2491$

17. (C) After 10 years from now, Mr. Vijay's age

$= 42 + 10$ years $= 52$ years

Son's age $= 14 + 10 = 24$ years

The required ratio $= 52 : 24 = 13 : 6$

18. (C) Given $3A = 4B = 5C = k$

$\therefore \quad 3A = k \Rightarrow A = \dfrac{k}{3}$

$4B = k \Rightarrow B = \dfrac{k}{4}$

$5c = k \Rightarrow C = \dfrac{k}{5}$

$\therefore A : B : C = \dfrac{k}{3} : \dfrac{k}{4} : \dfrac{k}{5}$

$= \dfrac{1}{3} \times 60 : \dfrac{1}{4} \times 60 : \dfrac{1}{5} \times 60$

$[\because$ LCM of 3, 4 & 5 $= 60]$

$= 20 : 15 : 12$

19. (A) $3 + \dfrac{1}{3} = \dfrac{10}{3}$

20. (A) $5(4 + 3) - 3(3 + 2) = 35 - 15 = 20$

21. (D) $\dfrac{0.5+0.6+0.7+0.8+0.9+1+1.1+1.2+1.3+1.4+1.5}{0.1+0.2+0.3+0.4+0.5+0.6+0.7+0.8+0.9+1}$

$= \dfrac{11}{5.5} \times \dfrac{10}{10} = 2$

22. (C) $2l = 2000 \text{ m}l$

Required ratio $= 250 : 2000$

$= 1 : 8$

23. (D) LCM of 3, 5, 8 & 12 $= 120$

Greatest 5 digit number 99999

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120 | 99999 | 833
    | 960
    | 399
    | 360
    | 399
    | 360
    | 39
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$\therefore$ Greatest 5 digit number which is exactly divisible by 3, 5, 8, 12 $= 99999 - 39 = 99960$

$\therefore$ Required number $= 99960 + 2 = 99962$

24. (B) 2, 3, 4 & 5 LCM is 60

$2 + 3 = 5$

$\therefore \; 2 + 3 + 4 + 5 = 14$

25. (A) LHS $= 10 - 11 + 12 - 13 + ... - 99 + 100 - 101 + 102$

$= (10 - 11) + (12 - 13) + ... + (98 - 99) + (100 - 101) + 102$

$= -1 - 1 - 1 .... - 1$ (46 minus 1) $+ 102$

$= -46 + 102 = 56$

PHYSICS

26. **(B)** The brightness of the lamps increases when there are more batteries or there are fewer lamps used in an electric circuit.

    Lamp R, which has 2 batteries and 1 bulb is the brightest, Lamp P will have $\frac{1}{2}$ the brightness of lamp R. Lamp Q will have $\frac{2}{3}$ the brightness of lamp P. Lamp S will have $\frac{1}{2}$ the brightness of lamp P.

27. **(D)** Thickness, breadth, depth, diameter and height are all the measurements of length.

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. **(B)** When electric current flows through the following appliances, electrical energy is converted to heat energy in a water heater, sound energy in a CD player, light energy in a bulb and mechanical energy in a fan.

30. **(B)** From the tabulated results of students 'X' and 'Y' with respect to the use of their finger spans to measure the length of their teacher's table, statement (B) is correct.

    (i) 25 finger spans of student 'X' indicate that he has long fingers.

    (ii) 31 finger spans of student 'Y' indicate that he has short fingers.

    We can conclude that different students have different sized body parts.

31. **(B)** Statements (ii) and (iv) are correct about a pinhole camera. It has no single lens. It has screen. It produces a real and inverted image of an object. No colourless shadows are formed as light travels in a straight line.

32. **(B)** A pencil lead shown in option (B) is sharpened on both the sides. This pencil lead when placed in the gap closes the electric circuit and enables the bulb to glow.

    In options (A) and (C) one side is conducting and the other side is insulating so, current will not flow through it. In option (D), both the sides are insulating.

33. **(D)** Student P measured the most accurate length of a table because he used a 5 m long measuring tape which is longer than the table. So, he measured 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 that can be measured which are exact multiples of half a metre.

34. **(A)** The correct order of the length of a boy's shadows from the longest to the shortest is S, P, Q and R.

    The length of a boy's shadow depends on how far he is from the lamp above him. The more is the distance from the lamp, the longer his shadow will be. Hence, when the boy is at point S, his shadow is the longest. The length of his shadow decreases as he moves from P to R.

    The shortest length of his shadow will be when he is directly below the lamp i.e., at R.

35. **(A)** Electrical insulators are plastic, wood, paper, clay, rubber, etc.

    Electrical conductors are metals like mercury, tungsten, carbon(graphite), steel, iron, copper, gold, nickel, silver etc.

CHEMISTRY

36. (A) The correct matching is

P-iv ; Q-i ; R-ii ; S-iii

Saw dust and chalk powder - Insoluble in water

Wood and paper - Float on water

Vinegar and Water - Miscible liquids

Stone and Metal plate - Sink in water

37. (B) 'X' is melting of wax which is a physical and reversible change. When solid wax is heated, it melts and changes to liquid. On cooling, it changes to solid again. There is only a change in state. Hence, it is a physical and reversible change. 'Y' is making of ice from water. There is change of state from liquid water to solid ice. It is a physical and reversible change.

38. (D) Among the four containers, container S (a flask) has the smallest surface area exposed to the atmosphere. Thus, the rate of evaporation will be the slowest in container S.

39. (A) Copper is a metal. Metals are good conductors of heat and electricity.

40. (B) As per the given passage, suitable words are smaller (i), heated (ii), expansion (iii) and contraction (iv).

41. (B) When a solution does not dissolve any more solute (sugar) in water, it is said to be saturated.

Option (A): A solid that will not dissolve in a particular solvent is said to be insoluble.

Option (C): A solid that will dissolve in a solvent is said to be soluble.

Option (D): A solution in which more solute will dissolve in a solvent is said to be unsaturated.

42. (B) X is partly soluble in liquid Y. On mixing equal volumes of each liquid, the resultant volume will be slightly less than the total volume obtained on adding the sum of the volumes of two liquids.

43. (D) Water exists in liquid state in all water bodies like rivers, lakes, ponds, reservoirs, seas, oceans etc.

44. (A) Salt is soluble in water. Hence, it cannot be separated by filtration. Sand is insoluble in water. It can be separated by filtration not evaporation.

45. (C) Tissue paper is made up of paper and a shawl is made up of woollen threads only. So, both are made up of one material only.

BIOLOGY

46. (B) Gliding joint is present between the bones of wrist and ankle.

47. (D) Rice is a source of starch. When iodine solution is added, it will turn blue-black in colour.

48. (B) Glucose is a simple form of carbohydrate which gives quick supply of energy when consumed.

49. (C) Omnivores eat both plants and animals. Rat is an omnivore.

50. (C) The leaves are succulent as they become fleshy or swollen to store water. This kind of adaptation help plants to conserve very limited supply of water and resist to drying up. They are found in xerophytic leaves.

51. (D) The missing parts in preparation of ghee from cow are : P is milk, Q is cream and R is butter.

52. (B) Bread mould is a fungus.

53. (A) Breathing roots bear minute pores called pneumatophores through which exchange of gases takes place. Such roots absorb atmospheric air for respiration. These are found in plants which grow in marshy places. Epiphytes roots cling to the plant for support.

54. (D) P – Anther

Q – Ovule

R – Petals

S – Stigma

55. (B) Bending of a stem towards sunlight is called phototropism.

CRITICAL THINKING

56. **(A)** The smaller wheel will always turn faster than the larger wheel. The small wheel turns in the same direction as the large wheel and in the opposite direction as the medium wheel. The smaller wheel turns faster and larger wheel turns slowest.

57. **(A)** In every image, the dots and the stripes keep alternating between the inner figure and the outer figure. Therefore after the third figure, the dots will be in the inner figure. Therefore option A and C are possible.

    Now we see that the inner figure and outer figure get alternated after 2 steps i.e. once the outer circle has seen both dots and stripes, it is then made the inner circle in the third image. Therefore in the fourth image the outer hexagon will stay till it has seen both circles and stripes. Hence option A is the right answer.

58. **(C)** Charan is three months younger than Tarun and four months younger than John. Also, Charan is two months younger than Pankaj. So, John is the oldest, and he will get the extra piece of pizza.

59. **(B)** The correct answer is (B) Sports can boost physical health and teamwork skills. This option supports the statement by indicating the benefits of including sports in school curricula.

60. **(C)** Stealing some thing is a crime. So, all thieves are criminals. Therefore, theives is in the category of criminals and Judge is totally different from them. Hence, option (A) is correct.

The End