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NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION (UPDATED)

CLASS - 6
Question Paper Code : UN470

KEY

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

SOLUTIONS

MATHEMATICS

01. (D) Given l = 3b

Given l − 8 cm = b + 4 cm

3b − 8 cm = b + 4 cm

3b − b = 8 cm + 4 cm

2b = 12 cm

b = $\dfrac{12}{2}$ = 6 cm

∴ l = 3b = 3 × 6 cm = 18 cm

Area = lb = 18 cm × 6 cm = 108 cm²

02. (D) $\dfrac{12240}{512}$ lies between 23 and 24

$$512\overline{)12240}(23.9$$
$$\underline{1024}$$
$$2000$$
$$\underline{1536}$$
$$4640$$
$$\underline{4608}$$
$$32$$

03. (D) Outer length = 5 cm + 3 m + 3 m = 11 m

Outer breadth = 4 m + 2 m + 2 m = 8 m

Area of shaded region = Total area − Inner rectangle area

$= 11 × 8 \text{ m}^2 − 5 × 4 \text{ m}^2 = 88 \text{ m}^2 − 20 \text{ m}^2$

$= 68 \text{ m}^2$

04. (C) $\dfrac{3}{5} = 0.6$

05. (D) $-\dfrac{1}{2} - \dfrac{1}{4} - \dfrac{1}{8} = \dfrac{-4-2-1}{8} = -\dfrac{7}{8} = -0.875$

$-\dfrac{1}{3} - \dfrac{1}{4} - \dfrac{1}{12} = \dfrac{-4-3-1}{12} = -\dfrac{8}{12} = -0.66$

$-\dfrac{5}{6} - \dfrac{2}{5} - \dfrac{1}{2} = \dfrac{-25-12-15}{30} = -\dfrac{\overset{14}{\cancel{53}}}{\underset{10}{\cancel{30}}} = -1.4$

$-\dfrac{1}{3} - \dfrac{1}{6} - \dfrac{1}{18} = \dfrac{-6-3-1}{18} = \dfrac{-\overset{5}{\cancel{10}}}{\underset{9}{\cancel{18}}} = -0.555$

∴ −1.4 < −0.875 < − 0.66 < − 0.55

∴ Option (D) is the largest

06. (A) ₹ 120 − ₹ 100 = ₹ 20

07. (C) Perimeter = 2 (l × b) = 2(22 cm + 20 cm)

= 2 × 42 cm

= 84 cm

08. (A) New length = 2l and new breadth = 2b

∴ New area = 2l × 2b = 4 (lb)

09. (C) Given 23x = 841

$x = \dfrac{851}{23} = 37$

∴ 13x − 10x = 3x = 3 × 37 = 111

10. (B) $\dfrac{P}{2} = 5 + 9$

$\dfrac{P}{2} = 14$ means half of P = 14

then P = 28

11 (C) Perimeter of the rectangular field = 2(l + b)

= 2(135 + 78) m = 2 × 213 m = 426 m

Total distance jogged = 5 × 426 m

= 2130 mts

12. (C) 71% of 0.07 = 0.0497

47% of 0.9 = 0.369

38% of 1.1 = 0.418

51% of 0.8 = 0.408

Option (C) is greatest

13. (B) 615 − 12915 ÷ 41 × 37

$= 615 - \dfrac{\overset{31}{\cancel{12915}}}{\underset{1}{\cancel{41}}} × 37$

= 615 − 11655

= − 11040

14. (C) Square 'B' to be shaded to get a line symmetry

Note : Remove the shaded region of the square between A and B

15. (C) Given the ratio of numbers $= 7\dfrac{1}{3} : 4\dfrac{2}{5}$

$= \dfrac{22}{3} : \dfrac{22}{5}$

$= \dfrac{1}{3} × 15 : \dfrac{1}{5} × 15$

= 5 : 3

= 5x : 3x

Given 5x + 3x = 9875

8x = 9872

$x = \dfrac{9872}{8} = 1234$

∴ 3x = 3 × 1234 = 3702

16. (A) $\dfrac{44893}{44} = \dfrac{\overset{10203}{\cancel{448932}}}{\underset{1}{\cancel{44}}} = 10203$

$\dfrac{394641}{39} = \dfrac{\overset{10119}{\cancel{394641}}}{\underset{1}{\cancel{39}}} = 10119$

$\dfrac{772008}{76} = \dfrac{\overset{10158}{\cancel{772008}}}{\underset{1}{\cancel{76}}} = 10158$

$\dfrac{132587}{13} = \dfrac{\overset{10199}{\cancel{132587}}}{\underset{1}{\cancel{13}}} = 10199$

Option (A) is greatest

17. (C) Given area of rectangle = 75 cm²

$\Rightarrow l \times$ b = 75 cm²

$l \times$ 5 cm = 75 cm²

$l = \dfrac{75\ cm^2}{5\ cm} = 15$ cm

18. (C) DCCCXLVI = 500 +100 + 100 + 100 + (50 − 10) + 5 + 1

= 846

19. (B) $(1-2)-(3-4)-(5-6)-(7-8)-(9-10)$

$-(11-12)-(13-14)$

$= -1 - (-1) - (-1) - (-1) - (-1) - (-1) - (-1)$

$= -1 + 1 + 1 + 1 + 1 + 1 + 1 = 5$

20. (B) LHS = $\dfrac{1}{5\times7}+\dfrac{1}{7\times9}+\dfrac{1}{9\times11}+\cdots+\dfrac{1}{23\times25}$

$= \dfrac{2}{2}\left[\dfrac{1}{5\times7}+\dfrac{1}{7\times9}+\dfrac{1}{9\times11}+\cdots+\dfrac{1}{23\times25}\right]$

$= \dfrac{1}{2}\left[\dfrac{2}{5\times7}+\dfrac{2}{7\times9}+\dfrac{2}{9\times11}+\cdots+\dfrac{2}{23\times25}\right]$

$= \dfrac{1}{2}\left[\dfrac{1}{5}-\dfrac{1}{7}+\dfrac{1}{7}-\dfrac{1}{9}+\dfrac{1}{9}-\dfrac{1}{11}\cdots+\dfrac{1}{23}-\dfrac{1}{25}\right]$
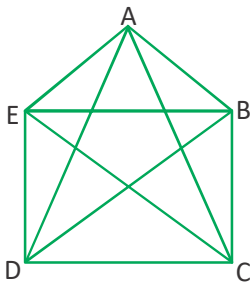
$= \dfrac{1}{2}\left[\dfrac{1}{5}-\dfrac{1}{25}\right]$

$= \dfrac{1}{2}\left[\dfrac{5-1}{25}\right]$

$= \dfrac{1}{2}\times\dfrac{4}{25}=\dfrac{2}{25}$

21. (B) 50 − 3 = 40 + 7 = 47

22. (D)

A, B, C, D and E are the given five points

∴ $\overline{AB},\overline{AC},\overline{AD},\overline{AE},\overline{BC},\overline{BD},\overline{BE},\overline{CD},\overline{CE},\overline{DE}$ are the required 10 line segments

23. (B) Let the number be x

∴ x = 56y + 29

= 56y + 24 + 5

= 8(7y + 3) + 5

∴ x is divided by 8 leaves a remainder 5

24. (B) At 6 'o' clock the angle between two hands is 180°. i.e., straight angle

25. (C) Let the two numbers be 12a and 12b

Given 12a × 12b = LCM × HCF

12 × 12 × ab = 12 × 924

ab = $\dfrac{12\times924}{12\times12}$ = 77

∴ ab = 1 × 77 = 11 × 7

The possible numbers are 12 & 924 (or) 132 & 84

PHYSICS

26. (B) L1 will light up as long as S1 and either S2 or S3 is closed. However for L2 to light up, S1 and S2 must be closed.

27. (C) Number of divisions =

$$\frac{1m \times 1000}{0.1 \text{ mm}} = 10000$$

28. (C) Statements (i), (ii) and (iv) are not correct. Light rays incident on a mirror can be reflected.

29. (B) The correct matching is

(a) - iii, (b) - i, (c) - ii, (d) - v, (e) - iv

Conductor - Allows electricity to pass through it.

Insulator - Does not allow electricity to pass through it.

Electric circuit - Complete path for electricity.

Filament of electric bulb - Has high melting point.

Electric cell - Has two terminals.

30. (C) Motion of a spinning top is in rotatory motion. Swinging of arms of a soldier while marching is oscillatory. The beating of our heart and expansion/contraction of lungs are periodic. A freely falling body is in rectilinear motion.

31. (B) Shadows 1 and 4 of a boy and a cat as shown in the above figures is in the correct direction of the morning sun.

32. (D) When the button is pressed down, the metal lever will move up and touch the upper contact point of the circuit. As the three batteries are arranged in the circuit, bulbs X and Y will receive 75 units of electrical energy. Thus, each bulb will have 37.5 units of electrical energy.

33. (B) 3 cm 6 mm = 0.03 m + 0.006 m = 0.036 m.

34. (C) As light travels in a straight line, student R can see the flame of the candle.

35. (D) Connecting too many appliances to one power point will result in fire. Use of electrical appliances with damaged insulation or exposed wires will cause shock to the user. Always operate electrical appliances with dry hands. Use of wet hands will cause electric shock as human body is a good conductor of electricity.

CHEMISTRY

36. (C) A bow string should be flexible but strong. Moreover for a tribal, the availability of material is as important as the other two characteristics.

37. (A) Leaves decay by the action of micro-organisms in soil. It is an irreversible change as we cannot get back original leaves.

38. (B) Animals living in water get displaced from their original habitat during floods.

39. (C) Iron, paper and rubber do not break into pieces when dropped.

Rubber can be stretched to a certain extent without breaking. Paper cannot be stretched.

Glass and ceramic break into pieces when dropped. Ceramics are made from clay. The main component of glass is sand.

40. (C) Milk and water both being soluble liquids dissolve in each other to form a uniform solution. They cannot be separated by filtration.

41. (A) When a substance absorbs heat or heated continuously, it starts boiling. It is a fast, man-made process (P). When a substance absorbs heat from the sun or surroundings of its own and changes from liquid to gaseous state, it is called evaporation. Evaporation of water is a slow, natural process (Q).

42. (D) The water in Bowl S has the highest amount of heat which helps to increase the rate of evaporation. The higher the temperature of the water in the bowl, the faster it evaporates.

43. (C) Cardboard and chopsticks are made from bamboo while measuring cylinder and camera lens are prepared from glass.

44. (A) In wheat flour, flour is the wanted component while husk (X) is the unwanted component. When cut paddy (Y) stalks are beaten on a stone, the grain seeds separate from their stalks.

45. (D) Oil being less dense than water floats on any water surface. It is sprayed on a pond to kill and control the larvae of mosquitoes. Wood is less dense than water. Boats are used on a river for various purposes. Air containing oxygen is lighter than water. It is bubbled through the water in an aquarium.

BIOLOGY

46. (D) Photosynthesis requires carbon dioxide. The greater the amount of carbon dioxide available, the faster the rate of photosynthesis.

47. (C) The green stem contains chlorophyll which takes in sunlight to make food.

48. (C) Organisms X, Y and Z are camel, polar bear and red eyed frog respectively

49. (C) Dandelion is dispersed by wind.

Castor is dispersed by animals.

50. (D) P - Deer; Q - Vulture; R - Tapewarm; S - Crow

51. (B) Some non-woody plants have structures like tendrils, twining stems, hooks or clasping roots to cling onto supports so that the plants can grow to higher grounds and obtain more sunlight.

52. (C) Lichen shows symbiotic relationship between alga and fungus. Alga provides food material to the fungus and in return fungus provides shelter, water and minerals to the alga

53. (B) In the given figure I - skull, II - ribcage, III - back bone, IV - thigh bone.

54. (D) The leaves make food which is transported to other plant parts for use.

Excess sugar is stored as starch in the storage parts.

55. (C) Charkha is a device used for spinning was popularised by Mahatma Gandhi as a part of the independence movement.

CRITICAL THINKING

56. (B) Manisha

57. (C) In key each symbol is taken from each column .

Option(A) : Incorrect symbol and number are found in same column.

Option (B) : Incorrect both number and letter are found in same column.

Option (C) : Correct letter, number and symbol are found in different columns.

Option (D) : Incorrect number and letter are found in same column.

58. (B) From statements 1 & 2, we can say that Sea is Sky's son. It is clearly stated in statement 4 that Air is the daughter of Sky. From statement 5, we can say that Cloud is also Sky's son. Hence Sky has 3 children (2 boys and 1 girl) and the correct answer is option B.

59. (C)

60. (D)