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NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION

Paper Code: UN423

Solutions for Class : 5

Mathematics

1. (D) $P + Q = 105$
 $P - Q = 45$
 So, $2P = 105 + 45 = 150$
 $\Rightarrow P = 75$
 Then, $Q = P - 45 = 75 - 45 = 30$
 $\therefore P : Q = 75 : 30 = 5 : 2$

2. (B) $\frac{17.28 \div 12}{3.6 \times 0.2} = \frac{17.28 \times \frac{1}{12}}{0.72}$
 $= \frac{1728}{72 \times 12} = \frac{1728}{864} = 2$

3. (A) $\frac{14}{15} \div 6 = \frac{14}{15} \times \frac{1}{6}$
 $= \frac{7}{15 \times 3} = \frac{7}{45}$

4. (A) Factors of 42 : 1×42
 2×21
 3×14
 6×7
 The factors of 42, that are multiples of 7 are 7, 14, 21 and 42.
 Their sum = $7 + 14 + 21 + 42 = 84$

5. (B) $\angle COB = \angle AOD = 70^\circ = \angle x + \angle y$
 $\angle x : \angle y = 3 : 2$
 $\therefore 5 \text{ units} = 70^\circ$
 Thus, 1 unit = $\frac{70^\circ}{5} = 14^\circ$
 $\angle x = 3 \text{ units} = 3 \times 14^\circ = 42^\circ$

6. (C) Sum = $\frac{1}{9} + \frac{9}{2}$
 $= \frac{2 + 81}{18} = \frac{83}{18}$
 $= 4 \frac{11}{18}$
 $\therefore$ The required sum is $4 \frac{11}{18}$.

7. (B) The value of roman numerals are as follows

I = 1
 V = 5
 X = 10
 L = 50
 C = 100
 D = 500
 M = 1000

So, the smallest number which can be formed using all the above roman numerals is MCDXLIV = 1444.

8. (B) Total number of sweets distributed = 2961

Number of sweets each child received = 3
 So, total number of children
 $= 2961 \div 3 = 987$

9. (B) Let the two digit number of $10x + y$
 Reversing the digit, number become $10y + x$.

Sum = $10x + y + 10y + x$
 $\Rightarrow 11x + 11y = 110$
 $\Rightarrow x + y = 10 \quad \dots (1)$

$x - y = 4$ (Given) $\dots (2)$

From equ. (1) & (2)

$2x = 14 \Rightarrow x = 7$

$\therefore Y = 3$

Hence the number is 73

10. (A) We have the simplest form as

$\frac{3}{15} = \frac{1}{5}$, $\frac{16}{31} = \frac{16}{31}$

$\frac{9}{17} = \frac{9}{17}$ and $\frac{4}{5} = \frac{4}{5}$

So, $\frac{3}{15}$ is incorrect as it is not in the correct simplest form while all others are in the complete form.

11. (D) Average of A, B and C = 10 years

$$\frac{A+B+C}{3} = 10$$

$$A + B + C = 30 \text{ yr.}$$

$$\frac{A+C}{2} = 9 \Rightarrow A+C = 18$$

$$\text{Now, } (A + C) + B = 30 \text{ yr.}$$

$$18 + B = 30 \Rightarrow B = 30 - 18 = 12 \text{ yrs.}$$

12. (B) (a) Cost of 1 apple = $\frac{30}{6} = ₹5$

$$(b) \text{ Cost of 1 apple} = \frac{16}{4} = ₹4$$

$$(c) \text{ Cost of 1 apple} = \frac{25}{5} = ₹5$$

$$(d) \text{ Cost of 1 apple} = \frac{48}{8} = ₹6$$

13. (D) Perimeter of smaller square with side

$$a_1 = 12 \text{ cm}$$

$$\Rightarrow 4a_1 = 12$$

$$\Rightarrow a_1 = 3 \text{ cm}$$

$$\text{Area of smaller square} = (a_1)^2 = (3)^2 = 9 \text{ cm}^2$$

$$\text{Perimeter of bigger square with side } a_2 = 24 \text{ cm}$$

$$\Rightarrow 4a_2 = 24$$

$$\Rightarrow a_2 = 6 \text{ cm}$$

$$\text{Area of bigger square} = (a_2)^2 = (6)^2 = 36 \text{ cm}^2$$

The area of bigger square is 4 times that of smaller square.

14. (B) The required difference =
$$\begin{array}{r} 9999999 \\ - 10000 \\ \hline 9989999 \end{array}$$

15. (D) 21 tenths = 2.1

The difference of the given numbers = $2.1 - 1.98 = 0.12 = 12 \text{ hundredths}$

16. (B) Number of pages read in that hour = 30% of 90

$$= \frac{30}{100} \times 90 = 27$$

17. (B) LCM (2, 5, 6) = $5 \times 6 = 30$

Smallest value of X = 30

$$\text{LCM (4,8)} = 8$$

[as $4 = 2 \times 2$ and $8 = 2 \times 2 \times 2$,

$$\text{so LCM (4, 8)} = 2 \times 2 \times 2 = 8]$$

Smallest value of Y = 8

18. (A) Number of shaded parts = 9

Total number of parts = 13

Here, two more parts can be drawn.

So, total number of parts in the figure = $13 + 2 = 15$

$$\text{Fraction of shaded part} = \frac{9}{15} = \frac{3}{5}$$

$\therefore$ Number of unshaded parts to be added = 2

19. (C) Weight of [C] = 4 kg 800 g

$$= 4000 \text{ g} + 800 \text{ g} = 4800 \text{ g}$$

$$[1 \text{ kg} = 1000 \text{ g}]$$

$$\text{So, weight of [A]} = \frac{4800}{3} = 1600 \text{ g}$$

$$[1 \text{ C} = 3 \text{ A}]$$

$$\text{Weight of [B]} = \frac{1600}{2} = 800 \text{ g}$$

$$[1 \text{ A} = 2 \text{ B}]$$

20. (A) Total amount = $329 + 429 = ₹ 758$.

Amount contribute by each = $758 \div 6 = 126.33 = 126.30$.

21. (C) If x is the number of chocolate ice creams sold then

$$\frac{1}{4} = \frac{x}{48} \Rightarrow x = 12$$

22. (B) The value of the 2 in 529, 307, 604, 000 is ten billion.

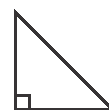
23. (C) Number of right angles formed in Fig. I = 0

[since, none of the angles is of 90° in the given figure]

Number of right angles formed in Fig. II = 2



Number of right angles formed in Fig. III = 1



So, on comparing, we get $\text{II} > \text{III} > \text{I}$

24. (D) Given that, [] = $18 - 6 \times 2 + 12 \div 3$

Following the rule of operations, we get

$$[] = 18 - 12 + 4$$

$$[12 \div 3 = 4, 6 \times 2 = 12]$$

$$= 6 + 4 = 10$$

25. (D) Area of square = 64 cm^2

$$\text{side} = \sqrt{64} \text{ cm} = 8 \text{ cm}$$

$$\therefore \text{perimeter} = 4 \times 8 \text{ cm} = 32 \text{ cm}$$

26. (C) Option (c) represents zero angle.
27. (D) As $2805 \div 2.55 = 1100$,
 $280.5 \div 25.5 = \frac{1100}{100} = 11$
28. (A) The greatest 6-digit odd number that can be formed using 6,0,3,7,6 and 9 is 976603. The difference in place values of the two 6's in 976603 is $6000 - 600 = 5400$.
29. (B) Of the given options 33 and 55 have 11 as their greatest common factor.
30. (C) $0.1\% = \frac{0.1}{100} = \frac{1}{1000}$.
31. (B) Quantity of flour to bake 20 cakes = 74.4 kg
 Flour needed to bake 13 cakes
 $= \frac{74.4 \times 13}{20}$ kg
 $= 48.36$ kg
32. (C) No. of spoiled roses = $182039 \div 13 = 14003$
33. (B)
- | | | | | | | | |
|----|---|------|------|----|---|---|---|
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| TM | M | H.Th | T.Th | Th | H | T | O |
34. (A) Largest number less than 100 divisible by 15 = 90
 $90 - 5 = 85$
 17×5
 $\therefore 17$ is a factor of 85
35. (D) $70 = 2 \times 5 \times 7$
 The prime factors of 70 are 2, 5, 7
 $\therefore p + q + r = 2 + 5 + 7 = 14$
36. (C) $50 : 30 = 5 : 3$
37. (C) $Q + R - P = 456.321 + 95.326 - 256.32 = 295.327$
38. (C) Perimeter of square I = 8 cm = $4 \times \text{Side}$
 Area of square II = $16 \text{ cm}^2 = \text{Side} \times \text{Side}$
 So, Side of square = II = 4 cm
 Perimeter of square = II $4 \times \text{Side} = 4 \times 4 = 16$ cm
 So, the length of wire = Perimeter of square II
 $= 8 \text{ cm} + 16 \text{ cm} = 24 \text{ cm}$
39. (A) L.C.M. of 12 and 18 is 36.
 $\therefore$ The required number of stamps is the largest multiple of 36, less than 500.
 $500 \div 36 = 13 \text{ R } 32$ as
 $36 \times 13 = 468$ and $36 \times 14 = 504$.
 Thus, the required number of stamps = 468

40. (D)

$$Q - 2P = \frac{12}{25}$$

$$\Rightarrow \frac{3}{4} - \frac{12}{25} = 2P$$

$$\Rightarrow 2P = \frac{27}{100}$$

$$\Rightarrow P = \frac{27}{200}$$

$$\Rightarrow P + Q = \frac{27}{200} + \frac{3}{4} = \frac{177}{200}$$

41. (B) Since 5 is present on the right side of the decimal, therefore 50 tenths does not tell the place value of 5 in 21.3572.
42. (C) Option (C) is a true statement.
43. (A)
44. (B) Ayush thinks that $5 + 2 \times 3 = 21$, But, $5 + 2 \times 3 = 11$. Thus we need to add 10 to make the left hand side equal to 21.

45. (B)

$$\frac{5}{6} = \frac{x}{54} \Rightarrow x = 9 \times 5 = 45 \text{ cm}$$

General Science

46. (C) In the given venn diagram 'X' is a man, 'Y' is a frog that breathes through lungs and skin and 'Z' is an earthworm.
47. (D) An animal which hunts for its food is called predator and the animal that gets killed and eaten as food is called a prey. Herbivores are consumers and carnivores that consume flesh of other animals are called secondary consumers.
48. (C) The exhaled air released by teacher contains carbon dioxide that turned lime water milky.
49. (B) Mosquito bite causes malaria.
50. (A) The hammer acts as 1st order lever. The lever of a hammer depends upon its use. If it removes a nail, it is of 1st order. if it strikes a nail, it is of 3rd order.
51. (C) Although marbles occupy space in the cup upto the brim, there are some air spaces in between them. When water is poured into the cup, it fills these spaces by driving out the air..
52. (D) Seed, seedling, sapling, plant represents the life cycle of a plant.
53. (B) X is the humerus.
54. (B) Oxygen helps in burning things more brightly.
55. (B) Dispersal of seeds by animal is called animal dispersal.

56. (D) As moon is much closer to the earth, it blocks certain places of the sun and blocks the sunlight to reach the earth during solar eclipse.
57. (D) Ball and socket, pivot and hinge are the joints found in our body. Sternum or breast bone is the strong, flat dagger-shaped bone.
58. (D) Forces P and Q are acting in opposite directions and does not allow the table to move.
59. (B) The potato reproduces by underground stems. The part marked 'X' is an eye which will develop into a bud.
60. (C) A sewing machine consists of a wheel and axle.
61. (D) When the rock is completely immersed in water, the water that overflows from the can will be equal to the volume of the rock.
62. (D) The animal given in the figure is an Earthworm. They are called natural tillers of the soil. They help in loosening the soil.
63. (A) P-2, Q-4, R-1, S-3
Elbow and knee - hinge joint, wrist - gliding joint, neck - pivot joint, shoulder and hip - ball and socket joint.
64. (B) The upward buoyant force of water is balanced by the weight of the ship and help to float on water.
65. (B) Insects are invertebrates that can fly.
66. (B) The fixed point of a lever is called fulcrum.
67. (B) Frictional force stops a moving object.
68. (B) Caterpillar is the larval stage of butterfly. It resembles a worm. It undergoes metamorphosis and develops into a pupa and butterfly.
69. (B) p-iv, q-iii, r-ii, s-i
Axe to cut branches, sickle to cut the crop, spade to shovel the earth and crow bar to dig the earth.
70. (C) b, c, d, a
Brain, heart, stomach, kidneys.
71. (B) The winged seed gets dispersed by wind.
72. (A) Camel carry loads and help to travel long distance in desert. Hence they are called "ship of the desert".
73. (A) Cerebrum is the centre for sensation, thinking and memory.
74. (A) Wool is the animal source that is used to make woollen clothes in winter.
75. (B) Q-Cotyledons are seed leaves that provide food for the developing new plant. P is plumule and R is radicle.
76. (A) Vitamin C is richly found in fruits and vegetables.
77. (B) Diarrhoea is spread by contaminated food and water. By drinking clean, boiled water and consuming fresh food we can prevent diarrhoea.
78. (C) The force responsible for the coconut to fall on the ground is gravitational force.
79. (C) Snail is an invertebrate.
80. (D) When the earth comes between the sun and the moon, lunar eclipse is possible.
81. (A) X is an artery that carries or transports oxygen rich blood to all over the body and Y - vein carries carbon dioxide rich blood or impure blood.
82. (D) Air pressure between the card board and the rim of the glass push the card board up.
83. (B) Webbed in frogs and ducks feet helps in swimming in water.
84. (B) A group of stars seen in the sky forming a figure is called a constellation.
85. (D) Soil has moisture.
86. (A) The handle of a hand pump (bore well) is an example of 1st order lever and the 'X' is fulcrum.
87. (C) The given figure shows rib cage. Rib cage protects lungs and heart.
88. (D) Petroleum is a fossil fuel that produces energy on combustion or burning.
89. (C) Water, sunlight and carbon dioxide are the essential raw materials that are required by the green plants for the process of photosynthesis.
90. (A) Venus fly trap is an insectivorous plant, that grows in mineral deficient soils. To meet the requirement of minerals, it traps small insects and eat them.
91. (A) 92. (B)
93. (A) 94. (C)
95. (B) 96. (A)
97. (B) 98. (B)
99. (C) 100. (D)

