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# NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION

***CLASS - 6***

***Question Paper Code : 1B107***

## KEY

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

## SOLUTIONS

### MATHEMATICS

01. (D) Given $lb = 44\frac{1}{7}\text{cm}^2$

$$l \times 6\,\text{cm} = \frac{309}{7}\text{cm}^2$$

$$l = \frac{309}{7}\text{cm}^2 \times \frac{1}{6\,\text{cm}}$$

$$= \frac{103}{14}\text{cm} = 7\frac{5}{14}\text{cm}$$

02. (D) Difference = 10°C – (–30°C) = 10°C + 30°C = 40°C

03. (B) $$\frac{1\times2\times3\times4\times5\times6\times7\times8\times9}{1+2+3+4+5+6+7+8+9}$$

$$= \frac{1\times2\times3\times4\times\cancel{5}\times6\times7\times8\times\cancel{9}}{\cancel{45}}$$

= 8064

04. (C) Ascending order of composite numbers are 4, 6, 8, 9, 10, 12

∴ 6th composite number in the ascending order (A) = 12

Ascending order of prime numbers are 2, 3, 5, 7, 11, 13, 17

∴ 7th prime number in the ascending order (B) = 17

∴ A – B = 12 – 17 = – 5

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

06. (B) $1^2 – 2^2 + 3^2 – 4^2 + 5^2 – 6^2 + 7^2 – 8^2 = 1 – 4 + 9 – 16 + 25 – 36 + 49 – 64$

$= (1 + 9 + 25 + 49) – 4 – 16 – 36 – 64$

$= 84 – (4 + 16 + 36 + 64)$

$= 84 – 120$

$= – 36$

07. (D) Let the two numbers be a & b.

∴ LCM × HCF = a × b

⇒ LCM × 18 = 16200

$$\text{LCM} = \frac{\cancel{16,200}^{900}}{\cancel{18}_{1}}$$

= 900

08. (A) If $x = –5$ then

$2(–5) + 10 = –10 + 10$

$= 0$

∴ $x = –5$

09. (C) Let the cost of 23 kgs wheat Rs. $x$

∴ 50 kg : Rs. 1470 = 23 kg : Rs. $x$

Product of means = product of extremes

∴ $50x = 23 \times$ Rs. 1470

$$x = \frac{23 \times \text{Rs.}\cancel{1470}^{29.4}}{\cancel{50}_{1}}$$

= Rs. 676.2

10. (B) Total number of sweets the four children have = 30

Since each  represents 2 sweets, the number of symbols in the pictograph

$= \frac{30}{2} = 1$

13 symbols are already present in the pictograph

Therefore, Anu has (15 – 13) × 2 sweets = 2 × 2 = 4 sweets

11. (A) Given $x : y = 3 : 4$ and $y : z = 7 : 8$

'$y$' is the common ratio of both given ratios

∴ LCM of $y$ ratios = 4 × 7 = 28

∴ $x : y = 3 \times 7 : 4 \times 7 = 21 : 28$

$y : z = 7 \times 4 : 8 \times 4 = 28 : 32$

$x : y : z = 21 : 28 : 32$

∴ $x : z = 21 : 32$

12. (B) Sum of the digits of the given number

= 6 + 3 + 6 + 4 + 6 + 5 + 6 + 6 + 6 + 7 + 6 + 8 + 6 + 9 = 84

If sum of the digit is 81 then it is divisible by 9

i.e. 63646566676866 is divisible by 9

∴ 63646566676869 = 63646566676866 + 3

∴ 63646566676869 is divided by 9 then the remainder is 3.

13. (B) Given $x : y = 4 : 5 = 4a : 5a$

∴ $x = 4a$ and $y = 5a$

∴ $(3x + y) : (5x + 3y) = (3 \times 4a + 5a) : (5 \times 4a + 3 \times 5a) = 17d : 35d$

14. (C) From options

$18^2 + 25^2 + 33^2 = 324 + 625 + 1089 = 2038$

15. (C)
$$x = 1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{\left(\frac{3}{2}\right)}}}$$

$$= 1 + \frac{1}{1 + \frac{1}{1 + \frac{2}{3}}}$$

$$= 1 + \frac{1}{1 + \frac{1}{\left(\frac{5}{3}\right)}}$$

$$= 1 + \frac{1}{1 + \frac{3}{5}}$$

$$= 1 + \frac{1}{\left(\frac{8}{5}\right)}$$

$$= 1 + \frac{5}{8}$$

$$= \frac{13}{8}$$

$\therefore \quad 2x + \frac{7}{4} = 2 \times \frac{13}{8} + \frac{7}{4} = \frac{20}{4} = 5$

16. (B) Given $\frac{16}{5}, x, \frac{15}{2}$ and $\frac{25}{2}$ are in proportion

$$\therefore \frac{15x}{2} = \frac{16}{5} \times \frac{25}{2}$$

$$x = 8 \times 5 \times \frac{2}{15} = \frac{16}{3} = 5\frac{1}{3}$$

17. (D) Area of bigger rectangle

= 28 cm × (12 + 8) cm = 560 $cm^2$

Area of smaller rectangle = 8 cm × (28 cm – 9 cm – 5 cm)

= 8 cm × 14 cm = 112 $cm^2$

Area of shaded region

= 560 $cm^2$ – 112 $cm^2$ = 448 $cm^2$

18. (A) W score = 2 × 5 + 4 = 10 + 4 = 14

19. (B) Biggest 5 digit number = 99,999

Biggest 5 digit number = 99,999

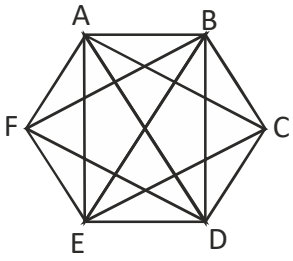
$\therefore$ Number of 5 digit numbers = 99,999 – 9,999 = 90,000

20. (A) Remaining fund = 38 × Rs. 42 $\times \left(1 - \frac{49}{57}\right)$

$$= \cancel{38}^{2} \times \cancel{42}^{14} \times \frac{8}{\cancel{57}_{3_1}}$$

= Rs. 224

21. (C)




AB, AC, AD, AE, AF, BC, BD, BE, CD, CE, CF, DE, DF, EF are the required 15 lines

22. (B) $5\frac{4}{7} = 5 + \frac{4}{7} = 5 + 0.57 = 5.57$

$$5\frac{1}{2} = 5 + \frac{1}{2} = 5.5$$

$$4\frac{2}{3} = 4 + \frac{2}{3} = 4 + 0.66 = 4.66$$

$$4\frac{3}{4} = 4 + \frac{3}{4} = 4 + 0.75 = 4.75$$

$\therefore$ 5.57 > 5.5 > 4.75 > 4.66

$$\therefore 5\frac{4}{7} > 5\frac{1}{2} > 4\frac{3}{4} > 4\frac{2}{3}$$

23. (C) 2021 + 2022 + 2023 + ------ + 2030 = 2020 + 1 + 2020 + 2 + 2020 + 3 + ----- + 2020 + 10 = 2020 × 10 + 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10

= 20,200 + 55

= 20,255

24. (D) Given 12, 14, 15, 16, 18, 20, 21, 22 are the composite numbers

$\therefore$ $x$ = 14, $y$ = 16 and $z$ = 22

$\therefore$ $x - y - z = 14 - 16 - 22 = -2 - 22 = -24$

25. (A) Total cost = Rs. 123.8 + Rs. 78.9 + Rs. 6.6

= Rs. 209.3

## PHYSICS

26. (D) P is a star, a light source.

Q is a black wallet. It is not a light source. It reflects most of the light falling on it.

R is a tissue paper that is translucent.

S is moon, an opaque, non-luminous object

27. (B) Two switches 1 and 5 have to be closed to light up the bulb. Switches 1 and 5 form a closed electric circuit with two cells properly connected to the two terminals of the bulb.

28. (A) The given lengths in the increasing magnitude are:

1 micrometre, 1 millimetre, 1 centimetre, 1 metre and 1 kilometre

29. (A) If switch P is opened, the lighted bulb will stop glowing.

30. (D) Graph shown in option (D) gives the correct length of a shadow of an object from 6 a.m. to 12 noon.

31. (C) $\frac{1}{10}$ cm = 0.1 cm and 1 cm = 100 mm;

$\therefore$ 0.1 cm = 1 mm

32. (B) Bulbs M and N are connected one below the other. So, the current is shared between both the bulbs. Most of the current passes through bulb L. Thus, bulb L glows brighter than Bulb M or Bulb N.

Option (A): The current flowing through the three bulbs are different. Hence, they cannot glow with the same brightness.

Options (C) and (D): Bulbs M and N glow with equal brightness as both are glowing less bright than bulb L.

33. (D) Shadows of objects are formed became light travels in a straight line opaque objects cast shadows as light cannot pass through them.

34. (B) Length of micro SD card = 5.9 – 4.6

= 1.3 cm = 1.3 × 10 = 13 mm

35. (D) Electric wires are insulated with insulators of electricity.

## CHEMISTRY

36. (D) All the given statements are true about the interdependence of plants and animals.

37. (B) Air, liquid ammonia and milk are mixtures while silver, aluminium and copper are metals which are pure substances.

38. (B) Milk powder and lemon crystals are soluble in water. Rest of the solids are insoluble in water.

39. (D) Windmills are used to draw water from tubewells, run flour mills and to generate electricity.

40. (C) Sand and sulphur both are insoluble in water.

In the rest of the given mixtures, sand is a common insoluble component but copper sulphate, potash, alum and sugar are all soluble in water. So, they cannot be separated by using water as the solvent.

41. (D) All the given solids do not disappear completely as they are insoluble in water.

42. (C) After a day, water vapour is found inside the plastic cover as air contains water vapour.

43. (C) When a gas changes into a liquid, the process is known as condensation.

44. (D) Powdered substance 'Y' is chalk powder. It is used to polish metals and also to prevent rusting.

45. (A) Glass panels usually appear hazy because water vapour settles on the tiny dust particles on the panel.

## BIOLOGY

46. (D) In the given figure fox is predator. Predator is the animal that hunts and kills other animals for its food.

47. (B) The ribcage is made up of pairs of curved bones in our chest and its connected to the backbone (Spine).

The ribcage protects the heart and the lungs.

The h eart helps to pump blood.

48. (D) Organic matter such as leftover food and bones can be decomposed by bacteria or fungi into simple substances that can be absorbed and used by plants for healthy growth.

49. (A) Fish, cod liver, butter, egg and milk are rich in vitamin D.

50. (D) The blow hole of the dolphin helps it to take oxygen from the air.

51. (D) Gas Z oxygen gas. Plants carry out photosynthesis when there is sunlight. During photosynthesis, plants take in carbon dioxide and give out oxygen. [Plants help top replenish oxygen in the air when they carry out photosynthesis during the day.]

52. (B) Plants respond to stimulus. Hence it grows towards the light.

53. (C) Bread is made from cereals like wheat and cereals are the best source of carbohydrates.

54. (C) Water does not give us energy to carry out our daily activities.

55. (D) Bath towel, paper, glass bottle, metal chair can be reused and recycled.

## CRITICAL THINKING

56. (A) Let's analyze the given information step-by-step to deduce which school wears which color uniforms.

1. School A does not wear green uniforms.
2. School B wears blue uniforms.
3. No students from School C wear blue uniforms.
4. One of the schools wears green uniforms.

From point 2, we know that:

- School B wears blue uniforms.

From point 3, we know that:

- School C does not wear blue uniforms.

Since School B wears blue uniforms, and School C does not wear blue uniforms, the only color left for School C is green (as one school must wear green according to point 4).

Now, we know:

- School B wears blue uniforms.
- School C wears green uniforms.

Since School A does not wear green uniforms and the only colors left are red and blue, and blue is already taken by School B, the only color left for School A is red.

Therefore, School A wears red uniforms.

57. (B) 31 = 7 match sticks required

74 = 7 match sticks required

91 = 8 match sticks required

71 = 5 match sticks required

Therefore the bigger number that one can build using 7 matchsitcks is 74.

58. (C) Death by old age

The culprit likely chose "death by old age" because it is a natural process that cannot be hastened or controlled by anyone, including the king. This choice cleverly exploits the ambiguity in the king's offer and ensures that the execution cannot be carried out immediately or within a reasonable time frame.

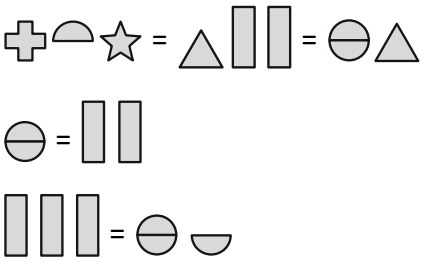
59. (D) Assertion (A) : This statement is incorrect. Not all animals that live underwater are amphibians. Many animals that live underwater are categorized as fish, marine mammals, or other aquatic species, not amphibians. Amphibians typically include frogs, toads, salamanders, and newts, which may live both on land and in water at different stages of their life cycle.

Reason (R) : This statement is correct. Amphibians are indeed small vertebrates that require water or a moist environment to survive. This is because their skin must remain moist to facilitate respiration and other physiological processes.

Relationship between (A) and (R):

Even though the reason (R) is true, it does not logically support the assertion (A) because (A) is a false statement. The reason correctly describes a characteristic of amphibians but does not justify or explain the incorrect assertion that all underwater animals are amphibians.

60. (C) From step (1)



*The End*