



UNIFIED COUNCIL

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NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION (UPDATED)

CLASS - 8

Question Paper Code : **UN449**

KEY

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

SOLUTIONS

MATHEMATICS

1. (B) $(a+b) - (a-b) = 2$
 $a + b - a + b = 2$
 $2b = 2$
 $b = 1$ then a & b are coprimes
2. (C) $x + y = P(x + y + z)$
 $y + z = P(x + y + z)$
 $z + x = P(x + y + z)$
 $\therefore x + y + y + z + z + x = 3P(x + y + z)$
 $2(x + y + z) = 3P(x + y + z)$
 $P = \frac{2}{3}$

3. (A) Length = $4x$ & breadth = $3x$
 $\therefore 12x^2 = 1728$
 $x^2 = 144$
 $x = 12$
 $\therefore l = 48$ mts & $b = 36$ mts
 $P = 2(l + b) = 168$
Total cost of fencing = $168 \text{ m} \times ₹ 2.5$
 $= ₹ 420$
4. (C) Given $h_1 : h_2 = 3 : 1$
 $\frac{h_1}{h_2} = \frac{3}{1}$

$$\text{Given } \pi r_1^2 h_1 = \pi r_2^2 h_2$$

$$\Rightarrow \frac{r_1^2}{r_2^2} = \frac{h_2}{h_1} \Rightarrow \left(\frac{r_1}{r_2}\right)^2 = \frac{1}{3}$$

$$\frac{r_1}{r_2} = \sqrt{\frac{1}{3}} = \frac{1}{\sqrt{3}}$$

5. (C) Let speed of steamer be xKMPH

Let the distance be 'd' KM

$$\text{Given } \frac{d}{x+2} = 4$$

$$d = 4(x+2) = 4x + 8 \rightarrow (1)$$

$$\text{Given } \frac{d}{x-2} = 5$$

$$d = 5x - 10 \rightarrow (2)$$

$$\text{from (1) \& (2) } 4x + 8 = 5x - 10$$

Speed of steamer (x) = 18 KMPH

6. (B) Let breadth be 'x' cm

$$\text{Given } l = 3x$$

$$\text{Given } (3x - 3)(x+5) - (3x)(x) = 57$$

$$3x^2 + 15x - 3x - 15 - 3x^2 = 57$$

$$12x = 57 + 15 = 72$$

$$x = 6$$

$$\therefore l = 3x = 18$$

$$P = 2(l+b) = 2(24 \text{ cm}) = 48 \text{ cm}$$

7. (C) Let the number be $100x + 10y + z \times 1$

$$\text{Given } 100x + 10y + z - (x+y+z) = 99x + 9y = 9(11x + y)$$

\therefore It is divisible by 9.

8. (D) $1^3 + 12^3 = 10^3 + 9^3$ ie Both are equal to 1729.

$$\therefore \sqrt{x} = 3$$

$$x = 9$$

9. (A) Let $x = \sqrt{6 + \sqrt{6 + \sqrt{6 + \dots \infty}}}$

squaring on both sides

$$x^2 = 6 + \sqrt{6 + \sqrt{6 + \sqrt{6 + \dots \infty}}}$$

$$x^2 = 6 + x$$

$$x^2 - x - 6 = 0$$

$$(x-3)(x+2) = 0$$

$$x = 3 \text{ (OR) } x = -2$$

10. (B) Given $3^{3x-5} = 9^{-x}$

$$3^{3x-5} = 3^{-2x}$$

$$3x - 5 = -2x$$

$$5x = 5$$

$$x = 1$$

11. (D) Let smallest angle be 'x'

$$\text{Given } x + 2x - 30^\circ = 180^\circ$$

$$3x = 210^\circ$$

$$x = 70^\circ$$

$$\therefore 2x - 30^\circ = 110^\circ$$

\therefore four angles are $70^\circ, 110^\circ, 70^\circ$ & 110°

12. (B) Let the present ages father and son be x & y years respectively

$$\text{Given } x = 3y \text{ \&}$$

$$x + 15 = 2(y + 15)$$

$$x + 15 = 2y + 30$$

$$3y + 15 = 2y + 30$$

$$y = 15$$

$$x = 3y = 45$$

$$x + y = 60$$

13. (B) Given the ratio of questions = 2 : 2 : 1 = 2x : 2x : x

$$\text{Total marks} = 2x \frac{1}{2} + 2x \times 1 + x \times 2$$

$$\Rightarrow x + 2x + 2x = 100$$

$$5x = 100$$

$$\backslash \text{No. of two mark questions} = x = 20$$

14. (B) $1 - \frac{x^3}{100} = \frac{9}{25} \Rightarrow \frac{16}{25} = \frac{x^3}{100}$

$$\Rightarrow x^3 = 64 \Rightarrow x = 4$$

15. (B) HCF of 1465, 1172 & 879 is 293

$$2^{1465} = 2^{5 \times 293} = 32^{293}$$

$$3^{1172} = 3^{4 \times 293} = 81^{293}$$

$$5^{879} = (5^3)^{293} = 125^{293}$$

\therefore Ascending order is $32^{293}, 81^{293}, 125^{293}$

ie $2^{1465}, 3^{1172}, 5^{879}$

16. (D) Given $xy = 45$ & $x - y = 4$

squaring on both sides

$$x^2 + y^2 - 2yx = 16$$

$$x^2 + y^2 - 90 = 16$$

$$x^2 + y^2 = 106$$

17. (C) Let the price of each article be 'x'
number of articles sold be y then original sales amount = xy

New sales amount

$$= x \frac{(80)}{100} \times \frac{180}{100} y = \frac{36xy}{25}$$

Increased sales =

$$= \frac{36xy}{25} - xy = \frac{11xy}{25}$$

Increased sales percentage

$$= \frac{\left(\frac{11xy}{25}\right)}{xy} \times 100 = 44\%$$

18. (A) Given $l : b : h = 3 : 2 : 1 = 3x : 2x : x$

Given TSA = 88 cm^2

$$2(6x^2 + 2x^2 + 3x^2) = 88 \text{ cm}^2$$

$$22x^2 = 88 \text{ cm}^2$$

$$x^2 = 4$$

$$x = 2$$

$$\text{LSA} = 2h(l+b) = 2(2)[6+4]$$

$$= 4 \times 10 = 40 \text{ cm}^2$$

19. (C) SP after

$$12\% \text{ discount} = \text{MP} \frac{(100-12)}{100}$$

$$= \text{MP} \times \frac{88}{100}$$

SP after 20%

$$\text{on above} = \text{MP} \frac{88}{100} \times \frac{(100-20)}{100}$$

$$= \text{MP} \times \frac{88}{100} \times \frac{80}{100}$$

$$= \text{MP} \times \frac{88}{125}$$

Discount

$$\text{percentage} = \frac{\text{MP} - \text{MP} \left(\frac{88}{125}\right)}{\text{MP}} \times 100$$

$$= \frac{(125-88)}{125 \times \text{MP}} \times 100$$

$$= \frac{37}{5} \times 4$$

$$= \frac{148}{5} = 29 \frac{3}{5} \%$$

$$\text{(OR)} \quad 100 - \frac{(100-d_1)(100-d_2)}{100^{n-1}}$$

$$= 100 - \frac{88 \times 80}{100} = \frac{500-352}{5} = \frac{148}{5}$$

$$\text{(OR)} \quad a+b - \frac{ab}{100}$$

20. (B) Circumference of circle = Perimeter of a rectangle

$$2\pi r = 2(18.7 + 14.3)$$

$$\frac{22}{7} \times r = 33$$

$$r = \frac{33 \times 7}{22} = \frac{21}{2} = 10.5 \text{ cm}$$

21. (D) $\text{CI} = ₹ 15,625 \left(1 + \frac{8}{100}\right)^3 - ₹ 15,625$

$$= ₹ 15,625^1 \times \frac{27}{25} \times \frac{27}{25} \times \frac{27}{25} - ₹ 15,625$$

$$= ₹ (19683 - 15,625)$$

$$= ₹ 4058$$

22. (C) LHS =

$$\sqrt[3]{(\sqrt[3]{x})^3 + 3(\sqrt[3]{x})^2 \sqrt[3]{y} + 3\sqrt[3]{x}(\sqrt[3]{y})^2 + (\sqrt[3]{y})^3}$$

$$= \sqrt[3]{(\sqrt[3]{x} + \sqrt[3]{y})^3}$$

$$= (\sqrt[3]{x} + \sqrt[3]{y})^{3 \times \frac{1}{3}}$$

$$= \sqrt[3]{x} + \sqrt[3]{y}$$

PHYSICS

23. (D) Breadth² = Diagonal² – length²
= 37² – 35²
Breadth = $\sqrt{144}$ = 12
Area = 35 m × 12 m = 420 mts².
24. (C) Area of equilateral triangle
= $\frac{\sqrt{3}}{4} \times 14 \times 14$ cm²
= 49 $\sqrt{3}$ cm²
Altitude of an equilateral triangle
= $\frac{\sqrt{3}}{2} a = \frac{\sqrt{3}}{2} \times 14$ cm = 7 $\sqrt{3}$
Radius of circle = $\frac{2}{3}$ of altitude
= $\frac{2}{3} \times 7\sqrt{3}$
= $\frac{14}{\sqrt{3}}$ cm
Area of shaded part = circle area – triangle area
= $\pi \left(\frac{14}{\sqrt{3}}\right)^2 - 49\sqrt{3}$ cm²
= $\frac{22}{7} \times \frac{14^2 \times 14}{3} - 49\sqrt{3}$
= (205.333 – 84.87) cm²
= 120.46 cm²

25. (D) LHS = $\frac{(2^6)^{\frac{1}{6}} (6^3)^{\frac{1}{3}} (3^4)^{\frac{1}{4}}}{(8^3)^{\frac{1}{3}} (2^4)^{\frac{1}{4}} (3^2)^{\frac{1}{2}}}$
= $\frac{2^{-1} \times 6^{-1} \times 3}{8^{-1} \times 2 \times 3^{-1}}$
= $\frac{\cancel{2} \times \cancel{3} \times 3}{2 \times 2 \times \cancel{3}^2}$
= 3

26. (C) Statements (A), (B) and (D) are not true of both sound and light.
27. (D) Statements (A), (B) and (C) are not true regarding pressure exerted by a liquid. Pressure in a liquid increases with depth, but at the same depth, the pressure is same at all points.
28. (A) Smooth rubber ball will move more easily than the tennis ball as the amount of frictional force acting on the smooth rubber ball is lesser than that acting on the tennis ball which has a rough surface.
29. (D) Electrolysis process is used to separate water into its constituent elements, hydrogen and oxygen.
Options (A), (B) and (C): The techniques given in these options are not used to separate water into its constituent elements.
30. (C) Following statements are true about human eye.
The iris gives a distinct colour to the eye is true.
It has converging (convex) lens is true.
The optic nerve enters the eye near the blind spot is true.
The space between lens and cornea is filled with ciliary muscles is false as it is filled with a transparent liquid called aqueous humous.
31. (D) The correct sequence of transmission of sound in different media from the slowest to the fastest is helium gas, alcohol and metal rod.
32. (C) Diamond is an insulator.
33. (D) The lens in our eye is held in place by the ciliary muscles, which can change the thickness of the lens and hence its focal length. The eye lens becomes thick to see near objects and thin to see distant objects by the muscular contraction and expansion of ciliary muscles.

34. (A) The height of the mercury column drops as the pressure in the bell jar decreases due to the air being pumped out from the jar.

35. (A) The weak zones around the boundaries of plates underneath the earth, which are prone to slide and cause earthquake are commonly known as fault zones.

CHEMISTRY

36. (D) Acid rain is corrosive and harmful to both living and non-living things.

37. (D) Statements (A) and (B) are true. Statement (C) is not true. During spontaneous combustion, a material suddenly bursts into flames. Refer Pg. 70 for statements (A) and (B) and Pg. 69 for statement (C) of VIII NCERT Book.

38. (D) Potassium is the most reactive metal and placed at the top of the reactivity series. Gold is the least reactive and is placed at the bottom of the reactivity series of metals.

39. (C) PET is a synthetic polymer called 'Polyethylene Terephthalate'. PET is generally referred to as 'polyester'. As a plastic, PET is used as a substitute for replacing materials like glass.

Acrylic is a synthetic fibre. Due to its resemblance and properties as that of wool, it is often used as substitute for wool.

40. (B) Statements (A), (C) and (D) are true. LPG being a smokeless fuel does not cause pollution.

41. (A) The correct matching is

P - 2, Q - 3, R - 1, S - 4.

Petroleum gas in liquid form is LPG.

Natural gas is compressed natural gas CNG.

Petroleum is also known by the name black gold.

Paraffin wax is used in making vaseline, candles, ointments, etc.

42. (B) For rusting to occur, there must be oxygen and water. The boiled water has

no oxygen and the thin layer of oil prevents air (containing oxygen) from dissolving in the water.

43. (D) Nylon is used in making bristles of toothbrush, because of its water non-absorption tendency, more strength even in wet condition and resistance towards bacteria and fungus.

44. (A) Some red phosphorus on a matchstick is converted into white phosphorus which burns the matchstick.

45. (A) Copper forms a green coating due to its corrosion. In this process, its surface gets covered with a layer of basic copper carbonate, i.e., it contains copper hydroxide and copper carbonate.

BIOLOGY

46. (B) Nucleus and golgi apparatus are found in both plant and animal cells.

47. (B) Recycling drink cans.

Buying household products designed with less packaging material, help to save our earth.

48. (A) Some living things on earth have become extinct. They became extinct because of over-hunting, the presence of diseases of the destruction of their habitats due to logging or deforestation.

Some living things are in danger of extinction because of over-hunting, poaching, diseases, excessive logging or deforestation.

49. (C) The egg is the largest cell in the human body. It is a female reproductive cell (female gamete). It is produced in the female reproductive system. It does not move much. The sperm is a male reproductive cell (male gamete). It is produced in the male reproductive system. It is transferred through the penis into the female's vagina. It then moves actively to meet the egg inside the female's body. and fertilization occurs.

The egg and the sperm are cells. Each of them has a nucleus that carries

genetic information.

50. (A) X is nucleus and Y is chloroplast.

51. (C) Penicillin is derived from penicillium fungi, weakened bacteria, attenuated virus and killed microbes are usually used to produce vaccine.

52. (A) Structure P is the nucleus of a cell 1 labelled as W in the given diagram is Nucleus.

53. (B) The smell of flowers diffuse with air and reach us with the movement of air particles.

54. (B) Burning unwanted plastic products in our neighbourhood to reduce non-biodegradable rubbish.

Dumping biodegradable refuse such as fruit skins and bones in our sewage to make the water nutrient rich for healthy growth of flowering plants.

55. (B) Infected leaves is not an inherited character.

CRITICAL THINKING

56. (D) Left, Same

57. (C)

58. Delet

59. (C) Water is essential for swimming- without water, there is no swimming. The other choices are things that may or may not be present.

60. (D) 100th year is not leap year. So, 24 february's have 29 days.

THE END
