UNIFIED COUNCIL

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SLSTSE

Test ◦ Assess ◦ Achieve

STATE LEVEL SCIENCE TALENT SEARCH EXAMINATION

CLASS - 8

Question Paper Code : US757

KEY

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

SOLUTIONS

MATHEMATICS

1. **(D)** LHS $= 2^{\frac{1}{6}} \div \left[2^{\frac{1}{5}} \div \left(2^{\frac{2}{3}} \right)^{\frac{1}{4} \times \frac{1}{5}} \right]$

$= 2^{\frac{1}{6}} \div \left[2^{\frac{1}{5}} \div 2^{\frac{1}{30}} \right]$

$= 2^{\frac{1}{6}} \div \left[2^{\frac{1}{5} - \frac{1}{30}} \right]$

$= 2^{\frac{1}{6}} \div 2^{\frac{1}{6}}$

$= 1$

2. **(B)** $\sqrt{41 - \sqrt{21 + \sqrt{19 - \sqrt{9}}}} = \sqrt{41 - \sqrt{21 + 4}}$

$= \sqrt{41 - 5}$

$= \sqrt{36}$

$= 6$

3. **(D)** LHS $= \dfrac{\left(\frac{1}{x}\right)}{\left(\frac{1}{x} + \frac{1}{y}\right)} + \dfrac{\left(\frac{1}{x}\right)}{\frac{1}{x} - \frac{1}{y}}$

$= \dfrac{\left(\frac{1}{x}\right)}{\left(\frac{x+y}{xy}\right)} + \dfrac{\left(\frac{1}{x}\right)}{\left(\frac{y-x}{xy}\right)}$

$$= \frac{y}{x+y} + \frac{y}{y-x}$$

$$= y\left[\frac{1}{x+y} + \frac{1}{y-x}\right]$$

$$= y\left[\frac{y-x+y+x}{y^2-x^2}\right]$$

$$= \frac{2y^2}{y^2-x^2}$$

4. **(C)** $\angle ABC = 180° - 135° = 45°$

$\angle ACB = 180° - 110° = 70°$

In ΔABC, $45° + 70° + \angle x = 180°$

$\angle x = 65°$

5. **(B)** $\text{LHS} = \dfrac{\left(x^3+8y^3\right)(x-5)}{\left(x^2-2xy+4y^2\right)\left(x^2-25\right)}$

$$= \frac{(x+2y)\left(x^2-2xy+4y^2\right)(x-5)}{\left(x^2-2xy+4y^2\right)(x+5)(x-5)}$$

$$= \frac{x+2y}{x+5}$$

$$= \frac{7+22}{7+5}$$

$$= \frac{29}{12}$$

6. **(A)** $P : Q = \frac{33}{7} : \frac{33}{8} = 8:7 = 8\times8 : 7\times8 = 64:56$

$Q : R = \frac{8}{3} : \frac{7}{3} = 8:7 = 8\times7 : 7\times7 = 56:49$

$\therefore$ P : Q : R = 64 : 56 : 49

7. **(D)** $\text{LHS} = \dfrac{1}{1\times2} + \dfrac{1}{2\times3} + \ldots\ldots + \dfrac{1}{2018\times2019}$

$$= \frac{1}{1} - \frac{1}{2} + \frac{1}{2} - \frac{1}{3} + \ldots\ldots + \frac{1}{2018} - \frac{1}{2019}$$

$$= 1 - \frac{1}{2019}$$

$$= \frac{2018}{2019}$$

8. **(C)** $\sqrt{3}$ is irrational number

9. **(C)** $\sqrt{\frac{1}{16}+\frac{1}{9}} = \sqrt{\frac{9+16}{16\times9}} = \sqrt{\frac{25}{144}} = \frac{5}{12}$

10. **(B)** Let side of cube 'a' cm

Given $\sqrt{3}a = 8\sqrt{3}$ cm

$a = 8$ cm

Total surface area $= 6a^2$

$= 6 \times 64\ cm^2$

$= 384\ cm^2$

11. **(D)** If the angles in a triangle are in the ratio of 1 : 2 : 3, then their corresponding sides are in the ratio of $1 : \sqrt{3} : 2$

12. **(A)** Ascending order of the given data is 64, 66, 68, 72, 73, 75, 77, 78, 79, 82, 84, 85, 86

$\therefore$ Middle most value in the ascending order = 77

$\therefore$ Median = 77

13. **(B)** $4\sqrt{2} = \sqrt{4^2\times2} = \sqrt{16\times2} = \sqrt{32}$

14. **(A)** Given $a^2 + b^2 + c^2 = ab + bc + ca$

$\Rightarrow 2a^2 + 2b^2 + 2c^2 = 2ab + 2bc + 2ca$

$\Rightarrow a^2+a^2+b^2+c^2+c^2+c^2 = 2ab + 2bc + 2ca$

$\Rightarrow a^2-2ab+b^2+b^2-2bc+c^2+c^2-2ca+a^2 = 0$

$\Rightarrow (a-b)^2 + (b-c)^2 + (c-a)^2 = 0$

$\Rightarrow a - b = 0$ and $b - c = 0$

$\Rightarrow a = b = c$

$\Rightarrow$ It is an equilateral triangle

15. **(D)** $\text{LHS} = \dfrac{x\left(16x^2-1\right)}{(4x+1)(20x-5)} = \dfrac{x(4x+1)(4x-1)}{5(4x+1)(4x-1)}$

$$= \frac{x}{5}$$

$$= \frac{5555}{5}$$

$$= 1111$$

16. **(B)** $x^3 - 1 = (x^2 + x + 1)(x - 1)$

$\therefore$ HCF of $(x-1)(x^2+x+1)$ & x^2+x+1 is (x^2+x+1)

17. **(B)** Radius of circle = $\frac{14}{2}$ cm = 7 cm

Area of shaded region

= Area of square – Area of 4 quadrants

= $(14\text{ cm})^2 - 4 \times \frac{1}{4} \times \pi r^2$

= $196\text{ cm}^2 - \frac{22}{7} \times 7 \times 7\text{ cm}^2$

= $196\text{ cm}^2 - 154\text{ cm}^2$

= 42 cm^2

18. **(D)** LCM of 2^k, 2^{k+1} & 2^{k+5} is 2^{k+5}

19. **(B)** Let a = kA, b = kB, C = kC, d = kD

then, $\frac{\sqrt{aA} + \sqrt{bB} + \sqrt{cC} + \sqrt{dD}}{\sqrt{\left[(a+b+c+d)(A+B+C+D)\right]}}$

= $\frac{A\sqrt{k} + B\sqrt{k} + C\sqrt{k} + D\sqrt{k}}{\sqrt{(kA+kB+kC+kD)(A+B+C+D)}}$

= $\frac{\sqrt{k}(A+B+C+D)}{\sqrt{k}(A+B+C+D)} = 1$

20. **(B)** If $x = 10$ then $x^2 + x + 11 = 100 + 10 + 11 = 121$ which is not a prime

21. **(A)** The area of rectangle WXYZ = 10 × 6 = 60.

Since the shaded area is half of the total area of WXYZ, its area is $\frac{1}{2} \times 60 = 30$.

Since AD and WX are perpendicular, then the shaded area has four right angles, so is a rectangle.

Since square ABCD has a side length of 6, then DC = 6.

Since the shaded area is 30, then PD × DC = 30 or PD × 6 = 30 or PD = 5.

Since AD = 6 and PD = 5, then AP = 1.

22. **(D)** First, we note that $5^{35} - 6^{21}$ is a positive integer, since $5^{35} - 6^{21} = (5^5)^7 - (6^3)^7 = 3125^7 - 216^7$ and 3125 > 216.

Second, we note that any positive integer power of 5 has a units digit of 5. Since, 5 × 5 = 25 and this product has a units digit of 5, then the units digit of 53 is obtained by multiplying 5 by the units digit 5 of 25. Thus, the units digit of (5^3) is 5. Similarly, each successive power of 5 has a units digit of 5.

Similarly, each power of 6 has a units digit of 6.

Therefore, 5^{35} has a units digit of 5 and 6^{21} has a units digit of 6. When a positive integer with units digit 6 is subtracted from a larger positive integer whose units digit is 5, the difference has a units digit of 9.

Therefore, $5^{35} - 6^{21}$ has a units digit of 9.

23. **(B)** As they are in direct proportion

$\therefore$ Object ratio = Image ratio

$\frac{17.5\text{ m}}{40.25\text{ m}} = \frac{x}{28.75}$

$\therefore x = 12.5$ m

24. **(B)** Let the edge of each cube be 'x' cm

Given $24 \times 30 \times 36\text{ cm}^3 - 8x^3 = 20{,}088\text{ cm}^2$

$(25{,}920 - 20{,}088)\text{ cm}^3 = 8x^3$

$x^3 = \frac{5832}{8}\text{ cm}^3 = 729\text{ cm}^3$

$x^3 = (19\text{ cm})^3$

$x = 9$ cm

25. **(C)** $\frac{15}{100} \times 400 = 60$

$\frac{60+x}{400+x} \times 100 = 32$

$\Rightarrow \frac{60+x}{400+x} = \frac{32}{100} = \frac{8}{25}$

$\Rightarrow x = 100\text{ m}l$

PHYSICS

26. **(C)** The speed of sound in solids is about 5000 m/s i.e., (railway tracks) is more than that in air. So, a person can hear an approaching train when he presses his ear to the railway track faster. A person standing on the track hears the sound of an approaching train very slowly as the speed of sound in air is between 300 to 340 m/s.

27. **(D)** A smooth surface like glass offers least resistance as the friction produced is less. It is easy to move a load of 100 g on a glass surface as it is smoother than other surfaces. Hence, the reading on this scale would be the smallest.

28. **(D)** The density of an object is not a force as density is equal to mass/volume.

29. **(A)** Tin cans used for storing soft drinks or food items are usually electroplated with tin because tin is less reactive than the base metal with which the can is made. Tin does not contaminate the food or soft drink. It also does not get corroded.

30. **(D)** Noise pollution is hazardous to human's health in many ways. Insomnia (lack of sleep), hypertension (high blood pressure) and hearing impairment (temporary or permanent hearing problem) are the effects of noise pollution.

31. **(A)** A sharp needle has a tip that exerts a force on a very small area of contact thereby producing more pressure than the pressure exerted by a blunt needle.

32. **(D)** Friction not only wears out machine parts but also produces heat that can damage sensitive moving parts in a machine by slowing it down. Friction also produces squeaking noise due to rubbing of worn out parts in a machine.

33. **(B)** An LED has two leads. One lead is slightly longer than the other. The longer lead is always connected to a positive terminal of the battery while the shorter lead is always connected to a negative terminal of the battery.

    Circuit shown in option (B), has closed switch. Only this makes the LED glow.

34. **(D)** The three delicate bones present in the middle ear of humans are the hammer, the anvil and the stirrup.

35. **(B)** In cities, water from an overhead tank at a height flows down due to difference in pressure and gravitational force.

CHEMISTRY

36. **(A)** As X and Y are carbon rich materials, thus these could be coal or its derivatives. When coal (X) is heated in the absence of air, coke (Y) is formed which is tough, porous and a black substance.

$$\underset{(X)}{\text{Coal}} \xrightarrow{\text{Absence of air}} \underset{(Y)}{\text{Coke}}$$

37. **(B)** Teflon, a polymer is chemically unreactive and thermally stable as it is not affected by heat.

38. **(B)** Statements (A), (C) and (D) are true of sodium. Sodium dissolves in water to form a base called sodium hydroxide. Bases turn red litmus paper to blue.

39. **(A)** A good fuel has low ignition temperature and high calorific value besides satisfying other conditions.

40. **(A)** The correct matching is

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

    Petroleum gas in liquid form – LPG.

    Natural gas that is compressed – CNG. Petroleum is also known by the name black gold.

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

41. **(D)** Bakelite and Melamine are two examples of thermosetting plastics. Electrical switches are made from bakelite. Floor tiles and fire proof fabrics are made from melamine

42. **(D)** Metals are used to make wire. Non-metals like diamond is used in glass cutting. Chlorine gas is passed through drinking water to kill germs. Sulphur is used in the vulcanisation of rubber to make it hard.

43. **(B)** The combustion in which heat, light and sound are produced is known as explosive combustion.

44. **(C)** Anthracite is the most superior quality of coal which contains 94-98% carbon. It is lustrous. It burns without smoke and gives more heat and little ash. Hence, the quality of coal in descending order is Anthracite, bituminous, lignite, peat.

45. **(D)** The correct matching is:

a-4, b-1, c-2, d-3

(i) Silk - Saree

(ii) Nylon - Rope

(iii) Acrylic - Sweater

(iv) Plastic - Bottle

BIOLOGY

46. **(A)** In the figure given option A are RBC's RBC cells are disc shaped and an iron containing protein called heamoglobin. Heamoglobin helps in transport of oxygen.

47. **(D)** Animal husbandry deals with increase in milk production, porper utilisation of animal wastes and protection of animals against different diseases.

48. **(D)** Some useful microorganisms like yeast help in fermentation for making breas and alcohol. Certain fungi (Penicillium) are used to produce antibiotics are important to man as they help in producing antibiotics. They also decompose comples waste materials into simple substances.

49. **(B)** Consumption of contaminated food and water cause amoebic dysentry.

50. **(B)** Dodo is an extinct species.

51. **(C)** The egg of a hen is a cell.

52. **(A)** Growing of pulses in one season and followed by rice is called croprotation method.

53. **(C)** A plant cell is characterized by the presence of cell wall, chloroplast and a large vacuole.

54. **(D)** Moulting means casting of old skin.

55. **(A)** The change from larva to adult is called metamorphosis. In frog, metamorphosis from tadpole to adult frog is controlled by thyroxine hormone secreted by thyroid gland.

CRITICAL THINKING

56. **(D)** Cace = paki

57. **(A)** 

58. **(D)**

59. **(B)** 10 rabbits $\rightarrow$ 2 goats

9 goats $\rightarrow$ 3 cows

8 cows $\rightarrow$ 2 horses

$(5 \div 2) \times 8$ cows $\leftarrow$ 5 horses

20 cows $\leftarrow$ 5 horses

(3×20) goats $\leftarrow$ 20 cows

60 goats $\leftarrow$ 20 cows

(30×10) rabbits $\leftarrow$ 60 goats

300 rabbits $\leftarrow$ 60 goats

5 horses can be exchanged for 300 rabbits.

60. **(B)** There are 99 '3's before the 100^{th} '3'.

1 '8' after the 1st '3',

2 '8's after the 2nd '3',

.

.

.

99 '8's after the 99^{th} '3'.

$1 + 2 + 3 + ... + 99 = 5050 - 100$

$= 4950$

$4950 + 99 = 5049$

There are 5049 digits before the 100th '3'.

THE END