



# UNIFIED COUNCIL

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## NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION (UPDATED)

CLASS - 8

Question Paper Code : UN465

### KEY

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

### SOLUTIONS

#### MATHEMATICS

1: (C) Given  $7\frac{1}{x} \times \frac{19}{3} = \frac{95}{2}$

$$7\frac{1}{x} = \frac{95}{2} \times \frac{3}{19}$$

$$7\frac{1}{x} = \frac{15}{2} = 7\frac{1}{2}$$

$$\therefore x = 2$$

2: (C) Option 'C' is true.

3: (A) 1 appears 21 times from 1 to 100.

4: (D) A sphere has no flats surface.

5: (C) Let the original side of a cube be a cm.

$$\therefore \text{TSA of original cube} = 6a^2$$

Given each side is doubled

$$\text{New side (A)} = 2a$$

$$\therefore \text{New TSA} = 6(2a \text{ cm})^2 = 6 \times 4a^2 \text{ cm}^2 = 4 \times 6a^2 \text{ cm}^2$$

$$\text{Increased TSA} = 4 \times 6a^2 - 6a^2 = 3 \times 6a^2$$

Increased TSA percentage

$$= \frac{3 \times 6a^2}{6a^2} \times 100 = 300\%$$

- 6: (D) Given  $\sqrt[3]{x} = -5$   
cubing on both sides  
 $\therefore x = (-5)^3 = -125$
- 7: (A)  
$$\frac{(67.542)^2 - (32.458)^2}{7000 - 3491.6} = \frac{(67.542 + 32.458)(67.542 - 32.458)}{3508.4}$$
$$= \frac{100 \times 35.084}{3508.4}$$
$$= \frac{3508.4}{3508.4}$$
$$= 1$$
- 8: (A) Population in 2021  
$$= 3.2 \times 10^7 \times \left( \frac{100+10}{100} \right)$$
$$= 32000000 \times \frac{110}{100}$$
$$= 35200000$$
$$= 3.52 \times 10^7$$
- 9: (C) Given  $116 + 16 = 2(34 + y)$   
$$\frac{132}{2} = 34 + y$$
$$66 - 34 = y$$
$$y = 32$$
- 10: (B) Given  $3^{x-y} = 3^3 \Rightarrow x - y = 3 \rightarrow (1)$   
 $3^{x+y} = 3^5 \Rightarrow x + y = 5 \rightarrow (2)$   
eq (1)+(2)  $\Rightarrow x - y + x + y = 3 + 5$   
 $2x = 8$   
 $x = \frac{8}{2} = 4$   
 $4 + y = 5 \rightarrow (2)$   
 $y = 5 - 4 = 1$
- 11: (C)  $3x^2 + 24x + 36 = 3(x^2 + 8x + 12)$   
 $= 3(x^2 + 6x + 2x + 12)$   
 $= 3(x(x + 6) + 2(x + 6))$   
 $= 3(x + 6)(x + 2)$   
 $\therefore$  Length =  $(x + 6)$  breadth =  $(x + 2)$  & height = 3

- 12: (A) PXQY is a parallelogram
- 13: (B) It is in indirect variation  
 $\therefore (600)(180 - 40) = (600 - 200)x$   
$$\frac{600 \times 140}{400} = x$$
$$x = 210$$
- 14: (D) Area of the sector =  $\frac{x}{360^\circ} \times \pi r^2$   
$$= \frac{45^\circ}{360^\circ} \times \frac{22}{7} \times 7 \text{ m} \times 7 \text{ m}$$
$$= \frac{1}{8} \times \frac{22^{11}}{7} \times 7 \times 7$$
$$= \frac{77}{4} \text{ m}^2$$
$$= 19.25 \text{ m}^2$$
- 15: (A)  $\frac{1}{3} = 0.33$  and  $\frac{4}{5} = 0.8$   
$$\frac{17}{30} = 0.56$$
$$\frac{9}{10} = 0.9$$
$$\frac{1}{4} = 0.25$$
$$1\frac{7}{10} = 1.7$$
  
Hence  $\frac{17}{30}$  lies between  $\frac{1}{3}$  and  $\frac{4}{5}$
- 16: (C) In a square diagonals are equal and perpendicular - bisectors.
- 17: (D)  $a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$   
 $(a + b + c)$  is a factor of  $(a^3 + b^3 + c^3 - 3abc)$

18: (B) Let the first part be ₹  $x$   
 $\therefore$  second part = ₹  $(45000 - x)$   
 Given 10% ₹  $x = 5\%$  of ₹  $(45,000 - x)$

$$\Rightarrow \frac{10^2}{100} \times ₹ x = \frac{5}{100} \times ₹ (45000 - x)$$

$$2x + x = ₹ 45000$$

$$3x = ₹ 45000$$

$$x = \frac{₹ 45000}{3} = ₹ 15,000$$

$\therefore$  Bigger part = ₹  $(45000 - x) = ₹ 30,000$ .

19: (A)  $20x^2 + 21\sqrt{3}x - 15 = 20x^2 + 25\sqrt{3}x - 4\sqrt{3}x - 15$   
 $= 5x(4x + 5\sqrt{3}) - \sqrt{3}(4x + 5\sqrt{3})$   
 $= (4x + 5\sqrt{3})(5x - \sqrt{3})$

20: (D) Given  $a + \frac{1}{a} = 4.25 = \frac{425}{100} = \frac{17}{4}$

Cubing on both sides

$$a^3 + \frac{1}{a^3} + 3a \times \frac{1}{a} \left( a + \frac{1}{a} \right) = \left( \frac{17}{4} \right)^3$$

$$a^3 + \frac{1}{a^3} + 3 \left( \frac{17}{4} \right) = \frac{4913}{64}$$

$$a^3 + \frac{1}{a^3} = \frac{4913}{64} - \frac{51}{4} = \frac{4913 - 816}{64} = \frac{4097}{64}$$

$$= 64.015$$

21: (C) Let the number to be divided be 'x'

$$\text{Given } \left( \frac{-33}{8} \right) \times \frac{1}{x} = \frac{-22}{3}$$

$$-\frac{33}{8} \times \frac{-3}{22} = x$$

$$= \frac{9}{16} = x$$

22: (C) Distance travelled in 35 minutes

$$= \frac{72^6 \text{ KM}}{60^7 \text{ min}} \times 35^7 \text{ min}$$

$$= 42 \text{ km}$$

23: (A) Given  $a^3 = \frac{x^3}{8} \text{ cm}^3 = \left( \frac{x}{2} \text{ cm} \right)^3$

$$\therefore a = \frac{x}{2} \text{ cm}$$

$$\therefore \text{Surface area} = 6a^2 = 6 \times \left( \frac{x}{2} \text{ cm} \right)^2$$

$$= 6 \times \frac{x^2}{4} \text{ cm}^2$$

$$= \frac{3x^2}{2} \text{ cm}^2$$

24: (C)  $\sqrt{1^3 + 2^3 + 3^3 + 4^3 + 5^3} = \sqrt{1 + 8 + 27 + 64 + 125}$

$$= \sqrt{225}$$

$$= 15$$

25: (C) Side of square =  $\sqrt{(4a^2 + 12ab + 9b^2)} \text{ cm}$

$$= \sqrt{(2a + 3b)^2} \text{ cm}$$

$$= (2a + 3b) \text{ cm}$$

$$\text{Perimeter of a square} = 4s = 4(2a + 3b) \text{ cm}$$

$$= (8a + 12b) \text{ cm}$$

### PHYSICS

26: (D) Light travels nearly a million times faster than sound and this is why we see the flash before we hear the boom of an explosion. Light travels at 300,000,000 m/s but sound travels at a speed of 330 m/s, nearly a million times slower than light.

27: (B) Gravitational force causes a satellite to move in an orbit around the earth.

28: (A) Tall building of 15 storeyed is an easy target for lightning.

29: (C) The proper inflation of tyres saves fuel because sliding contact with the road decreases.

30: (D) Sea water is a good conductor of electricity as it contains salts which increases the conductivity.

31. (C) The iris gives a distinct colour to the eye is true. The yellow spot is extremely sensitive to light is true. The space between the lens and cornea is filled with ciliary muscles is false. The optic nerve enters the eye near the blind spot is true.
32. (B) Heat is a form of energy It is supplied to a substance during Heating. Bending, Pressing and Twisting involve use of pull or push forces.
33. (C) Cheap metal objects of many types are electroplated with chromium to prevent them from corrosion and give a shiny appearance. Table made up of wood is not electroplated with chromium.
34. (C) Frictional force acts on both moving and non-moving bodies. When bodies are at rest, static friction plays a role and under motion, dynamic friction plays its role.
35. (D) Birds like kite and eagle have more cones and few rods. Owl has large number of rods but only a few cones.

### CHEMISTRY

36. (A) A fuel is said to be good if it has the following characteristics:
- (i) Low ignition temperature.
  - (ii) Low cost.
  - (iii) Causing minimum pollution on burning.
  - (iv) Readily available.
37. (A, C) Sulphur, a non-metal is found in onions and eggs.
38. (A) Methane( $\text{CH}_4$ ) burns in air to form  $\text{CO}_2$ ,  $\text{H}_2\text{O}$  and also releases heat as given below:
- $$\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O} + \text{Heat}$$
39. (C) Differences (i) and (iii) are true of thermoplastics and thermosetts.
40. (C) Aluminium is a light metal. It is a good conductor of heat and electricity. It is malleable and ductile.
41. (C) When solid fuels like wood or coal are burnt in air, due to incomplete combustion unburnt carbon (X) particles or carbon monoxide gas is released into the atmosphere. Carbon monoxide is a poisonous gas and when inhaled by humans causes a respiratory disease (Y).
42. (B) Teflon is chemically unreactive and thermally stable.
43. (A) Copper vessel, steel spoon and iron nail are metals that are sonorous in nature. Wooden chair and glass vase are non-metals that are not sonorous.
44. (D) Incomplete combustion of a fuel results in the formation of unburnt carbon and some poisonous gases like 'CO' and oxides of nitrogen which cause air pollution leading to many respiratory problems.
45. (A) Carbon monoxide is the most harmful substance for the human body.

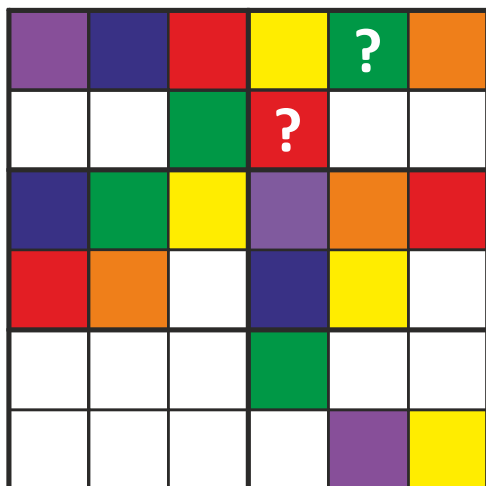
### BIOLOGY

46. (B) A paramecium is a single-celled (unicellular) organism. It can reproduce asexually from a single parent by splitting into two new organisms in a process called binary fission. (Binary fission is a method of cell division.)
47. (C) Euglena, Chlamydomonas and Spirogyra are autotrophs.
48. (D) The gland above the kidney is adrenal.
49. (A) X - Egg nucleus; Y - Sperm.
50. (B) Red blood cells are small and flexible so that they can fit through narrow blood vessels. They have a biconcave shape to maximize the surface area for oxygen absorption.
51. (D) Harrow is an agricultural implement or tool used to remove weeds. It consists of a shaft attached with comb like structure having sharp teeth. Harrow is used to break lumps of soil and even off the soil surface.

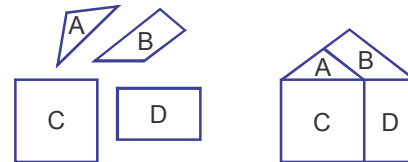
52. (C) Part labelled in the cell 3 is cell wall. Structure Z is the cell wall of a plant cell. The cell wall of a plant cell is made up of cellulose, a tough material that criss-crosses to form a strong and stiff layer. The cell wall of a plant cell supports the cell and gives it a regular shape.
53. (D) X is placenta. It is the connection between the mother and foetus. It helps in gaseous exchange, removes wastes and secretes hormones. Amnion provide quiet protective environment to the foetus.
54. (B) Dodo is an extinct species. It was flightless bird endemic to Indian Ocean island of Mauritius. Dodo got extinct in 17<sup>th</sup> century. Introduction of exotic species of animals like dogs, pigs, cats, rats, etc. to the island resulted in, extinction of Dodo.
55. (D) The given figures J and M are algae, K and L are protozoans.

**CRITICAL THINKING**

56: (C)



**THE END**



57: (B)

58: (D)

If Vani is older than Kathy and Eshwar is older than Vani, then Katiya has to be the youngest of the three.

Option (B) is clearly wrong because Eshwar is the oldest. There is no information in the paragraph to support either option (A) or option (C).

59: (C)

Dragon's eye level is the same as the tallest building height and the helicopter is flying above its eye level, to the left of it.

60: (B)

Karthik is the army officer.

In terms of age

The teacher is younger than Lokesh

= Lokesh > Harsha (teacher)

Harsha is older than the army officer

= Harsha > Army officer

Lokesh > Harsha (teacher) > Army officer

So, the Army officer is Karthik

	Teacher	Army	Doctor
Karthik	✗		
Lokesh	✗		
Harsha	✓	✗	