



UNIFIED COUNCIL

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NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION (UPDATED)

CLASS - 8

Question Paper Code : UN446

KEY

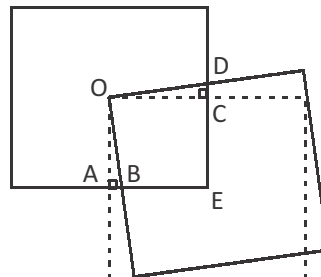
1. D	2. D	3. C	4. C	5. C	6. D	7. D	8. B	9. A	10. D
11. D	12. D	13. A	14. C	15. Del	16. D	17. D	18. D	19. D	20. D
21. C	22. B	23. A	24. B	25. C	26. D	27. D	28. A	29. D	30. C
31. A	32. D	33. B	34. D	35. C	36. A	37. C	38. A	39. B	40. C
41. B	42. D	43. B	44. A	45. C	46. D	47. B	48. B	49. B	50. C
51. D	52.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

SOLUTIONS

MATHEMATICS

- (D) Irrational number
- (D) $2x + 4x = 180^\circ$
 $x = 30^\circ$
 $30^\circ + \angle BAD = 180^\circ$
 $\angle BAD = 150^\circ$
- (C) $(6x+7)(2x+3) = (4x+5)(3x+2)$
 $12x^2 + 18x + 14x + 21$
 $= 12x^2 + 8x + 15x + 10$
 $9x = -11$
 $x = -\frac{11}{9}$

4. (C)



In $\triangle AOB$ $\angle AOB = x$ then
 $\angle BOC = 90^\circ - x$
 $\therefore \angle COD = \angle BOD - \angle BOC$
 $= 90^\circ - (90^\circ - x)$
 $= 90^\circ - 90^\circ + x = x$

$$\angle COD = \angle AOB \rightarrow (1)$$

In $\triangle AOB$ & $\triangle COD$

$$\angle A = \angle C = 90^\circ \text{ (angle)}$$

OA = OC (side)

$\angle AOB = \angle COD$ (Q angle & from eq (1))

$\therefore \triangle AOB \cong \triangle COD$ [Q ASA congruency]

\therefore Area of $\triangle AOB$ = area of $\triangle COD$

Area of shaded region BEDO = area of quadrilateral BECO + area of $\triangle COD$

= Area of quadrilateral BECO + area of $\triangle AOB$

= Area of square OAEC = $\frac{1}{4}$ area of original square = 6 cm^2

5. (C) Let breadth be 'x' cm

\therefore Length = $(x + 9)$ cm

$$\text{Given } (x+3)(x+9+3) - (x)(x+9) = 84$$

$$(x+3)(x+12) - x^2 - 9x = 84$$

$$x^2 + 15x + 36 - x^2 - 9x = 84$$

$$6x = 84 - 36$$

$$x = 8$$

\therefore lengths = $x + 9 = 17$

6. (D) Given $f(-1) = 0$

$$(-1)^4 + (P-3)(-1)^3 - (3P-5)(-1)^2 + (2P-9)(-1) + 6 = 0$$

$$1 - P + 3 - 3P + 5 - 2P + 9 + 6 = 0$$

$$-6P = -24$$

$$P = 4$$

7. (D) Let $2^a = x$ & $36 = y \Rightarrow x + y = 17 \rightarrow (2)$

$$\& 2^a \times 2 - 3b \times 3 = -11$$

$$2x - 3y = -11 \quad \rightarrow (2)$$

$$2x + 2y = 34 \quad \rightarrow (1) \times 2$$

$$2x - 3y = -11 \quad \rightarrow (2)$$

$$\hline 5y = 45$$

$$y = 9$$

$$x + 9 = 17$$

$$x = 8$$

$$x = 8 = 2^a \quad \text{and} \quad x = 9$$

$$2^3 = 2^a \quad 3^b = 3^2$$

$$\therefore a = 3$$

$$b = 2$$

$$8. \quad (B) \quad \text{LHS} = \left(\frac{\frac{1}{x} + \frac{1}{y}}{\frac{1}{x}} \right)^{-1} - \left(\frac{\frac{1}{x} - \frac{1}{y}}{\frac{1}{x}} \right)^{-1}$$

$$= \left(\frac{x+y}{x} \times \cancel{x} \right)^{-1} - \left(\frac{y-x}{x} \times \cancel{x} \right)^{-1}$$

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

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

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

9. (A) Total cost for painting

$$= [2h(l + b)] \times ₹ 4$$

$$= 12 \times 15 \times 4$$

$$= ₹ 720$$

10. (D) $4(4x)^7 = 4^{36}$

$$(4x)^7 = 4^{35}$$

$$(4x)^7 = (4^5)^7$$

$$4x = 4^5$$

$$x = 4^4$$

$$x = 256$$

$$11. \quad (D) \quad \text{LHS} = \frac{12 + 6m^2 - 3m - 18m^2 - 6m - 12}{4m - \cancel{6} + 3m + \cancel{6}}$$

$$= \frac{-12m^2 - 9m}{7m}$$

$$= -3 \cancel{m} \frac{(4m+3)}{7 \cancel{m}}$$

$$12. \quad (D) \quad A : B : C = \frac{1}{6} : \frac{1}{4} : \frac{1}{3} = \frac{1}{6} \times 12 : \frac{1}{4} \times 12 : \frac{1}{3} \times 12$$

$$= 2 : 3 : 4$$

$$\text{B's share} = \frac{3}{9} \times ₹ 207 = ₹ 69$$

$$13. \quad (A) \quad 27^{64} = (3^3)^{64} = 3^{192}$$

$$9^{100} = (3^2)^{100} = 3^{200}$$

$$81^{49} = (3^4)^{49} = 3^{196}$$

$$3^{198} = 3^{198}$$

$\therefore 9^{100}$ is the greatest

$$14. \text{ (C)} \quad \text{LHS} = \sqrt[3]{x^6 + 3x^2y^4 - 3x^4y^2 - y^6}$$

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

$$= \sqrt[3]{a^3 - 3a^2b + 3ab^2 - b^3}$$

where $x^2 = a$ & $y^2 = b$

$$= \sqrt[3]{(a-b)^3}$$

$$= (a-b)$$

$$= x^2 - y^2$$

15. Deleted

$$16. \text{ (D)} \quad \sqrt{p^3 + 3p^2 + 3p + 1} = \sqrt{(p+1)^3} = (p+1)^{3/2}$$

$$= (25)^{3/2} = 5^{2 \times \frac{3}{2}} = 125$$

$$17. \text{ (D)} \quad \text{Net milk} = 60\% \text{ of } 150 \text{ litres}$$

$$= \frac{60}{100} \times 150 \text{ litres}$$

$$= 90 \text{ litres}$$

90 litres is 50% of 180 litres

$\therefore 180 - 150 = 30$ litres water to be added

$$18. \text{ (D)} \quad 3^{1-\frac{1}{2}n} = 3^{\frac{1}{25}} = 3^{1-\frac{1}{32}} = 3^{\frac{31}{32}}$$

$$\therefore 3^n = 3^{\frac{31}{32}}$$

$$n = \frac{31}{32}$$

$$19. \text{ (D)} \quad 8 - 4 = 4 \quad \& \quad 8 + 4 = 12 \text{ which is } \frac{1}{7} \text{ of } 84$$

$$20. \text{ (D)} \quad \text{Divisor} = 5 \times \text{remainder} = 5 \times 48 = 240$$

$$\text{Quotient} = \frac{\text{Divisor}}{12} = \frac{240}{12} = 20$$

$$\therefore \text{Dividend} = \text{Divisor} \times \text{quotient} + \text{remainder}$$

$$= (240)(20) + 48 = 4800 + 48 = 4848$$

$$21. \text{ (C)} \quad P \left(1 + \frac{11}{100}\right)^2 - P - \frac{P \times 11 \times 2}{100} = ₹ 363$$

$$P \left(\frac{111}{100}\right)^2 - P - \frac{11P}{50} = ₹ 363$$

$$\frac{12321 \times P}{10,000} - P - \frac{11P}{50} = ₹ 363$$

$$\frac{12321P - 10,000P - 2200P}{10,000} = ₹ 363$$

$$\frac{121P}{10,000} = ₹ 363$$

$$P = ₹ 30,000$$

$$22. \text{ (B)} \quad \text{Difference in speed} = 54 - 45 = 9 \text{ km / h}$$

Time taken to cover 9 kms

$$= \frac{9 \times 60}{54}$$

$$= 10 \text{ min}$$

$$23. \text{ (A)} \quad (2.4 \text{ m})^3 = 13.824 \text{ m}^3$$

$$24. \text{ (B)} \quad \text{LHS} = \left[\frac{126^{\cancel{6}^2} \times 65^{\cancel{8}^4} \times 45^{\cancel{5}^5}}{147^{\cancel{2}^1} \times 243^{\cancel{8}^1}} \right]^{\frac{1}{2}} = 10^{\frac{1}{2}}$$

$$25. \text{ (C)} \quad \sqrt{1^3 + 2^3 + \dots + 10^3} = \sqrt{1+8+27+\dots+1000}$$

$$= \sqrt{3025} = 55$$

PHYSICS

26. (D) An explosion in outer space does not produce sound as sound cannot travel in vacuum.

27. (D) The pressure of air outside the cup is higher than the pressure inside the cup.

28. (A) Due to roughness of sand paper, a wooden block when pushed with same force could move a distance of 11 cm only. Among the given surfaces, sand paper produced the most frictional force, as it travelled less distance than others.

29. (D) Copper sulphate solution, graphite and acidified water conduct electricity. Solid NaCl does not conduct electricity. NaCl solution conducts electricity.

30. (C) Braille system has 63 characters or dot patterns.

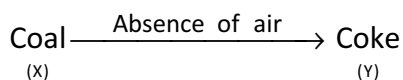
31. (A) As the same instrument is producing two types of sounds in the same medium, the speed of sound remains the same. In the case of frequency, the same instrument is producing low pitch as well as high pitch sounds. As pitch

is α frequency, low pitch sound has low frequency and high pitch sound has high frequency, so frequency is different for the same instrument.

32. (D) The force due to the electrical charges on objects is called electrostatic force. A plastic ruler acquired negative charge on rubbing with woollen cloth and attracts tiny pieces of paper and woollen cloth acquired positive charge.
33. (B) Combinations given in options (A), (C) and (D) are not possible. Unlike charges attract and like charges repel.
34. (D) Copper sulphate is a suitable electrolyte for copper plating an iron nail.
35. (C) As per the given figure, $d_1 = d_2$ i.e., object distance = image distance. Angle $\angle i = \angle r$, so angles $\angle x = \angle y$ and $\angle w = \angle z$ respectively are also equal.

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. So, X = coal and Y = coke.



37. (C) Fuel Q is most ideal as it leaves no residue and does not explode on burning.
38. (A) When metal zinc reacts with both a dilute acid and a dilute base, hydrogen gas is released as a common product as given below.
- $$\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2 \downarrow$$
- $$\text{Zn} + 2\text{NaOH} \rightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2 \uparrow$$
39. (B) Polyester being a synthetic fabric, will melt when it comes in contact with hot iron. So, it should not be ironed with a hot iron.
40. (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).

41. (B) Density of natural gas is less than oil and water. Hence, in the oil wells, natural gas forms the top most layer followed by oil and water.
42. (D) II (wool) and III (cotton) are natural fibres. So, they burn to form a residue. I (nylon) and V (polyester) are synthetic fibres. So, they melt on burning.
- II (wool) and IV (silk) both have proteins similar to the protein present in hair. So, they give smell of burning hair.
43. (B) Statements (A), (C) and (D) are true. Non-metals are less abundant than metals as they are only 15%.
44. (A) A good fuel has low ignition temperature and high calorific value besides satisfying other conditions.
45. (C) Copper is much less reactive than the other three metals and does not react with dilute hydrochloric acid to produce hydrogen gas.

BIOLOGY

46. (D) When an animal is dead and gone forever then it is said to be extinct.
47. (B) In the given cell diagram, the part labelled 2 is nucleus.
48. (B) The diagram in option B shows an organisms undergoing sexual reproduction. Sexual reproduction involves the fusion of male (sperm) and female (eggs) gametes.
49. (B) All mammals are multiple-cellular, i.e., they are made up of more than one cell. Reproduction in mammals involves a male and a female. This way of reproduction is known as sexual reproduction.

[A sexual reproduction does not involve a male and a female.]

Mammals carry out internal fertilization i.e, fertilization occurs inside the females.

Most mammals gave birth to their young alive except the spiny anteater and the platypus.

50. (C) An egg must be fertilized by a sperm before it can develop into a baby.
51. (D) Earthworms do not feed on the green leaves of crops. They speed up the decomposition of fallen leaves. When the leaves decompose in the soil, the soil becomes fertile. Their casting also make the soil fertile. They help to loosen and aerate the soil too.
52. (C) Similar to a cell membrane, the bag is partially / selectively permeable, i.e., it allows only certain substances to pass through it.
53. (B) A cell is the building block or the smallest unit of life.
54. (D) A prokaryote lacks membrane bound organelles.
55. (D) Advantages of biotechnology to mankind are better yield of crops, decrease usage of pesticides.

CRITICAL THINKING

56. (B) 1 point between A and B

$$= 1 + 2 = 3 \text{ line segments}$$

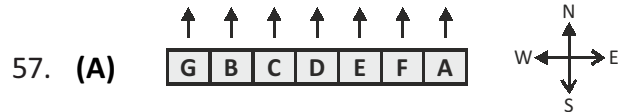
$$2 \text{ point between A and B} \\ = 1 + 2 + 3 = 6 \text{ line segments}$$

$$3 \text{ point between A and B} \\ = 1 + 2 + 3 + 4 = 10 \text{ line segments}$$

$$12 \text{ points between A and B} \\ = 1 + 2 + 3 + \dots + 12 + 13$$

$$= (1 + 13) \times 13 \div 2 = 91$$

91 lines segments can be counted altogether.



58. (D) There will be 19 cows in the eighth year.

59. (C) Because the load is nearly balanced, shifting the weight of the person on the right further away from the fulcrum will accomplish the additional work needed to balance the beam.



THE END
