



**NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION (UPDATED)**

**CLASS - 7**  
**Question Paper Code : 1P104**

**KEY**

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

**SOLUTIONS**

**MATHEMATICS**

01. (B) Given SP = Rs. 53298, loss % = 6%

$$SP = \frac{CP(100 - l\%)}{100}$$

$$Rs. 53298 = \frac{CP(100 - 6)}{100}$$

$$Rs. 53298 = \frac{CP \times 94}{100}$$

$$CP = Rs. 53298 \times \frac{100}{94} = Rs. 56700$$

02. (D)  $\frac{-123}{254} = -0.347$

$$\frac{-1107}{3894} = -0.284$$

$$\frac{-1353}{3186} = 0.424$$

$$\frac{-41}{57} = -0.719$$

$$\frac{-12177}{35046} = -0.347$$

$$\therefore \frac{-12177}{35046} = \frac{-12177}{35046}$$

$$\therefore \frac{-12177}{35046} = \frac{-123}{354}$$

03. (C) Area of a rectangle

$$= l \times b = 18 \frac{18}{23} \text{ cm} \times 6 \frac{7}{18} \text{ cm}$$

$$= \frac{432}{23} \text{ cm} \times \frac{115}{18} \text{ cm}$$

$$= 120 \text{ cm}^2$$

04. (C) Given  $a < b \Rightarrow \frac{a}{ab} < \frac{b}{ab}$

$$\Rightarrow \frac{1}{b} < \frac{1}{a}$$

$$\Rightarrow -\frac{1}{a} < -\frac{1}{b}$$

05. (A) Area of a rectangle = length  $\times$  breadth

$$= (3p + 5q)(5p - 7q)$$

$$= 3p(5p - 7q) + 5q(3p - 7q)$$

$$= 15p^2 - 21pq + 15pq - 35q^2$$

$$= (15p^2 + 4pq - 35q^2)$$

06. (A) Option (A)  $\left(-\frac{6}{7} - \frac{5}{6} + \frac{4}{9}\right)$

$$= (-0.857 - 0.833 + 0.444)$$

$$= -1.246$$

$$\text{Option (B) } \left(-\frac{8}{3} - \frac{1}{4} + \frac{11}{6}\right)$$

$$= -2.666 - 0.25 + 1.833 = -1.083$$

$$\text{Option (C) } \left(\frac{4}{3} + \frac{3}{5} - \frac{2}{3}\right)$$

$$= 1.333 + 0.6 - 0.666 = 1.267$$

$$\text{Option (D) } \left(-\frac{13}{20} + \frac{11}{14} - \frac{5}{7}\right)$$

$$= -0.65 + 0.785 - 0.714$$

$$= -0.579$$

Option 'A' is the smallest

07. (C)  $2^{3n-1} = 4^7$

$$2^{3n-1} = (2^2)^7$$

$$2^{3n-1} = 2^{2 \times 7}$$

$$3n - 1 = 14$$

$$3n = 14 + 1$$

$$n = \frac{15}{3}$$

$$n = 5$$

08. (B)  $4 \frac{4}{5} \times 1 \frac{2}{3} \times 7 \frac{3}{4} \times 2 \frac{8}{31} \times 1 \frac{5}{23} \times 3 \frac{2}{7}$

$$= \frac{24^8}{5_1} \times \frac{2^1}{3} \times \frac{31}{4_1} \times \frac{10}{31} \times \frac{28^7}{23} \times \frac{23}{7} = 560$$

09. (D) In  $\triangle ABC$ ,

given  $\angle A + \angle B = 135^\circ$  ..... (1)

$\angle A - \angle B = 5^\circ$  ..... (2)

Eg (1) + Eg (2)

$$= (\angle A + \angle B) + (\angle A - \angle B) = 135^\circ + 5^\circ$$

$$2\angle A = 140^\circ$$

$$\angle A = \frac{140^\circ}{2} = 70^\circ$$

$$70^\circ + \angle B = 135^\circ$$

$$\angle B = 135^\circ - 70^\circ$$

$$\angle B = 65^\circ$$

In  $\triangle ABC$

$$\angle A + \angle B + \angle C = 180^\circ$$

$$135^\circ + \angle C = 180^\circ$$

$$\angle C = 180^\circ - 135^\circ$$

$$\angle C = 45^\circ$$

$$\therefore \text{Biggest angle} = \angle A = 70^\circ$$

10. (A) Given  $AD = DC \Rightarrow \angle C = \angle DAC$

Given  $\angle AC + \angle C = 98^\circ$

$$\therefore \angle C + \angle C = 98^\circ$$

$$2\angle C = 98^\circ$$

$$\angle C = 49^\circ$$

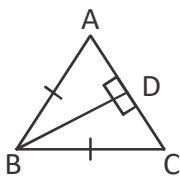
$$\therefore \angle DAC = 49^\circ \Rightarrow \angle BAC = 2 \times 49^\circ = 98^\circ$$

$$\text{In } \triangle ABC, \angle B + \angle BAC + \angle C = 180^\circ$$

$$\angle B + 98^\circ + 49^\circ = 180^\circ$$

$$\angle B = 33^\circ$$

11. (B) Only one line symmetry for an isosceles triangle



12. (A)  $\frac{-5}{6} = -0.833, \frac{-4}{5} = -0.8$

$$\frac{-3}{4} = -0.75, \frac{-2}{3} = -0.66$$

$$-\frac{7}{12} = -0.583$$

$$\therefore \frac{-5}{6} < \frac{-4}{5} < \frac{-3}{4} < \frac{-2}{3} < \frac{-7}{12}$$

13. (B)  $\frac{22}{7} \times \frac{35}{2} \left( 2 \times \frac{3.5}{2} + 3.6 \right) = \frac{11}{2} \times 7.1$

$$= 5.5 \times 7.1$$

$$= 39.05$$

14. (D) Let the other number be  $x$

$$\text{Given } -23 + x = -32$$

$$x = -32 + 23$$

$$\text{The second} = x = -9$$

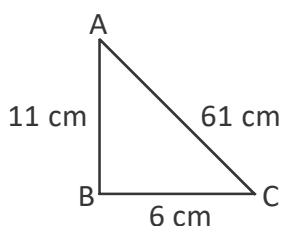
15. (B) Given in  $\triangle ABC$ ,  $AB = 11$  cm,  $BC = 60$  cm and  $AC = 61$  cm

$$AB^2 + BC^2 = 11^2 + 60^2$$

$$= 121 + 3600 = 3721$$

$$= 61^2$$

$$AB^2 + BC^2 = AC^2$$



This are the sides of a right angled triangle.

$$\text{Area of the triangle} = \frac{1}{2} \times AB \times BC$$

$$= \frac{1}{2} \times 11 \text{ cm} \times 60 \text{ cm}$$

$$= 330 \text{ cm}^2$$

16. (D) First 10 prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23 and 29

$\therefore$  Mean of first 10 prime numbers

$$= \frac{2 + 3 + 5 + 7 + 11 + 13 + 17 + 19 + 23 + 29}{10}$$

$$= \frac{129}{10} = 12.9$$

17. (A)  $\frac{x}{3} - \frac{2x}{5} - \frac{2x}{3} = \frac{77}{30}$

$$\frac{5x - 6x - 10x}{15} = \frac{77}{30}$$

$$-\frac{11x}{15} = \frac{77}{30}$$

$$x = \frac{77}{30} \times -\frac{15}{11} = -\frac{7}{2}$$

18. (C)  $\frac{-6}{7} = -0.851$

$$\frac{-7}{8} = -0.875$$

$$\frac{-17}{20} = -0.85 \text{ does not lie between}$$

$$-0.851 \text{ and } -0.875$$

$$\frac{-23}{25} = -0.92 \text{ does not be between}$$

$$-0.851 \text{ and } -0.875$$

$$\frac{-108}{125} = -0.864 \text{ which lies between}$$

$$-0.875 \text{ and } -0.851$$

$\therefore$  Option 'C' is correct

19. (B)  $4S = 41.6 \text{ cm}$

$$S = \frac{41.6 \text{ cm}}{4} = 10.4$$

$$\text{Area} = S \times S = 10.4 > 10.4$$

$$= 108.16 \text{ cm}^2$$

20. (D)  $\text{LHS} = \frac{2}{3}y^3 - \frac{1}{3}y^2 + \frac{5}{6}y + 7 + \frac{4}{3}y^3 - \frac{2}{3}y^2 - \frac{1}{3}y + 3$

$$\frac{2}{3}y^3 + \frac{4}{3}y^3 + \left(-\frac{1}{3}y^2 - \frac{2}{3}y^2\right) + \left(\frac{5}{6}y - \frac{1}{3}y\right) + (7+3)$$

$$\frac{2y^3 + 4y^3}{3} + \left(\frac{-y^2 - 2y^2}{3}\right) + \left(\frac{5y - 2y}{6}\right) + 10$$

$$= \frac{6y^3}{3} - \frac{3y^2}{3} + \frac{3y}{6} + 10$$

$$= 2y^3 - y^2 + \frac{y}{2} + 10$$

21. (B) Cost of each book =  $\frac{x}{8}$

Number of books can be for Rs. 60

$$= \frac{60}{\left(\frac{x}{8}\right)} = 60 \times \frac{8}{x}$$

$$= \frac{480}{x}$$

22. (A) Let the four consecutive odd numbers be  $x, x + 2, x + 4, x + 6$

$$\text{Given } x + x + 2 + x + 4 + x + 6 = 40$$

$$4x + 12 = 40$$

$$4x = 40 - 12$$

$$4x = 28$$

$$\therefore x = \frac{28}{4} = 7$$

$\therefore$  Four consecutive odd numbers are 7, 9, 11, 13

Smallest number = 7

23. (A) Area of

$$\Delta ABC = \frac{1}{2} AB \times BC$$

$$= \frac{1}{2} \times 7 \text{ cm} \times 24 \text{ cm} = 84 \text{ cm}^2$$

In  $\Delta ABC, \angle B = 90^\circ$

$$\Rightarrow AC^2 = AB^2 + BC^2$$

$$= (7 \text{ cm})^2 + (24 \text{ cm})^2$$

$$= 49 \text{ cm}^2 + 576 \text{ cm}^2$$

$$AC^2 = 625 \text{ cm}^2$$

$$AC = (25 \text{ cm})^2$$

But area of  $\Delta ABC = \frac{1}{2} \times AC \times BD$

$$84 \text{ cm}^2 = \frac{1}{2} \times 25 \text{ cm} \times BD$$

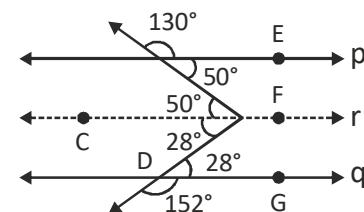
$$84 \text{ cm}^2 \times \frac{2}{25 \text{ cm}} = BD$$

$$BD = 6.72 \text{ cm}$$

24. (D) Options A, B and C are true

25. (C) Construction :

Draw  $r \parallel p$  through B



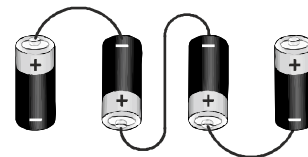
$$\therefore \angle EAB = \angle ABC = 180^\circ - 130^\circ = 50^\circ$$

$$\angle GDB = \angle DBC = 180^\circ - 152^\circ = 28^\circ$$

$$\therefore x = \angle ABC + \angle CBD = 50^\circ + 28^\circ = 78^\circ$$

### PHYSICS

26. (B) To make a battery, the positive terminal of one cell must be connected to the negative terminal of the next cell.



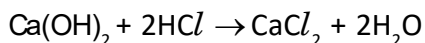
27. (B) When enough heat is supplied to a liquid, it will change to a gas. The temperature of the water in beaker II is the highest. Hence, the least amount of heating is needed before the water changes into water vapour. Water changes to water vapour at  $100^\circ\text{C}$ .

28. (D) Total distance travelled by the train  
 $= 30 + 90 = 120 \text{ km}$   
Average speed = 60 km/h  
Total time taken =  $\frac{120}{60} = 2 \text{ h}$   
Time taken for the first 30 km at a speed of 45 km/h =  $\frac{30}{45} = \frac{2}{3} \text{ h}$   
Thus, the train has to cover the balance of 90 km in  $2 - \frac{2}{3} = \frac{4}{3} \text{ h}$   
Hence, required speed will be  
 $\frac{90 \times 3}{4} = 67.5 \text{ km/h}$
29. (B) MCBs break the circuit automatically when they detect an overload or short circuit, while fuses melt and break the circuit when the current exceeds a certain limit. MCBs are resettable, while fuses need to be replaced once they are blown.
30. (A) The given graph shows that the temperature of the water decreased. When a substance loses heat, its temperature decreases. So, the water in the glass has lost heat.
31. (C) As average speed =  $\frac{\text{Total distance}}{\text{Total time}}$ , the required speed for the rest of the journey  
 $= \frac{75}{2 - 0.5 - 0.25} \text{ km/h}$   
 $= \frac{75}{1.25} = 60 \text{ km/h}$
32. (D) The fluorescent tube lights and compact fluorescent lamps (CFL) do not have filaments. So, they do not waste electricity by producing heat and hence they are very power efficient.  
A fluorescent tube light (or lamp) contains mercury vapour.
33. (C) Assuming that the expansion of the mercury is proportional to change in temperature.  
Temperature indicated by thermometer  
 $= \left(\frac{15}{25} \times 120\right) - 10 = 62^\circ\text{C}$
34. (B) Hand in a stop watch exhibits both circular and uniform motion.
35. (D) Statements (i) and (ii) only are correct. Statement (iii) is incorrect as polarity of an electromagnet depends on the direction of current flowing through the coil.

### CHEMISTRY

36. (B) Oxalic acid is present in spinach (palak). Ascorbic acid is present in amla and citrus fruits.  
Tartaric acid is present in unripe grapes and unripe mangoes.
37. (C) Lower part of ship (made up of iron) always remains under water. The salt water makes the process of rust formation faster. So, a ship undergoes rusting faster than the others.
38. (D) All the given substances can be used to test acids and bases.
39. (C) Formation of clouds, boiling of water and crystallisation of copper sulphate are physical, reversible changes. Grinding of wheat and threshing of wheat stalks are irreversible, physical changes. Making curd from milk, charging of car battery and ripening of fruits are chemical changes.
40. (C) China rose indicator turns acidic solution to dark pink (Magenta) colour.
41. (C) Conversion of animal waste into biogas by the action of anaerobic bacteria is a chemical change. Hence, process P is a chemical change. Process Q is also a chemical change as the obtained biogas undergoes several chemical processes to liquify and use it for cooking. Both the processes P and Q are chemical changes.

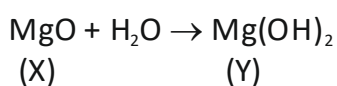
42. (B) The products formed due to the neutralisation reaction between calcium hydroxide and hydrochloric acid are calcium chloride and water as given below.



43. (C) The substance original colour was white and changed to yellow on heating in air. On cooling, the substance turned to white colour. Hence, this substance underwent a physical change.

44. (C) Colour of the phenolphthalein does not change in acidic or neutral solutions.

45. (B)  $\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$   
(X)



X is MgO, Y is Mg(OH)<sub>2</sub>

### BIOLOGY

46. (A) When the blood capillaries at that area were broken. It cause a bruise. These red blood cells leak out from the blood vessels that collect under the skin cause bruise.

47. (C) An adult human being has 32 teeth, 16 in each jaw. There are 6 molars, 4 premolars, 2 canines and 4 incisors in each jaw from the back of the mouth to the front

48. (C) The stones in the Muscular part of stomach is called gizzard. It help to grind food into smaller pieces, much like how human teeth grind food. This grinding action increases mechanical breakdown of the food so that enzymes can work on the food more efficiently.

49. (A) The alcohol dissolves the chlorophyll in the boiled leaf, when the leaf is boiled in alcohol.

50. (D) Food that enters the human digestive system (P) will be broken down into simpler soluble substances called digested food. The digested food will enter the human circulatory system (Q) and circulate to all parts of the body.

51. (A) The pancreas produces pancreatic juice (that contains amylase and lipase) and hormones involved in the regulation of blood glucose concentrations (insulin and glucagon). Pepsin is produced in the stomach and requires an acidic pH to function.

52. (B) In the given figure X, Y and Z are RBC, platelets and WBC respectively. WBC produces antibodies and its count goes up when there is any infection in the body.

53. (A) Coconut plant disperses its seed by water.

54. (D) P - Deer; Q - Vulture; R - Tapeworm; S - Crow

55. (C) Lichen shows symbiotic relationship between alga and fungus. Alga provides food material to the fungus and in return fungus provides shelter, water and minerals to the alga

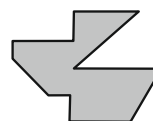
### CRITICAL THINKING

56. (A) If we consider that increased screen time leads to obesity (Statement I), it makes sense that teachers would recommend limiting screen time to combat obesity (Statement II).

57. (B) The frog climbs 5 feet each day and slips back 3 feet at night. This means the net gain per day is  $5 - 3 = 2$  feet. However, on the last day, the frog will not slip back after reaching the top.

1. After 1 day, the frog is at 5 feet.
2. After 2 days, the frog is at 4 feet ( $5 - 3 + 5$ ).
3. Continuing this, we find that after 7 days, the frog will be at 14 feet. On the 8th day, the frog climbs to 19 feet, and on the 9th day, it climbs to 20 feet and reaches the top. Thus, it takes 9 days for the frog to reach the top.

58. (D)



59. (B) School holidays will begin day after tomorrow (Saturday) following day is Sunday.

Today is 2 days before Saturday ie.. Thursday Yesterday is Wednesday. 2 days before Wednesday is Monday.

60. (D) The arrows in the given questions are rotated in clock direction. Except option (D) remaining options are rotated in counter clock direction.

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*The End*

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