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NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION (UPDATED)

CLASS - 6

Question Paper Code : UN487

KEY

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

SOLUTIONS

MATHEMATICS

01. (C) Required numbers → 2345, 2346, 2347, 2348, 2349, 2356, 2357, 2358, 2359, 2367, 2368, 2369, 2378, 2379, 2389 are the numbers

02. (C) $$\frac{-\frac{1}{2}-\frac{2}{3}-\frac{1}{3}+\frac{4}{5}+\frac{1}{5}+\frac{3}{4}}{\frac{1}{2}+\frac{2}{3}+\frac{1}{3}-\frac{4}{5}-\frac{1}{5}-\frac{1}{4}}$$

$$= \frac{-\frac{1}{2}-1+1+\frac{3}{4}}{\frac{1}{2}+1-1-\frac{1}{4}}$$

$$= \frac{\left(\frac{1}{4}\right)}{\left(\frac{1}{4}\right)} = 1$$

03. (A) Given bigger square area = 100 cm^2

$\Rightarrow (side)^2 = (10cm)^2$

$\therefore$ Side of bigger square = 10 cm

Given urshaded rectangle area = 180 cm^2

$\therefore l \times 10\ cm = 180\ cm^2$

$$\therefore l = \frac{180cm^2}{10cm} = 18\ cm$$

Given area of small square = 25 cm^2

$\therefore$ $(side)^2 = (5cm)^2$

Side of small square = 5 cm

$\therefore$ Total length = 18 cm + 10 cm = 28 cm

Total breadth = 10 cm + 5 cm = 15 cm

$\therefore$ Area of the shaded region = Total area – Area of unshaded parts

$= 28 \times 15\ cm^2 - (100 + 180 + 25)\ cm^2$

$= 420\ cm^2 - 305\ cm^2$

$= 115\ cm^2$

04. (B)

285) 465 (1
285
180) 285 (1
180
105) 180 (1
105
75) 105 (1
75
30) 75 (2
60
15) 30 (2
30
0

HCF = 15

$\therefore$ Number of baskets required to pack apples = $\frac{465}{15} = 31$

Number of baskets required to pack oranges = $\frac{285}{15} = 19$

$\therefore$ Minimum number of baskets required to pack all this fruits = 31 + 19 = 50

05. (D) $LHS = \frac{33.076161 - 0.009261}{10.3041 + 0.6741 + 0.0441}$

$= \frac{33.0669}{11.0223} = 3$

06. (C) $A \times B = 2021 = 43 \times 47$

$\Rightarrow A + B = 43 + 47 = 90$

07. (B) LCM of 15, 5, 20, 10 & 3 = 60

$= \frac{-8}{15} = \frac{-32}{60}, \frac{-3}{5} = \frac{-36}{60}, \frac{-11}{20} = \frac{-33}{60},$

$\frac{-7}{10} = \frac{-42}{60}, \frac{-2}{3} = \frac{-40}{60}$

$= \frac{-32}{60} > \frac{-33}{60} > \frac{-36}{60} > \frac{-40}{60} > \frac{-42}{60}$

ie $\frac{-8}{15} > \frac{-11}{20} > \frac{-3}{5} > \frac{-2}{3} > \frac{-7}{10}$

08. (C) Option 'A'

If $x = -42$ then LHS = $\frac{x}{6} = \frac{-42}{6} = -7$ &

RHS = $\frac{x}{7} + 1 = \frac{-42}{7} + 1 = -5$

$\therefore$ LHS $\neq$ RHS

Option 'B'

If $x = -42$ then LHS = $\frac{-x}{7} = \frac{-42}{7} = -6$

RHS = $\frac{x}{6} - 1 = \frac{-42}{7} - 1 = -7$

$\therefore$ LHS $\neq$ RHS

Option 'C'

If $x = -42$ then LHS = $\frac{x}{7} = \frac{-42}{7} = -6$

RHS = $\frac{x}{6} + 1 = \frac{-42}{6} + 1 = -6$

$\therefore$ LHS = RHS

09. (B) AB = 10 cm – 1 cm = 9 cm,

CD = 15 cm – 7 cm = 8 cm

$\therefore$ AB – CD = 9 cm – 8 cm = 1 cm

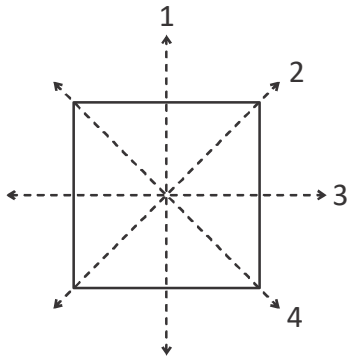
10. (D) $\frac{529}{4} - \frac{161}{2} + \frac{49}{4}$

$= \frac{529 - 322 + 49}{4} = \frac{256}{4} = 64$

11. (C) Number of numbers from 50 to 499

= 499 – 50 + 1 = 450

12. (C) A square has four lines of symmetry.



13. (A) Given $\angle A + \angle C + \angle B + \angle C = 120° + 140°$

$\therefore \angle A + \angle B + 2\angle C = 260°$

$100° + 2\angle C = 260°$ [$\because \angle A + \angle B = 100°$]

$2\angle C = 260° - 100° = 160°$

$\angle C = \frac{160°}{2} = 80°$

But given $\therefore \angle A + \angle C = 120°$

$\angle A + 80° = 120°$

$\angle A = 120° - 80° = 40°$

14. (C) The restaurants II and IV have 10 waiters

15. (D) Given the ratio of A & B

$= \frac{3}{5} : \frac{5}{6} = \frac{3}{5} \times 30 : \frac{5}{6} \times 30$

$= 18 : 25$

$= 18x : 25x$

Given $18x + 25x =$ ₹ 5,30,835

$43x =$ ₹ 5,30,835

$x =$ ₹ $\frac{5,30,835}{43} =$ ₹ 12,345

$\therefore$ A's share = $18x = 18 \times$ ₹ 12345

= ₹ 2,22,210

16. (B) Given $\frac{3}{5} : \frac{5}{6} = x : \frac{25}{9}$

$\left(\frac{\frac{3}{5}}{\frac{5}{6}}\right) = \frac{x}{\left(\frac{25}{9}\right)}$

$\frac{3}{5} \times \frac{6}{5} = \frac{9x}{25}$

$\frac{18}{25} \times \frac{25}{9} = x$

$x = 2$

17. (D) Required result = (123 × 5 × 567 – 123 × 7 × 99 – 123 × 3 × 321 – 123 × 2739)

= 123(2835 – 693 – 963 – 2739)

= 123 × – 1560

= –1,91,880

18. (B) LHS

$= \left(\frac{3x}{4} - \frac{7x}{8} + \frac{7x}{16}\right) + \left(\frac{-5y}{9} + \frac{2y}{3} - \frac{14y}{15}\right)$

$+ \left(\frac{-xy}{5} + \frac{3xy}{25} - \frac{31xy}{50}\right)$

$= \left(\frac{12x - 14x + 7x}{16}\right)$

$+ \left(\frac{-25y + 30y - 42y}{45}\right)$

$+ \left(\frac{-10xy + 6xy - 31xy}{50}\right)$

$= \frac{5x}{16} - \frac{37y}{45} - \frac{35xy}{50}$

$= \frac{5x}{16} - \frac{37y}{45} - \frac{7xy}{10}$

19. (C) Sum of the digits of odd places starting from units place

= 9 + 7 + 8 + 9 + 7 + 8 + 9 + 7 = 64

Sum of the digits of even places starting from tens place =

8 + 9 + 7 + 8 + 9 + 7 + 8 = 56

$\therefore$ Difference = 64 – 56 = 8

$\therefore$ Remainder = 8

20. (C) $\angle AOC = 72° + 18° = 90°$

$\angle BOD = 18° + 72° = 90°$

$\angle COE = 72° + 18° = 90°$

21. (B) Given area of a rectangle = Area of a square $\Rightarrow l \times 9$ cm = 15 cm × 15 cm

$$l = \frac{15\,\text{cm} \times 15\,\text{cm}}{9\text{cm}} = 25\text{ cm}$$

$\therefore$ Perimeter of the rectangle

= 2(l + b) = 2(25 + 9) cm

= 2 × 34 cm = 68 cm

22. (D) LCM of 7, 8, 5 & 4 = 280

$$\therefore \frac{-6}{7} = \frac{-6}{7} \times \frac{40}{40} = \frac{-240}{280},$$

$$\frac{-7}{8} = \frac{-7}{8} \times \frac{35}{35} = \frac{-245}{280},$$

$$\frac{-4}{5} = \frac{-4}{5} \times \frac{56}{56} = \frac{-224}{280},$$

$$\frac{-3}{4} = \frac{-3}{4} \times \frac{70}{70} = \frac{-210}{280}$$

$$\therefore \frac{-210}{280} > \frac{-224}{280} > \frac{-240}{280} > \frac{-245}{280}$$

ie $\frac{-3}{4} > \frac{-4}{5} > \frac{-6}{7} > \frac{-7}{8}$

$\therefore$ Greatest option = $\frac{-3}{4}$

23. (C) V + F = E + 2

$\Rightarrow$ F + F = 10 + 2 [$\because$ V = F]

2F = 12

$$F = \frac{12}{2} = 6$$

24. (C) Given (10 + 11 + 12 + ...+ 100) + (95 + 96 + 97 + 98 + 99 + 100 + 101 + ...+ 200) = 5005 + 15635

$\therefore$ (10 + 11 + 12 + ...+100) + (585 + 101 + 102 + ...+ 200) = 20640

$\therefore$ 10 + 11 + 12 + ...+ 100 + 101 + 102 + ... + 200 = 20640 – 585 = 20,055

25. (A) Second fraction = Sum – First fraction

$$= 5\frac{1}{7} - 4\frac{1}{3}$$

$$= \frac{36}{7} - \frac{13}{3}$$

$$= \frac{108-91}{21} = \frac{17}{21}$$

PHYSICS

26. (D) When Bulb X has fused/blown, the circuit becomes an open circuit. So, none of the bulbs light up.

[Electric current can only flow through a closed circuit (an unbroken path) but not in an open circuit (a broken path).]

27. (D) Total distance = 1 m is divided into 500 equal parts, then the length of one division = $\frac{1}{500}$ m = 0.002 m = 2 mm.

28. (C) Tracing paper allows some light to pass through it as it is translucent. Sand - paper blocks light completely as it is opaque. So, the readings are 2, 0.

29. (D) From the above experiment, we conclude that Object R does not conduct electricity as it is a bad conductor of electricity. But, Object S conducts electricity. Bulb in circuit with object S will light up.

30. (C) Person P and Q are at rest with respect to the car.

31. (C) Material P is translucent as the student could see everything faintly / partially.

Material Q is opaque as the student could not see anything.

Material R is transparent as the student could see everything clearly.

32. (C) The electrical components used in the construction of the given electric circuit are X – Battery, Y – Switch, Z – Bulb.

33. (C) 0.2 m = 0.2 × 100 = 20 cm

As the scale is 0.15m long, it cannot be used to measure 0.2 m or 20 cm by using only once.

34. (C) The shadow of the girl is the shortest when the sun is over her or above her head.

35. (C) As bulbs I and II lighted up in the given circuit, objects P and Q are conductors and R is an insulator due to which bulb III did not light up.

CHEMISTRY

36. (B) As rubber band 2 stretching is minimum i.e., 9 cm, it is the least flexible.

37. (C) In both the processes, evaporation and melting heat is absorbed. So, both of them are heat absorbing processes.

38. (D) Both of them are formed by condensation of water as water vapour turns into tiny water droplets. Water inside the tea kettle, boils, evaporates and comes out as steam through the spout of the tea kettle.

When the hot steam comes into contact with the cold air outside the tea kettle, it quickly condenses back to form tiny droplets of water.

39. (D) Sand (1) is opaque and wax paper (2) is translucent.

40. (D) When the air touches the surface of ice cold water in the glass, water vapours of the atmosphere are condensed to form water droplets that appear on the outer surface of glass.

41. (C) Burning of magnesium ribbon in air forms a new substance magnesium oxide. It is a chemical, irreversible change. Rest of them are physical and reversible changes.

42. (B) Liquid X is partly soluble in liquid Y. Hence, there is a slight increase in the level of liquid when the two liquids are mixed.

43. (B) When water vapour loses heat and condenses, it forms water droplets. These water droplets gather together to form clouds (J). When clouds become too big and heavy, they fall as rain or snow (K).

44. (D) Detergent powder is soluble in water, So, no residue is left on the filter paper after filtration.

45. (B) P can be any material as long as it is not plastic, wood or metal. The handkerchief is made up of cloth. Q, the chain, is made from metal. R the toothpick, is made from wood. S, the pail, is made from plastic.

BIOLOGY

46. (C) Parasitic roots are also called as sucking roots as they protrude into the host plant for the absorption of nutrients.

47. (B) Cereals like wheat, rice, corn, etc. are rich sources of carbohydrates which are the main source of energy of our body. That is why Varun should eat more cereals.

48. (C) Malaria can be prevented by either rearing fish in ponds or spraying oil on the surface of the water to stop mosquito breeding.

49. (B) a - ii; b - i; c - iv; d - iii

50. (D) Cotton is obtained from the cotton both or fruit of cotton plant.

51. (A) We eat stems of ginger, potato, turmeric, onion, sugarcane, ginger and Colocasia. We eat roots of turnip, carrot and radish. We eat flower of broccoli.

52. (D) Hollow bones, streamlined body shape and strong breast muscles help birds to fly.

53. (D) Lemon plant is an example of shrub.

54. (D) Deficiency of Vitamin D causes rickets in children. Rickets is characterised by delayed growth, weakness and pain in bones.

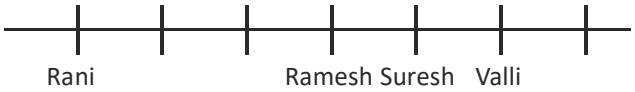
55. (B) In the given statements, X and Y refer to scavengers and decomposers respectively. Jackal feeds on dead bodies and bacteria feed on dead plants and animals remains by decomposing them.

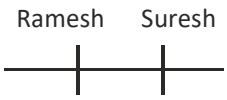
CRITICAL THINKING

56. (A) As per the given question Sprinters and Marthan Runner both are athletes. Some Sprinters can be Marthan Runners also. Hence option (A) is the correct answer.

57. (D) 'Rani sits at one extreme' means that we should look at arrangement 1. In this arrangement, any one out of the three persons Pavan, Tony and Umesh can be in seat 1, i.e., extreme right.

Pavan, Rani, Ramesh, Suresh, Tony, Umesh and Valli





Neither Pavan nor Tony nor Umesh can be seat in extreme right. Hence can't be determine.

58. (B) 9 + 3 + 8 + 6 + 1 + 2 + 3 = 32 (Top row)

1 + 4 + 2 + 5 + 4 + 8 + 6 = 30 (Bottom row)

Know interchange 6 and 5 i.e., card S we get sum of the numbers in top row is same as sum of numbers in bottom row.

9 + 3 + 8 + 5 + 1 + 2 + 3 = 31

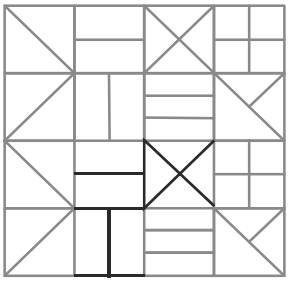
1 + 4 + 2 + 6 + 4 + 8 + 6 = 31

59. (D) Rakesh is 3 years younger to Revanth and Revanth age is 20 years.

Hence, Rakesh age is 20 – 3 = 17 years.

If Revanth was born in 2001 and his age is 20 yrs. Then Rakesh was born in 2004.

60. (C) So that the first and third lines are the same as the second and fourth lines.



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