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NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION (UPDATED)

CLASS - 6

Question Paper Code : 1P214

KEY

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

SOLUTIONS

MATHEMATICS

01. (B) $11 + 99 = 110$

02. (D) $\angle COD = 180° - 110° = 70°$

But $\angle COD + \angle BOC = 85°$

$70° + \angle BOC = 85°$

$\therefore \angle BOC = 15°$

03. (C) $871 + 872 + 873 + ... + 890$

$= 870 + 1 + 870 + 2 + ... + 870 + 10$

$= (870 \times 10) + (1 + 2 + 3 + ... + 10)$

$= 8700 + 55 = 8755$

04. (C) The product unit digit is zero

[$\because$ $2 \times 5 = 10$]

05. (D) Given

$1 + 2 + 3 + ... + 100 = 5050$ and

$1 + 2 + 3 + ... + 200 = 20100$

$5050 + 101 + 100 + ... + 200 = 20100$

$101 + 102 + ... + 200 = 20100 - 5050$

$= 15050$

$98 + 99 + 100 + 101 + 102 + ... + 200$

$= 15050 + 98 + 99 + 100$

$= 15347$

06. (D) Required sum = 101 + 149 = 250

07. (B) vertex

08. (B) 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84, 91, 98 are the two digit numbers which are divisible by 7

09. (A) 41

10. (D) Area of rectangle = l × b

= (5 + 7)cm × (2 + 3) cm

= 60 sq cm

Area of shaded region = 60 sqcm – area of unshaded parts

= 60 sq cm – (2 × 5) sq cm – (12 – 8) × 3 sq cm

= 60 sq cm – 10 sq cm – 12 sq cm

= 38 sq cm

11. (A) Savings in March

$$= \frac{₹7200 - ₹1600 - ₹800}{2} = \frac{₹4800}{2}$$

= ₹ 2400

12. (A) $N = \frac{\cancel{33}^{3}}{\cancel{5}_{1}} \times \frac{\cancel{15}^{3}}{\cancel{11}} = 9$

$$\frac{M}{N} = \frac{9}{9} = 1$$

13. (C) Required solution

$$\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\left(1-\frac{1}{5}\right)\left(1-\frac{1}{100}\right)$$

$$= \left(\frac{3-1}{3}\right)\left(\frac{4-1}{4}\right)\left(\frac{5-1}{5}\right).....\left(\frac{100-1}{100}\right)$$

$$= \frac{2}{\cancel{3}} \times \frac{\cancel{3}}{\cancel{4}} \times \frac{\cancel{4}}{\cancel{5}} \times ..... \times \frac{98}{\cancel{99}} \times \frac{\cancel{99}}{100}$$

$$= \frac{2}{100} = \frac{1}{50}$$

14. (B) Required number = LCM of (12, 16, 18, 21 & 28) + 17

= 1008 + 17

= 1025

15. (D) No. of whole numbers from 10 and 200 = 200 – 9 = 191

16. (D) Each box value $= \frac{300}{6} = 50$

Three box value = 3 × 50 = 150

17. (A) Greatest 5 digit number = 99,999

Greatest 4 digit number = 9,999

∴ Number of 5 digit numbers

= 99,999 – 9,999 = 90,000

18. (D) 320 is divisible by 8

∴ 2345678987654320 is divisible by 8

∴ 2345678987654325

= 2345678987654320 + 5

∴ Remainder = 5

19. (C) ∠VUW = 123°

20. (D) 11111 × 11111 = 123454321

The middle digit = 5

21. (B) The sum of the first 11 odd numbers

= 1 + 1.5 +....

= 11^2 = 121

22. (C) 9 and 16 are having 'n' common factors except 1

∴ 9 and 16 are coprimes

23. (D) Sum of the three agles of a triangle

= 180°

24. (D) 1, 3, 6, 10, 15, 21, ... are the triangular numbers

25. (C) 91° is the obtuse angle.

PHYSICS

26. (B) Magnetic force can act through non-magnetic materials

Magnetic field lines can pass through non-magnetic materials such as cloth, paper, or wood, allowing the magnet to attract the needle even when covered.

27. (D) The micrometer screw gauge provides high precision up to 0.01 mm, making it the only suitable tool for measuring the fine thickness of a sewing thread. Other instruments lack this level of accuracy or serve different purposes.

28. (B) Rectilinear < Circular < Oscillatory

Rectilinear motion is in a straight line, circular motion follows a curved path, and oscillatory motion repeats back and forth—showing increasing path complexity.

29. (B) N_1 is strongly attracted, N_2 is weakly attracted, and N_3 is weakly repelled

Ferromagnetic materials (like iron) have a strong induced magnetic moment in the same direction as the external field, leading to strong attraction.

Paramagnetic materials align weakly with the field, causing slight attraction.

Diamagnetic materials develop a small opposing magnetic moment, hence they are weakly repelled by the magnet.

30. (B) Magnetic whiteboards have a magnetic sheet behind the surface, but the magnetism is not uniform everywhere. Markers designed for these boards usually contain a small magnet inside. The marker sticks only where the magnetic field is strong enough to attract it, resulting in certain areas holding the marker while others do not. This is due to the localized magnetic fields, not chemical reactions or the weight of the marker.

31. (C) Curved bars cannot be measured accurately using a scale directly. Using a thread to follow the exact path of the curved and straight bars, and then measuring the thread with a scale, gives the true total length, ensuring correct payment to the contractor.

32. (C) The gardener moves back and forth along a straight line, which is oscillatory motion. The dog's motion is irrelevant here.

33. (A) Celsius (A) $\rightarrow$ Temperature scale $\rightarrow$ 5

Mercury (B) $\rightarrow$ Toxic substance $\rightarrow$ 4

Clinical thermometer (C) $\rightarrow$ Body temperature $\rightarrow$ 3

Laboratory thermometer (D) $\rightarrow$ Digital thermometer $\rightarrow$ 2

Kelvin (E) $\rightarrow$ 273.15 $\rightarrow$ 1

34. (D) Each thermometer displays temperatures in both degrees Celsius (°C) on the left scale and degrees Fahrenheit (°F) on the right scale.

To determine which thermometer best represents 65° F, the liquid level on the Fahrenheit scale for each option must be observed.

Thermometer P: The liquid level reaches the line marked 65 on the °F scale.

Thermometer Q: The liquid level is at 20° F.

Thermometer R: The liquid level is at 10° F.

Thermometer S: The liquid level is at 85° F.

Therefore, thermometer P is the correct representation of 65° F

35. (A) From A to B, the ball moves on a straight section, so the motion is linear.

From C to D, the ball follows a looped portion (curved), so the motion is circular.

CHEMISTRY

36. (C) A gas does not have a fixed volume or shape.

37. (B) The given properties belong to a metal ball. Rest of the objects are light in weight, float on water and are not hard and strong.

38. (A) Heat energy from the sun (solar energy) falls on water bodies. The water molecules on the surface escape into the atmosphere as water vapour and form clouds.

39. (D) Glass being transparent allows all light to pass through it. Glass panes of window enable us to see outside clearly.

40. (D) All the given factors affect the rate of evaporation of water.

41. (D) Based on the given flow chart materials in group X are made up of plastic whereas materials in group Y are made up of glass.

42. (B) A liquid has a definite volume but not a definite shape and it can flow.

43. (A) A tennis ball achieves the highest bounce when dropped from a height.

The tennis ball (A) achieves the highest bounce because its pressurized, hollow rubber core provides superior elasticity, allowing it to rebound more energy than the denser, harder cricket ball or the softer, energy-absorbing hand exercise ball.

Tennis Ball : High bounce (due to air pressure and elastic rubber).

Cricket Ball : Medium to low bounce (harder, denser leather).

Hand Exercise Ball : Low bounce (soft material designed to absorb impact).

44. (B) Droplets of water form on the outer surface of a glass containing a chilled drink illustrates condensation. It is a physical process where water vapour (a gas) in the warm, surrounding air cools down upon touching the cold glass surface, loses energy and changes state into liquid water droplets.

45. (C) The correct order in which rain is formed is $4 \rightarrow 2 \rightarrow 3 \rightarrow 1$

4 – Water evaporates from water bodies

2 – Water vapour being lighter rises into the air.

3 – The water vapour gets cooled and condenses to form clouds as water droplets.

1 – Water droplets become heavy and fall down as rain.

BIOLOGY

46. (A) These foods fish, cod liver oil, butter, eggs, and milk are rich in Vitamin D, essential for bones and immunity.

47. (C) Morphology is the branch of biology that deals with studying the form and external features of plants and animals.

48. (C) The plumule is the embryonic shoot within the seed that grows upward to form the stem and leaves after germination.

49. (C) The dense feathers and thick fat (blubber) act as insulation, keeping the penguin warm in cold habitats like Antarctica.

50. (D) A compound microscope provides high magnification, allowing detailed observation of tiny structures like onion skin cells.

51. (A) Single-humped camels (dromedaries) live in hot deserts; double-humped camels (Bactrian) live in cold deserts, using fat for energy and insulation.

52. (C) Bees and butterflies transfer pollen for fertilization, without them, many flowering plants would fail to produce seeds and fruits.

53. (B) Chips and sugary drinks lack vitamins, minerals, fiber, and protein, leading to poor immunity and health issues.

54. (A) Sundew is a carnivorous plant: it photosynthesizes but catches insects to get extra nutrients like nitrogen from poor soil.

55. (A) The apical bud is located at the tip of a stem or branch and is responsible for the upward or outward growth of the plant.

CRITICAL THINKING

56. (B) To determine the top view of the 3D object, imagine looking down on it directly from above. The top view shows the maximum extent of the blocks in the horizontal plane.

The object is arranged in a specific L-shape base with additional blocks stacked on top.

From the top, every block that occupies a specific x-y coordinate will be visible as a square in the top-down grid, regardless of its height.

The original shape has a base configuration that, when viewed from the top, matches the arrangement of squares in option (B).

Options (A), (C), and (D) present different configurations that do not match the complete top-down outline of the provided 3D object

57. (C) Current flows from the positive terminal of the battery through Switch 1, which is on.

The current reaches a junction where it splits into two paths. One path goes through bulb A and continues to the negative terminal. Therefore, bulb A is on.

The second path leads to another junction. Here, the current splits again:

One branch goes through bulb B and then to Switch 2. Since Switch 2 is off (open circuit), no current flows through this path, and bulb B is off.

The other branch goes through bulbs C and D in series and continues to the negative terminal. This path is a complete, closed circuit. Therefore, bulbs C and D are on.

In summary, bulbs A, C, and D are on, while bulb B is off.

58. (A) All three always lie, so every statement is false.

1. Ravi says his stone is the same colour as Kiran's $\rightarrow$ false

Ravi and Kiran have different colours.

2. Kiran says his stone is the same colour as Mohan's $\rightarrow$ false

Kiran and Mohan have different colours.

From this, Ravi and Mohan must have the same colour.

3. Mohan says exactly two stones are red $\rightarrow$ false

There are not exactly two red stones.

If Ravi and Mohan were red, there would be exactly two red stones $\rightarrow$ statement becomes true

So Ravi and Mohan must be green, and Kiran is red.

Therefore, Ravi's stone is green.

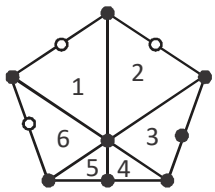
59. (B) Abha cannot pair with Ruta (they are best friends).

Aishwarya and Ruta cannot pair (both got A grade).

Abha is not best friends with Aishwarya and their grades are different.

So, Abha can be paired with Aishwarya

60. (C) There are 3 possible cases as given in the image. From the following images it is clear that the original image had 9 triangles and on joining any of the lines, we will get 3 more triangles. Therefore maximum number of triangles is 12.



There are 9 triangles in original image:

The triangles are 1, 2, 3, 4, 5, 6, 45, 456, 345

If we add a line between any two yellow points, we will get 3 more triangles. Refer below.