SCHOLARSHIPS worth ₹2 Crore

UDAAN

A QUEST FOR SCIENCE ASPIRANTS

SCIENCE APTITUDE TEST

CLASS - 8

SOLUTIONS

TEST CODE - 28

IIT Ashram JEE MAIN | JEE ADVANCED | GUJCET | FOUNDATION

Drs' Ashram NEET | GUJCET | FOUNDATION

ALKAPURI (H.O.) : UG – 1 to 2, Concorde Complex, Above PNB, R.C. Dutt Rd., Alkapuri, Vadodara.

M : 9081062221, 9033063029.

MANJALPUR - IIT ASHRAM : SF-1 TO 12, Kabir Plaza, Beside Kabir Complex, Above IDBI Bank, Infront of Army Camp Manjalpur, Nr. Gupta Hospital, Bhavan's Makarpura Road, Manjalpur . **M : 9033063027 / 9033063028**

ANAND - IIT ASHRAM : 2nd Floor, HR Stone Building, Beside Croma Showroom, A.V. Road, Nr. Town Hall, Anand. **M: 9227777098, 8460009041.**

Bhayli - IIT ASHRAM : Akshar Pavilion, 3rd floor, Tower A, Nilamber Circle, Main rd, Bhayli, Vadodara, Gujarat 391410. **M : 6358891896, 9081062221**

PART - I : MENTAL ABILITY

1.

Sol. (b) 42

Series: 2, 6, 12, 20, 30 Differences are +4, +6, +8, +10. Next difference = +12. 30 + 12 = 42

2.

Sol. (c) Z

Alphabet gaps: A (+3) $\rightarrow$ D , D (+4) $\rightarrow$ H , H (+5) $\rightarrow$ M , M (+6) $\rightarrow$ S. Next is +7. S + 7 = Z

3.

Sol. (d) ABBBBB

Pattern: AB (1 B), ABB (2 B), ABBB (3 B), ABBBB (4 B). Next = 5 B. Answer: ABBBBB

4.

Sol. (b) 79

Pattern: ×2 +1 4×2+1=9, 9×2+1=19, 19×2+1=39 39×2+1 = 79

5.

Sol. (c) 26

Rank from bottom = Total – Rank from top +1 40 – 15 +1 = 26

6.

Sol. (d) 0.6

Convert to decimals: $\frac{4}{5}$ = 0.8, 0.62 = 0.62;

$\frac{5}{8}$ = 0.625 Smallest = 0.6

7.

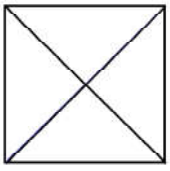
Sol. (c) E

Correct arrangement: C E B A D second person from the left is : E

8.

Sol. (d) 8

Two diagonals divide a square into 4 equal triangles.



9.

Sol. (b) 6 m

Path forms a rectangle. Final distance from starting point = 6 m.

10.

Sol. (a) EPH

Each letter is shifted +1. D $\rightarrow$ E, O $\rightarrow$ P, G $\rightarrow$ H Answer: EPH

11.

Sol. (a) Sister

Only son of grandfather = Rahul's father.

His daughter = Rahul's sister

12.

Sol. (c) 27

Number of small cubes = $n^3 = 3^3 = 27$ Answer: 27 (Option C)

13.

Sol. (a) $\frac{1}{3}$

Numbers >4 on a die = 5, 6 Favourable outcomes = 2

Probability = $\frac{2}{6} = \frac{1}{3}$

14.

Sol. (c) 40

Squares in 3×3 grid: 1×1 = 9, 2×2 = 4, 3×3 = 1 Total = 14 Answer: 14

15.

Sol. (c) 25

Pattern: 1^2, 2^2, 3^2, 4^2 Next = 5^2 = 25 Answer: 25

PART - II : MATHEMATICS

1.

Sol. (a) 8:15

Make b common:

2:3 and 4:5 $\rightarrow$ LCM(3,4) = 12

Scale ratios:

a: b = 2×4: 3×4 = 8:12

b: c = 4×3: 5×3 = 12: 15

Thus a: c = 8:15

2.

Sol. (b) 1% decrease

Let number be $\rightarrow$ 100

(100 - 10)% of 100 = 90% of 100 = 90

(100 + 10)% of 90 = 110% of 90 = 99

(100 - 99) = 1

So 1% loss on 100 Rs

3.

Sol. (b) 90,000

Current value = 90% of last year

81000 = 0.9 × X

X = 81000 / 0.9 = 90000

4.

Sol. (a) 1250 m²

Let width = x $\rightarrow$ length = 2x

Perimeter = 2(I + b) = 2(2x + x) = 6x

$6x = 150 \rightarrow x = \frac{150}{5} = 25$

Length = 50

Area = 50 × 25 = 1250 m²

5.

Sol. (a) x + 16

3x + 6 - 2x + 10

= (3x - 2x) + 16

= x+ 16

6.

Sol. (c) $4x^2 - 3x + 7$

A polynomial cannot contain negative powers, fractional powers, or variable in denominator.

7.

Sol. (b) $\frac{5}{12}$

$\text{Midpoint} = \frac{(a + b)}{2}$

$a = \frac{1}{6}$

$b = \frac{2}{3} = \frac{4}{6}$

$\text{Midpoint} = \frac{\frac{1}{6} + \frac{4}{6}}{2} = \frac{5}{6} \times \frac{1}{2} = \frac{5}{12}$

8.

Sol. (a) $\frac{2}{7}$

$\left(\frac{-3}{7}\right)^2 = \frac{9}{49}$

Multiply:

$\frac{9}{49} \times \frac{14}{9}$

Cancel 9:

$\frac{1}{49} \times 14 = \frac{14}{49} = \frac{2}{7}$

9.

Sol. (c) 40

Let rates be A,B,C. $A+B = \frac{1}{12}$, $B+C = \frac{1}{15}$, $A+C = \frac{1}{20}$.

Add all: $2(A + B + C) = \frac{1}{12} + \frac{1}{15} + \frac{1}{20}$ = common denominator is 60.

$\frac{5+4+3}{60} = \frac{12}{60} = \frac{1}{5} \Rightarrow A+B+C = \frac{1}{10}$.

Then A = (A+B+C) - (B+C)

$= \frac{1}{10} - \frac{1}{15} = \frac{3-2}{30} = \frac{1}{30}$

$\Rightarrow$ A takes 30 days.

10.

Sol. (a) 15 cm

Area = base × height

$$\text{height} = \frac{\text{Area}}{\text{base}} = \frac{120}{8} = 15$$

11.

Sol. (b) Rs 405

10% of 450 = 45

$\Rightarrow$ SP = 450 - 45 = 405

12.

Sol. (b) 32 cm^2

Area = $\frac{1}{2}$ x (sum of parallel sides) x height

$= \frac{1}{2} \times (10+6) \times 4$

$= \frac{1}{2} \times 16 \times 4 = 32\ cm^2$

13.

Sol. (a) $x^2 - 9$

$(a+b)(a-b) = a^2 - b^2 = x^2 - 9$

14.

Sol. (c) $\frac{-7}{15}$

Standard form: denominator > 0

and gcd(numerator, denominator) = 1

$\Rightarrow$ Only $\frac{-7}{15}$ satisfies.

15.

Sol. (b) 8

$2x - 1 = 15$

$\Rightarrow 2x = 16$

$\Rightarrow x = 8$

16.

Sol. (b) Rhombus

17.

Sol. (c) 0.7

$0.49 = (0.7)^2$

18.

Sol. (b)

$$\sqrt{\frac{225}{9}} = \frac{\sqrt{225}}{\sqrt{9}} = \frac{15}{3} = 5$$

19.

Sol. (d) All of these

Any number ending in 4 gives cube ending in 4 $\rightarrow$ last digit

pattern.

Examples: $4^3 = 64 \rightarrow$ ends in 4

Hence All of these.

20.

Sol. (d) 250

250 is not a cube

21.

Sol. (c) Both equal

$2^6 = 64$

$4^3 = 64$

Both are equal.

22.

Sol. (c) 6 days

$$\text{Workers} \propto \frac{1}{\text{time}}$$

If workers double, time halves $\frac{12}{2} = 6$

23.

SoL: (b) 35 L

Let original mixture = 7x milk, 3x water

After adding water: water = 3x + 5

New ratio = 7: 4

So,

$\Rightarrow 7x : 3x + 5 = 7 : 4$

Cross multiply:

$\Rightarrow 28x = 21x + 35$

$\Rightarrow 7x = 35$

$\Rightarrow x = 5$

Milk = 7x = 35 L

24.

Sol. (a) 440 cm^2

Curved surface $= 2\pi rh = 2 \times \pi \times 7 \times 10 =$

$140\pi r \approx 140 \times 22/7 = 440\ cm^2$

25.

Sol. (a) 4

$x^2 + 4x + 4 \Rightarrow$ constant 4

26.

Sol. (a) 60

$$\text{mean} = \frac{\text{sum of observations}}{\text{no of observations}}$$

$\therefore$ sum = mean × observations

12×5=60

27.

Sol. (a) 24

$h^2 = p^2 + b^2$.

$b^2 = h^2 - p^2$.

$b=\sqrt{h^2-p^2}$

$b=\sqrt{676-100} = \sqrt{576} = 24$

28.

Sol. (a) 2

$x = \frac{k}{y}$, k=24 $\Rightarrow$ $x=\frac{24}{12}=2$

29.

Sol. (a) (x - 4) (x - 5)

x^2 - 4x - 5x + 20

= x (x-4) - 5 (x - 4)

= (x-4) (x-5)

30.

Sol. (b) 56%

Let C = 100 $\rightarrow$ B = 130 $\rightarrow$ A = 130 ×1.2 = 156

$\Rightarrow$ A is 56% more than C.

PART - III : PHYSICS & CHEMISTRY

1.

Sol. (d) Retraces its own path

A ray passing through the centre of curvature falls normally on the mirror. It reflects back along the same path.

2.

Sol. (d) At the centre of curvature

When object is at centre of curvature, the image forms at the same position. The image size equals object size and it is real and inverted.

3.

Sol. (a) Equal and opposite

Rubbing transfers electrons from one object to another. One object loses electrons (positive) and other gains same number of electrons (negative).

4.

Sol. (d) The particles of medium transfer energy by vibrating along the direction of sound waves.

Sound waves make particles vibrate about their mean positions. Only energy travels forward, not the particles themselves.

5.

Sol. (b) Loudness decreases

Loudness depends on amplitude of vibration. Less amplitude means less energy, so sound becomes softer.

6.

Sol. (a) kgf

Thrust is a force, so it's measured in force units. The gravitational unit is kilogram-force (kgf).

7.

Sol. (a) The atmospheric pressure decreases

At high altitudes, outside pressure drops but blood pressure stays same. This pressure difference can cause nose bleeding.

8.

Sol. (c) Rolling friction < Sliding friction < static friction

Rolling friction is less than Sliding friction which is less than static friction. Limiting friction is the maximum value of static friction.

9.

Sol. (a) Focus

Focus is the point inside Earth where earthquake starts. Epicenter is the point directly above it on surface.

10.

Sol. (b) 2.5 N

Force = mass × g = 0.25 kg × 10 m/s² = 2.5 N.

We convert grams to kilograms first.

11.

Sol. (a) Physical changes: (i), (ii), (v); Chemical changes: (iii), (iv)

Melting of wax, movement of liquid wax, and smoke formation (condensed wax vapor) are physical changes as no new substance forms. Burning of wax and soot formation are chemical changes producing new substances like CO_2 and carbon.

12.

Sol. (c) Aluminium

Aluminium is a metal and all metals are good conductors of electricity because they have free electrons. Sulphur and phosphorus are non-metals and poor conductors.

13.

Sol. (b) Calorific value - LPG releases more heat energy per unit mass than others

Calorific value tells us how much heat energy is produced when 1 kg of fuel burns completely. LPG has the highest calorific value (around 55 MJ/kg), so it produces maximum heat.

14.

Sol. (a) Hydrogen gas is released

When acids react with metal, they generally produce salt, water, and hydrogen gas. For example, $2HCl + Ca \rightarrow CaCl_2 + H_2$.

15.

Sol. (b) Malleability - ability to be hammered into sheets without breaking

Malleability is the property that allows metals to be beaten into thin sheets or different shapes without breaking. Iron becomes more malleable when heated, making it easier to shape.

16.

Sol. (a) P > Q > R > S > T

More reactive metals react faster with acids. According to the reactivity series, magnesium is most reactive, followed by aluminium, zinc, and iron. Copper won't react at all as it's below hydrogen in the series.

17.

Sol. (c) Rusting of iron

Rusting is a chemical change because iron reacts with oxygen and moisture to form a new substance called hydrated iron oxide (rust). The other options are just physical changes where the substance remains the same.

18.

Sol. (d) A chemical change where carbon dioxide gas is released and energy is absorbed

This is an acid-base reaction where baking soda (base) reacts with vinegar (acid) to form carbon dioxide bubbles. The cooling effect shows it's an endothermic reaction that absorbs heat from surroundings.

19.

Sol. (c) Oxygen

Oxygen is a supporter of combustion - without it, burning cannot happen. That's why some fire extinguishers work by cutting off oxygen supply to the fire.

20.

Sol. (b) 7

Pure water has a pH of 7, which is neutral - neither acidic nor basic. Values below 7 are acidic and above 7 are basic on the pH scale.

PART - IV : BIOLOGY

1.

Sol. (c) Root nodules

Nitrogen-fixing bacteria (Rhizobium) live in the root nodules of leguminous plants and convert atmospheric nitrogen into usable forms.

2.

Sol. (d) All of the above

Ploughing helps roots grow deeper, mixes nutrients evenly, and increases air spaces for root respiration.

3.

Sol. (d) All of the above

Endemic species have a limited habitat, are specially adapted to it, and are severely affected by any environmental disturbance.

4.

Sol. (b) Threatened and endangered species

The Red Data Book lists species that are at risk of extinction, including plants and animals.

5.

Sol. (a) Poaching

Poaching is illegal hunting and directly threatens wildlife instead of conserving it.

6.

Sol. (b) Progesterone

Progesterone maintains pregnancy and inhibits further ovulation after fertilization.

7.

Sol. (c) Both a and b

Birds lay eggs on land and need protection from drying, while frogs lay eggs in water where shells are unnecessary.

8.

Sol. (c) Both a and b

External fertilization and lack of parental care in oysters result in low survival rates, so more eggs are produced.

9.

Sol. (a) Increased activity of sebaceous glands

Hormonal changes during adolescence stimulate sebaceous glands to produce excess oil, leading to acne.

10.

Sol. (b) Estrogen

Estrogen controls the development of female secondary sexual characteristics such as breast development and wider hips.