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UDAAN

A QUEST FOR SCIENCE ASPIRANTS

SCIENCE APTITUDE TEST

CLASS - 8

SOLUTIONS

EXAM DATE : 21.12.25

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PART - I : MENTAL ABILITY

1.

Sol. (b) 153

Pattern: $3 \times 2 + 1 = 7$,

$7 \times 2 + 2 = 16$,

$16 \times 2 + 3 = 35$,

$35 \times 2 + 4 = 74$, $74 \times 2 + 5 = 153$.

2.

Sol. (b) O

A = 1, C = 3, F = 6, J = 10,

difference +2, +3, +4, +5 next +6 letter

10 + 5 = 15 = O.

3.

Sol. (a) OET

First letters:

$C(+3) \rightarrow F(+3) \rightarrow I(+3) \rightarrow L(+3) \rightarrow O$.

Second letters:

$Y(+4) \rightarrow T(+4) \rightarrow O(+4) \rightarrow J(+4) \rightarrow E$.

Third letters:

$D(+4) \rightarrow H(+4) \rightarrow L(+4). P(+4) \rightarrow T \rightarrow OET$

4.

Sol. (b) 45

Pattern: $12 \rightarrow 1.5 = 18$, $30 \rightarrow 1.5$

= 45 (diagonal products? Not needed, consistent with doubling rule).

Actually likely: 12: 18 = 2: 3, 30 : ? = 2:3

$\rightarrow$? = 45.

5.

Sol. (a) 29

Let total boys = N. A from left = 15, B from right = 10 $\rightarrow$ B from left = N- 9.

Swap positions $\rightarrow$ A's new pos from left = B's old pos from left = N - 9 = 20 $\rightarrow$

N = 29.

6.

Sol. (c) C

Arrangement: E D C A B (north-facing)

$\rightarrow$ middle = C.

Middle = C

7.

Sol. (c) 8

Square with both diagonals has 8 small triangles (4 from each diagonal dividing square into 4 triangles, plus central division gives 8).

8.

Sol. (a) 5 km East

Path: $12S \rightarrow 5E \rightarrow 12N \rightarrow$ ends 5 km East of start? Let's check: Start $\rightarrow S12 \rightarrow E5 \rightarrow N12 \rightarrow$ East displacement = 5 km.

9.

Sol. (a) MHTIROGLA

'TELEPHONE' reversed = ENOHPELET, but given code is ENCHIPELET (letter shuffling). 'ALGORITHM' reversed = MHTIROGLA.

10.

Sol. (c) Uncle

A's son is D's brother $\rightarrow$ D is A's daughter. C Is D's sister $\rightarrow$ C is A's daughter. B is A's brother $\rightarrow$ B is C's uncle.

11.

Sol. (a) 8

Cube cut into $4 \times 4 \times 4 \rightarrow$ no paint = inner $2 \times 2 \times 2 = 8$.

12.

Sol. (c) 3

Standard dice opposite pairs: (1,6), (2,5), (3,4)

13.

Sol. (a) 27

$5 \times 5 \times 5 = 125$ small cubes no paint = inner $3 \times 3 \times 3 = 27$.

14.

Sol. (d) E

Circular arrangement: Sequence around: A between D and F $\rightarrow$ D-A-F or F-A-D.

E immediate left of F $\rightarrow$ F, then E to F's left.

C between E and BE-C-B or B-C-E. Fit together: D-A-F-E-C-B (circle) $\rightarrow$ between A and F $\rightarrow$ E

15.

Sol. (d) 15 km North

Path: 10N $\rightarrow$ 8W $\rightarrow$ 5S $\rightarrow$ 8E net N-S: 10N-5S=5N, E-W: 8W-8E = 0E start to end: 15N.

PART - II : MATHEMATICS

1.

Sol. (c) 6 years

Let ages = 3x, 5x. Then $\frac{3x+4}{5x+4}=\frac{5}{7} \rightarrow 21x + 28$

$= 25 + 20 \rightarrow x = 2 \rightarrow$ A's age = 6.

2.

Sol. (b) $16\frac{2}{3}\%$

$16\frac{2}{3}\%$ (not exactly in options) - But given options: (b)% seems misprinted. If forced, probably intended $\frac{50}{3}\%$.

$\rightarrow$ If increased by 20%, reverse % decrease $= \frac{20}{120} \times 100 = 16\%\frac{2}{3}$.

3.

Sol. (b) Let numbers = 7x, 9x

Then $\frac{7x-12}{9x-12}=\frac{3}{5}$

$35x - 60 = 27x - 36 \rightarrow x = 3$

$\rightarrow$ Smaller = 21

4.

Sol. (a)

Let length = 5x breadth = 3x Perimeter = $16x = 64 \rightarrow x = 4 \rightarrow$ area = $20x^2 = 240$

5.

Sol. (a)

Area = $\frac{1}{2} d_1 d_2 = 120$

$\rightarrow \frac{1}{2} \times 24 \times d_2 = 120$

$\rightarrow d_2 = 10$

6.

Sol. (a) 110

Given $x+\frac{1}{x}=5$, square it:

$$x^3+\frac{1}{x^3}=\left(x+\frac{1}{x}\right)^3-3x\times\frac{1}{x}\left(x+\frac{1}{x}\right)$$

$$=(5)^3-3\times1\times(5)$$

$= 125 - 15 = 110$

7.

Sol. (a)

correct factorization:

$((x^2+1)+x))\ ((x^2+1)-x))$

$= (x^4 + x + 1)$

8.

Sol. (a)

$\sqrt{2} \approx 1.414, \sqrt{3} \approx 1.732 \rightarrow 1.5$ is between them.

9.

Sol. (a)

$\frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{2}-\sqrt{3}}$ nallze each: first =

= $\sqrt{3}$ - $\sqrt{2}$, second =$\sqrt{3}$+$\sqrt{2}$ sum = $2\sqrt{3}$.

10.

Sol. (a) Number = 75

Let number = 10x + y

x + y = 12

Reversed = 10y + x = original –18

10y + x = 10x + y –18 $\rightarrow$ 9y –9x = –18

y – x = 2

Solve with x + y = 12 $\rightarrow$ (x,y) = (7,5) $\rightarrow$ 75

11.

Sol. (b) $\frac{3}{5}$

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

$\rightarrow$ 4x + 4 = 3x + 9 - x = 5fraction $\frac{3}{5}$

12.

Sol. (a) **AD = DE**

In parallelogram, AE bisects A

$\rightarrow \angle A \; \angle DAE = \angle EAB = \angle DEA$ (alternate angles) $\rightarrow \Delta ADE$ Isosceles $\rightarrow$ AD=DE.

13.

Sol. (b) 144°

Sum of angles = 360

Ratio sum = 10

Each part = 360/10 = 36

Largest = 4 × 36 = 144°

14.

Sol. (a) $\sqrt{2}+1$

Because $\sqrt{3+2\sqrt{2}} = \sqrt{(\sqrt{2}+1)^2} = \sqrt{2}+1$.

Question has misprint?

Given is $\sqrt{3}+2\sqrt{2}$ but options match

$\sqrt{3+2\sqrt{2}}$ simplification.

15.

Sol. (a) 7744

Only 4-digit perfect square with digit sum 22: 7744, hundreds=7,units=4 (7=4+3).

16.

Sol. (b) 0.06

0.000216 = 216×10^{-6} cube root

= 6×10^{-2} = 0.06

17.

Sol. (b) 294 cm^2

Volume = a^3 =343 $\rightarrow$ a=7

Surface area $6a^2 = 6\times49 = 294cm^2$

18.

Sol. (b)

Let $2^x = 3^y = 6^{-z} = k$

$\rightarrow k^{1/x} = 2, k^{1/y} = 3, k^{1/z} = \frac{1}{6}$

$\rightarrow 2 \times 3 \times \frac{1}{6} = (k)^{\frac{1}{x}+\frac{1}{y}+\frac{1}{z}}$.

$1^0 = (k)^{\frac{1}{x}+\frac{1}{y}+\frac{1}{z}}$

$\frac{1}{x}+\frac{1}{y}+\frac{1}{z} = 0$

19.

Sol. (c) 4

Numerator:$4^{2x+1} - 16^x = 4.16^x - 16^x = 3 \; . \; 16^x$

Denominator: $16^x - \frac{16^x}{4} = \frac{3}{4}.16^x$

Ratio = $\frac{3}{3/4} = 4 \rightarrow (c)$

20.

Sol. (a) 15

Mean 20 $\rightarrow$ subtract 5 from $\rightarrow$ each new mean 15 (a)

21.

Sol. (c) 8

Data sorted: 3,5,6,7,9,12,18,20

Median = average of 4th and 5th = (7+9)/2 = 8

22.

Sol. (a) 2

Mode = most frequent = 2 (appears 4 times)

23.

Sol. (a) 21

Direct variation x $\rightarrow$ y

x = ky $\rightarrow$ 12 = 4k $\rightarrow$ k=3

For y=7 $\rightarrow$ x=21

24.

Sol.(a) 4

x = ky $\rightarrow$ 10×6 = 60 $\rightarrow$ x × 15 = 60 $\rightarrow$ x = 4

25.

Sol. (a) 616 cm^2

Square area 484 $\rightarrow$ side 22 cm $\rightarrow$ perimeter 88 cm (wire length) $\rightarrow$ circle circumference $2\pi r = 88 \rightarrow r = 14cm$

area $\pi r^2 = \frac{22}{7} \times 196 = 616 cm^2$

Sol. (a) 500

CI – SI for 2 years = $(P \times r^2)/100^2$

25 = P × 1/100 $\rightarrow$ P = 2500

SI = (2500×10×2)/100 = 500

27.

Sol. (b) 3abc

Given a + b + c = 0 $\rightarrow$ $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca) = 0$. Thus $a^2 + b^2 + c^2 = - 2(ab + bc + ca)$ no match with options unless using identity:

Actually known: if a + b + c = 0 then $a^3 + b^3 + c^3 = 3abc$, but here $a^2 + b^2 + c^2$ not directly related. Check options: given options seem wrong; likely intended $a^3 + b^3 + c^3 = 3abc$ but question misprint. Ignore.

28.

Sol. (b) $\frac{13}{125}$

Terminating decimal if denominator has only 2's and 5's in simplest form.

(a) $\frac{17}{1} \rightarrow$ terminating

(b) $\frac{1}{90} \rightarrow$ non-terminating

(c) $\frac{1}{13} \rightarrow$ non-terminating

(d) $\frac{1}{125} \rightarrow$ terminating

Question ambiguous; possibly they mean which fraction from a list? Likely $\frac{1}{125} \rightarrow$

29.

Sol. (b) 46

Let digits a, b, ab = 24 number 10a + b $\rightarrow$ 10a + b + 18 = 10b + a $\rightarrow$ 9a-9b = - 18 $\rightarrow$ a - b = - 2 $\rightarrow$ solve ab = 24 b - a = 2 $\rightarrow$ a = 4 b = 6 or a = - 6 invalid $\rightarrow$ number 46

30.

Sol. (b) 8.25 days

Total work = 6×10 = 60 man-days

After 3 days, work done = 6 × 3 = 18 left 42 man-days

Now 8 men - time = 8 $\rightarrow$ 42/8 = 5.25 days

Total 3+5.25 = 8.25 days

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PART - III : PHYSICS & CHEMISTRY

1.

Sol. (d) Dispersion

When white light passes through a prism, it splits into seven colours. This phenomenon is called dispersion.

2.

Sol. (a) Erect and diminished

Convex mirrors always form virtual, erect and smaller images. They are used as rear-view mirrors in vehicles.

3.

Sol. (a) Induction

Induction is the process of charging without direct contact. The charged body only needs to be brought near.

4.

Sol. (b) A positively charged rod is placed in contact with the disc of electroscope

Charging by conduction requires direct contact with the charging body. The electroscope gets the same type of charge as the rod.

5.

Sol. (d) Decibel

Loudness of sound is measured in decibel (dB). Normal conversation is around 60 dB.

6.

Sol. (c) Frequency

Frequency determines how high or low pitched a sound is. High frequency gives high pitch, low frequency gives low pitch.

7.

Sol. (b) 5 kgf

Thrust equals the weight of the body pressing down the surface. Here the body weighs 5 kgf, so thrust is 5 kgf. Kgf is another unit of force.

8.

Sol. (c) $N\ m^{-2}$

Pressure = Force / Area. So unit is Newton per square meter = $N\ m^{-2}$.

9.

Sol. (b) Sliding friction

In a flourmill, wheat grains slide against grinding stones. This produces sliding friction between surfaces.

10.

Sol. (b) Seismograph

Seismograph is the instrument that detects and records earthquake waves. The record it produces is called a seismogram.

11.

Sol. (c) Brittle in nature

Metals are actually malleable and ductile, meaning they can be hammered into sheets and drawn into wires. Non-metals are the ones that are brittle and break easily when force is applied.

12.

Sol. (b) Physical change

When ice melts, only the state changes from solid to liquid, but the chemical composition remains H2O. We can freeze it back to ice, which shows it's a reversible physical change.

13.

Sol. (c) Litmus

Litmus paper is the most common indicator used in labs. Red litmus turns blue in base and blue litmus turns red in acid.

14.

Sol. (b) A chemical change where magnesium combines with oxygen

Magnesium reacts with oxygen in air to form magnesium oxide (white ash). The product weighs more because oxygen from air has been added to the magnesium.

15.

Sol. (b) Carbon monoxide and water vapour with soot

Incomplete combustion happens when there isn't enough oxygen available. This produces dangerous carbon monoxide gas and black soot (unburnt carbon particles) and water.

16.

Sol. (a) Sodium chloride

This is a simple neutralization reaction: $HCl + NaOH \rightarrow NaCl + H_2O$. The salt formed is sodium chloride, which is table salt.

17.

Sol. (c) Acidic oxides

When non-metals like carbon or sulphur burn in oxygen, they form oxides that dissolve in water to give acids.

18.

Sol. (b) Ignition temperature is reached more easily in hot conditions

Every fuel has an ignition temperature - the minimum temperature needed to catch fire. In summer, the surrounding heat brings coal closer to this temperature, making spontaneous combustion possible.

19.

Sol. (a) Displacement in test tubes 1 and 2 only; silver metal deposits and reddish-brown copper deposits form respectively

Iron is more reactive than copper and silver but less reactive than zinc and magnesium (check the series given). So iron can only displace copper and silver from their solutions, not the more reactive metals.

20.

Sol. (c) Carry supplementary oxygen supply to maintain the ratio for complete combustion

Complete combustion needs a proper fuel-to-oxygen ratio. Since there's less oxygen at high altitude, we must carry extra oxygen supply to ensure complete burning and prevent poisonous carbon monoxide formation.

PART - IV : BIOLOGY

1.

Sol. (b) Nitrogen-fixing bacteria are depleted

Cereal crops do not fix nitrogen. Repeated cereal cultivation reduces soil nitrogen because no leguminous crops are grown to replenish nitrogen-fixing bacteria.

2.

Sol. (b) It ensures uniform depth and spacing, preventing overcrowding

Seed drills place seeds at proper depth and spacing, ensuring better germination and growth.

3.

Sol. (a) These diseases are caused by viruses

Antibiotics kill bacteria, not viruses.

4.

Sol. (a) National parks have stricter protection; no human activity allowed

In wildlife sanctuaries, limited human activities (like grazing) may be permitted, but in national parks they are strictly prohibited.

5.

Sol. (b) Reduces transpiration, leading to reduced rainfall

Fewer trees $\rightarrow$ less transpiration $\rightarrow$ less water vapour $\rightarrow$ decline in rainfall.

6.

Sol. (b) It occurs outside the female's body in water Female frogs lay eggs in water and males release sperms over them.

7.

Sol. (d) All of the above

Internal fertilization increases success rate, protects gametes/zygotes, and requires fewer gametes.

8.

Sol. (b) Butterfly

Butterflies undergo egg ? larva ? pupa ? adult (complete metamorphosis).

9.

Sol. (b) One fertilized egg splits into two embryos

This creates two genetically identical offspring.

10.

Sol. (a) For rapid growth and muscle development

Adolescents experience growth spurts and need proteins for building body tissues.