



SCIENCE APTITUDE TEST CLASS - 10 SOLUTIONS

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PART - I : MENTAL ABILITY

1.

Sol. (c) 11 dotsPattern of addition: +1, +2, +3, +4. So, $7 + 4 = 11$.

2.

Sol. (a) Cube

2D shape to its 3D counterpart. Triangle forms a Pyramid, Square forms a Cube.

3.

Sol. (c) Q

Backward skips increase by one each time: -2 (Z to X), -3 (X to U), -4 (U to Q), -5 (Q to L).

4.

Sol. (a) O15

Letters skip +2, +3, +4, +5 (J+5=O). Numbers skip +2, +3, +4, +5 (10+5=15).

5.

Sol. (b) 30 kmA is 20km North, B is 10km South. They both walked 15km East. Distance between them is $20 + 10 = 30$ km.

6.

Sol. (a) 30Only Tea = $60 - 40 = 20$. Only Coffee = $50 - 40 = 10$. Exactly one = $20 + 10 = 30$.

7.

Sol. (d) 216 $27 = (3^3)$, $125 = (5^3)$, $343 = (7^3)$ are cubes of odd numbers. $216 = (6^3)$ is a cube of an even number.

8.

Sol. (a) 48

$$(15 - 5) \times (6 + 2) = 80$$

$$(9 - 4) \times (7 + 6) = 65$$

$$(13 - 11) \times (16 + 8) = 48 \quad \text{So, 48 is valid}$$

9.

Sol. (a) Brother

"Only son of my grandfather" = Woman's father. "Son of [her father]" = Her brother.

10.

Sol. (b) WednesdayDays from Aug 10 to Dec 25 = 21 (Aug) + 30 (Sep) + 31 (Oct) + 30 (Nov) + 25 (Dec) = 137 days.
 $137 \div 7 = 19$ weeks + 4 days. Saturday + 4 = Wednesday.

11.

Sol. (a) for tir dic

12.

Sol. (c) Both I and II follow

I follows: Doctors (some) $\rightarrow$ Engineers $\rightarrow$ Teachers. So some doctors are teachers.

II follows: Engineers $\rightarrow$ Teachers. No teacher is a pilot. So no engineer is a pilot.

13.

Sol. (c) All three products

A: 50, 60, 70, 80. B: 60, 70, 80, 90. C: 40, 50, 60, 70. All increase.

14.

Sol. (a) 13:11

Total A = $50+60+70+80 = 260$

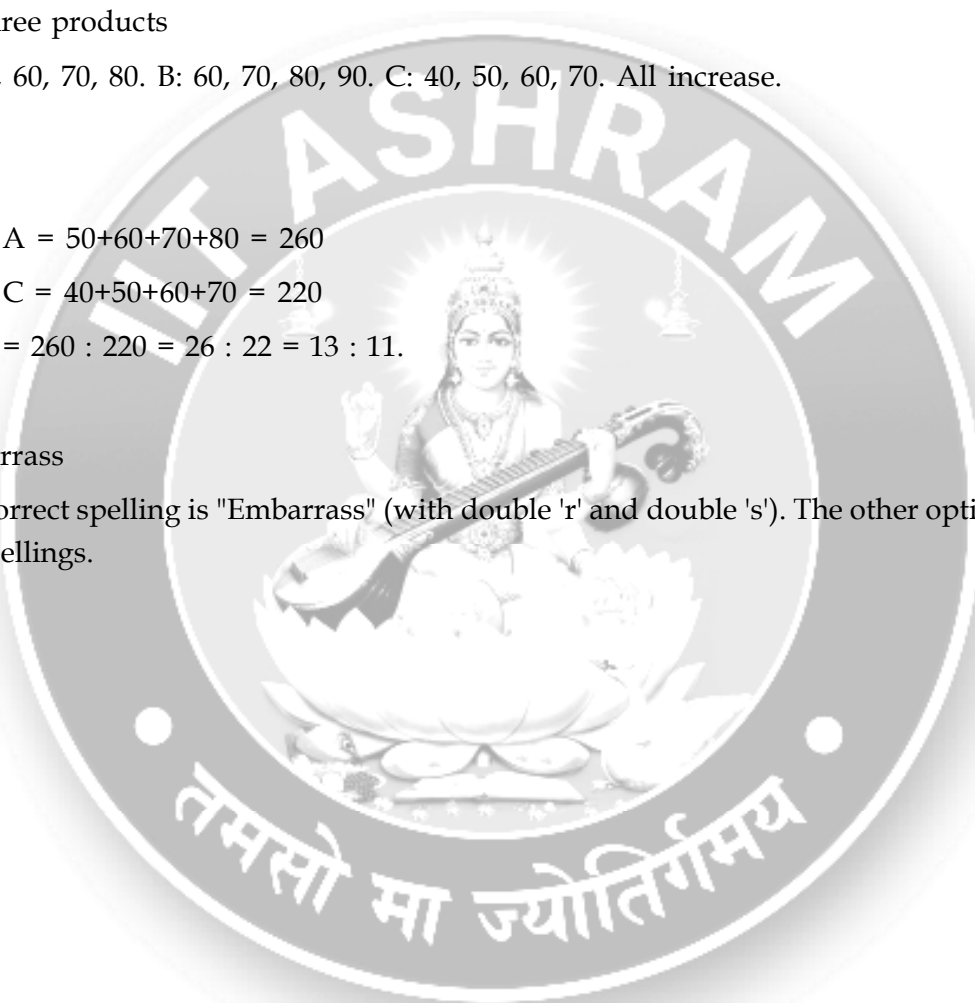
Total C = $40+50+60+70 = 220$

Ratio = $260 : 220 = 26 : 22 = 13 : 11$.

15.

Sol. (b) Embarrass

The correct spelling is "Embarrass" (with double 'r' and double 's'). The other options are incorrect misspellings.



PART - II : MATHEMATICS

1.

Sol. (d) 4

$$\text{Let: } x = \sqrt{12 + \sqrt{12 + \sqrt{12 + \dots}}}$$

On squaring both sides,

$$\Rightarrow x^2 = 12 + \sqrt{12 + \sqrt{12 + \dots}}$$

$$\Rightarrow x^2 = 12 + x$$

$$\Rightarrow x^2 - x - 12 = 0$$

$$\Rightarrow x^2 - 4x + 3x - 12 = 0$$

$$\Rightarrow x(x - 4) + 3(x - 4) = 0$$

$$\Rightarrow (x + 3)(x - 4) = 0$$

$$\Rightarrow x = -3 \text{ \& } x = 4$$

Here, $x = 4$ is valid.

2.

Sol. (a) 98

$$x = \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$$

$$\text{and } y = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$$

Rationalise both x and y .

$$\Rightarrow x = \frac{(\sqrt{3} - \sqrt{2})(\sqrt{3} - \sqrt{2})}{(\sqrt{3} + \sqrt{2})(\sqrt{3} - \sqrt{2})} = \frac{(\sqrt{3} - \sqrt{2})^2}{3 - 2} = \frac{3 + 2 - 2\sqrt{6}}{1} = 5 - 2\sqrt{6}$$

Similarly,

$$y = \frac{(\sqrt{3} + \sqrt{2})(\sqrt{3} + \sqrt{2})}{(\sqrt{3} - \sqrt{2})(\sqrt{3} + \sqrt{2})} = \frac{(\sqrt{3} + \sqrt{2})^2}{3 - 2} = \frac{3 + 2 + 2\sqrt{6}}{1} = 5 + 2\sqrt{6}$$

The value of $x^2 + y^2 = (x+y)^2 - 2xy$

$$= (5 - 2\sqrt{6} + 5 + 2\sqrt{6})^2 - 2(5 - 2\sqrt{6})(5 + 2\sqrt{6}) = (10)^2 - 2(25 - 24) = 100 - 2 = 98$$

3.

Sol. (d) $\sqrt{8} + \sqrt{2}$

$$\Rightarrow \sqrt{8} + \sqrt{2} = 2\sqrt{2} + \sqrt{2} = 3\sqrt{2}$$

4.

Sol. (a) 47

$$x + \frac{1}{x} = 3$$

on squaring both sides

$$\Rightarrow x^2 + \frac{1}{x^2} + 2 \times x \times \frac{1}{x} = 9 \quad \Rightarrow x^2 + \frac{1}{x^2} = 9 - 2 \quad \Rightarrow x^2 + \frac{1}{x^2} = 7$$

again squaring bothside

$$\Rightarrow x^4 + \frac{1}{x^4} + 2x^2 \times \frac{1}{x^2} = 49 \quad \Rightarrow x^4 + \frac{1}{x^4} = 49 - 2 \quad \Rightarrow x^4 + \frac{1}{x^4} = 47$$

5.

Sol. (a) 4cm

HCF (40, 84) is 4.

6.

Sol. (a) an irrational number

If $(a - d)$, a , $(a + d)$ are three zeros of $\Rightarrow P(x) = x^3 - 3x^2 + x + 1$ We know that from $P(x)$,

$$a=1, \quad b=-3, \quad c=1, \quad d=1$$

$$\text{Sum of zeros } (\alpha + \beta + \gamma) = \frac{-b}{a}$$

$$\Rightarrow (a - d) + a + (a + d) = \frac{-(-3)}{1} \Rightarrow 3a = 3$$

$$a = 1$$

$$\text{Product of zeros } (\alpha\beta\gamma) = \frac{-d}{a} \Rightarrow (a - d) \times a \times (a + d) = \frac{-1}{1}$$

From eq. (1),

$$\Rightarrow (1 - d) \times 1 \times (1 + d) = -1 \quad \Rightarrow 1 - d^2 = -1 \quad \Rightarrow d^2 = 2$$

$$d = \pm\sqrt{2}$$

Then, $(a + d) = 1 + \sqrt{2}$, So it is an irrational no

7.

Sol. (a) (6, 5)

Let C(4,1) is the midpoint of A(2,-3) and B(x,y).

By midpoint formula,

$$\Rightarrow C(4,1) = \left(\frac{2+x}{2}, \frac{-3+y}{2} \right)$$

$$\Rightarrow 4 = \frac{2+x}{2} \quad \text{and} \quad 1 = \frac{-3+y}{2}$$

$$\Rightarrow 2+x = 8 \quad -3+y = 2$$

$$\Rightarrow x = 6 \quad y = 5$$

Hence, B (x, y) = (6, 5)

8.

Sol. (b) 2(3,2) is the solution of $2x + ky = 10$ At $x=3, y=2$

Then,

$$\Rightarrow 2(3) + k(2) = 10 \quad \Rightarrow 2k = 10 - 6 \quad \Rightarrow k = 2$$

9.

Sol. (b) $-m, (m+3)$

$$x^2 - 3x - m(m+3) = 0$$

$$\Rightarrow x^2 + mx - (m+3)x - m(m+3) = 0$$

$$\Rightarrow x(x+m) - (m+3)(x+m) = 0$$

$$\Rightarrow (x+m)(x-(m+3)) = 0$$

$$\Rightarrow x+m=0 \quad \Rightarrow x=-m$$

and

$$\Rightarrow x-(m+3)=0 \quad \Rightarrow x=m+3$$

10.

Sol. (a) 5 cmDiagonals of Rhombus are $d_1 = 6$ cm and $d_2 = 8$ cm.

Side of Rhombus

$$= \sqrt{\left(\frac{d_1}{2}\right)^2 + \left(\frac{d_2}{2}\right)^2} = \sqrt{\left(\frac{6}{2}\right)^2 + \left(\frac{8}{2}\right)^2} = \sqrt{9+16} = \sqrt{25} = 5 \text{ cm}$$

Side of Rhombus is = 5 cm.

11.

Sol. (a) 150

$$\text{HCF}(a, b) = 12, \quad a \times b = 1800$$

We know that

$$\Rightarrow a \times b = \text{HCF}(a, b) \times \text{LCM}(a, b) \quad \Rightarrow \quad 1800 = 12 \times \text{LCM}(a, b)$$

$$\Rightarrow \text{LCM}(a, b) = \frac{1800}{12} \quad \Rightarrow \quad \text{LCM}(a, b) = 150$$

12.

Sol. (a) 1 6^n ends with digit 6 and 5^n ends with 5.

$$\text{Difference} = 6 - 5 = 1$$

So, it always ends with digit 1.

13.

Sol. (a) 2520

$$\Rightarrow \text{LCM}(1 \text{ to } 10) = 2^3 \times 3^2 \times 5 \times 7 = 2520$$

14.

Sol. (a) 2Let α and β are two zeroes of

$$p(x) = (k^2 + 4)x^2 + 13x + 4k$$

Then, $\beta = \frac{1}{\alpha}$ is reciprocal of α .

$$\text{Product of zeroes: } (\alpha\beta) = \frac{c}{a}$$

$$\Rightarrow \alpha \times \frac{1}{\alpha} = \frac{4k}{k^2 + 4} \quad \Rightarrow \quad 1 = \frac{4k}{k^2 + 4} \quad \Rightarrow \quad k^2 + 4 = 4k \quad \Rightarrow \quad k^2 - 4k + 4 = 0$$

$$\Rightarrow k^2 - 2k - 2k + 4 = 0 \quad \Rightarrow \quad k(k - 2) - 2(k - 2) = 0 \quad \Rightarrow \quad (k - 2)(k - 2) = 0 \quad \Rightarrow \quad k = 2$$

15.

Sol. (b) 7

For many solution,

$$\Rightarrow \frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} \quad \Rightarrow \quad \frac{2}{(k-1)} = \frac{3}{(k+2)} = \frac{7}{3k} \quad \Rightarrow \quad \frac{2}{(k-1)} = \frac{3}{(k+2)} \quad \text{Or} \quad \frac{3}{(k+2)} = \frac{7}{3k}$$

$$\Rightarrow 2(k+2) = 3(k-1) \quad : \quad 3(3k) = 7(k+2)$$

$$\Rightarrow 2k + 4 = 3k - 3 \quad : \quad 9k = 7k + 14$$

$$\Rightarrow k = 7 \quad : \quad 2k = 14, k = 7$$

16.

Sol. (a) 63Let unit's and ten's digit of a two digit number be y & x .The original number be $(10x + y)$.

Then,

$$\Rightarrow x + y = 9 \quad \dots(i)$$

$$\Rightarrow (10x + y) = (10y + x) + 27$$

$$\Rightarrow 9x - 9y = 27$$

$$\Rightarrow x - y = 3 \quad \dots(ii)$$

Solving, $x = 6$ and $y = 3$.Then the two digit number is $(10x + y) = (10 \times 6 + 3) = 63$.

17.

Sol. (a) $\frac{\sqrt{17}}{2}$ If α and β are zeroes of

$$P(x) = 2x^2 - 7x + 4$$

Here,

$$a = 2, \quad b = -7, \quad c = 4$$

$$\Rightarrow \text{Sum of zeros : } \alpha + \beta = -\frac{b}{a} = \frac{7}{2} \quad \Rightarrow \text{Product of zeros: } \alpha\beta = \frac{c}{a} = 2$$

$$\text{Then, } |\alpha - \beta| = \sqrt{(\alpha + \beta)^2 - 4\alpha\beta} = \sqrt{\left(\frac{7}{2}\right)^2 - 4 \times 2} = \sqrt{\frac{49}{4} - 8} = \sqrt{\frac{49 - 32}{4}} = \frac{\sqrt{17}}{2}$$

$$\text{Hence, } |\alpha - \beta| = \frac{\sqrt{17}}{2}$$

18.

Sol. (c) 23

$$\Rightarrow a = 7, \quad a_n = 84, \quad S_n = \frac{2093}{2}, \quad n = ?$$

$$\text{Using, } S_n = \frac{n}{2}(a + a_n) \Rightarrow \frac{2093}{2} = \frac{n}{2}(7 + 84) \Rightarrow 2093 = 91n \Rightarrow n = \frac{2093}{91} = 23 \Rightarrow n = 23$$

19.

Sol. (b) 1

$$a_7 = \frac{1}{9} \text{ and } a_9 = \frac{1}{7}, a_{63} = ?$$

Let a be the first term and d be the common difference of an A.P.

Then,

$$\Rightarrow a_7 = \frac{1}{9}$$

$$\Rightarrow a + 6d = \frac{1}{9} \quad \dots (i)$$

$$\Rightarrow a_9 = \frac{1}{7}$$

$$\Rightarrow a + 8d = \frac{1}{7} \quad \dots (ii)$$

By solving eq. (i) & (ii),

$$a = \frac{1}{63} \quad \text{and} \quad d = \frac{1}{63}$$

$$a_{63} = a + 62d$$

$$= \frac{1}{63} + 62 \times \frac{1}{63} = 1$$

$$a_{63} = 1$$

20.

Sol. (c) 8 cm

In $\triangle ABC$,

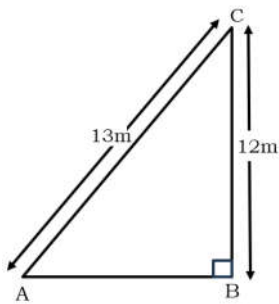
$$\angle A = 90^\circ, AD \perp BC$$

$$\Rightarrow \triangle CDA \sim \triangle CAB \text{ (by AA)} \Rightarrow \frac{CD}{CA} = \frac{CA}{CB} \Rightarrow CA^2 = CB \times CD$$

$$\Rightarrow x^2 = 16 \times 4 \Rightarrow x = \sqrt{16 \times 4} \Rightarrow x = 8 \text{ cm}$$

21.

Sol. (a) 5 m

Let in, $\triangle ABC$ $AC = 13 \text{ m}, BC = 12 \text{ m}$

By Pythagoras' theorem,

$$AB^2 = AC^2 - BC^2$$

$$= (13)^2 - (12)^2$$

$$AB^2 = 25$$

$$AB = \sqrt{25}$$

$$AB = 5 \text{ m}$$

22.

Sol. (c) $2x$ or $\frac{1}{2x}$

$$\sec^2 \theta = \left(x + \frac{1}{4x}\right)^2 = (x)^2 + \left(\frac{1}{4x}\right)^2 + 2x \times \frac{1}{4x} = (x)^2 + \left(\frac{1}{4x}\right)^2 + \frac{1}{2}$$

$$\text{We know that } 1 + \tan^2 \theta = (x)^2 + \left(\frac{1}{4x}\right)^2 + \frac{1}{2}$$

$$\tan^2 \theta = (x)^2 + \left(\frac{1}{4x}\right)^2 - \frac{1}{2}$$

$$\tan^2 \theta = \left(x - \frac{1}{4x}\right)^2$$

$$\text{Then } \tan \theta = \left(x - \frac{1}{4x}\right) \text{ OR } \left(-x + \frac{1}{4x}\right)$$

$$\text{When } \tan \theta = \left(x - \frac{1}{4x}\right)$$

$$\sec\theta + \tan\theta = \left(x + \frac{1}{4x}\right) + \left(x - \frac{1}{4x}\right) = 2x$$

$$\text{When } \tan\theta = \left(-x + \frac{1}{4x}\right)$$

$$\sec\theta + \tan\theta = \left(x + \frac{1}{4x}\right) + \left(-x + \frac{1}{4x}\right) = \frac{1}{2x}$$

$$\text{The value of } \sec\theta + \tan\theta = 2x, \frac{1}{2x}$$

23.

Sol. (c) $\sqrt{a^2 + b^2}$

$$\begin{aligned} \text{Distance} &= \sqrt{(a \cos \theta + b \sin \theta - 0)^2 + (0 - (a \sin \theta - b \cos \theta))^2} \\ &= \sqrt{(a \cos \theta + b \sin \theta)^2 + (a \sin \theta - b \cos \theta)^2} \\ &= \sqrt{a^2 \cos^2 \theta + b^2 \sin^2 \theta + 2ab \sin \theta \cos \theta + a^2 \sin^2 \theta + b^2 \cos^2 \theta - 2ab \sin \theta \cos \theta} \\ &= \sqrt{a^2 (\sin^2 \theta + \cos^2 \theta) + b^2 (\sin^2 \theta + \cos^2 \theta)} \\ &= \sqrt{a^2 + b^2} \because \sin^2 \theta + \cos^2 \theta = 1 \end{aligned}$$

24.

Sol. (a) $\pm 2\sqrt{3}$

Given $\tan\theta + \cot\theta = 4$

On squaring,

$$\tan^2\theta + \cot^2\theta + 2\tan\theta \cot\theta = 16 \quad [\because \tan\theta \cdot \cot\theta = 1]$$

$$\tan^2\theta + \cot^2\theta = 16 - 2$$

$$\tan^2\theta + \cot^2\theta = 14$$

Subtracting 2 from both sides

$$\tan^2\theta + \cot^2\theta - 2 = 14 - 2$$

$$\tan^2\theta + \cot^2\theta - 2\tan\theta \cot\theta = 12$$

$$(\tan\theta - \cot\theta)^2 = 12$$

$$\tan\theta - \cot\theta = \pm 2\sqrt{3}$$

25.

Sol. (b) $b^2 - a^2$

$$p = a \cot \theta + b \operatorname{cosec} \theta \quad \dots\dots\dots (i)$$

$$q = b \cot \theta + a \operatorname{cosec} \theta \quad \dots\dots\dots (ii)$$

Subtract eq. (ii) from eq. (i) after squaring.

$$\begin{aligned} p^2 - q^2 &= (a \cot \theta + b \operatorname{cosec} \theta)^2 - (b \cot \theta + a \operatorname{cosec} \theta)^2 \\ &= (a \cot \theta + b \operatorname{cosec} \theta + b \cot \theta + a \operatorname{cosec} \theta) (a \cot \theta + b \operatorname{cosec} \theta - b \cot \theta - a \operatorname{cosec} \theta) \\ p^2 - q^2 &= \{(a + b) \cot \theta + (a + b) \operatorname{cosec} \theta\} \{(a - b) \cot \theta - (a - b) \operatorname{cosec} \theta\} \\ &= (a + b) (\cot \theta + \operatorname{cosec} \theta) (a - b) (\cot \theta - \operatorname{cosec} \theta) \\ &= (a^2 - b^2) (\cot \theta + \operatorname{cosec} \theta) (\cot \theta - \operatorname{cosec} \theta) \\ &= - (a^2 - b^2) (\operatorname{cosec}^2 \theta - \cot^2 \theta) \quad [\because (\operatorname{cosec}^2 \theta - \cot^2 \theta) = 1] \\ &= (b^2 - a^2) \end{aligned}$$

26.

Sol. (b) 3 cm

When a quadrilateral is circumscribing a circle, then sum of oppsite sides are equal to each other.

$$AB + CD = AD + BC$$

$$6 + 4 = AD + 7$$

$$AD = 10 - 7 \text{ cm}$$

$$AD = 3 \text{ cm}$$

27.

Sol. (a) 12 cm

Volume of sphere = vol. of cone

$$\frac{4}{3} \pi (6)^3 = \frac{1}{3} \pi r^2 (6)$$

$$4 \times 36 = r^2$$

$$r = \sqrt{36 \times 4}$$

$$r = 12 \text{ cm}$$

28.

Sol. (b) 3 : 1 : 2

Vol. of cylinder = vol. of cone = vol. of hemisphere

$$\pi r^2 h = \frac{1}{3} \pi r^2 h = \frac{2}{3} \pi r^3$$

If $h = r$ then,

$$\Rightarrow \pi r^3 = \frac{1}{3} \pi r^3 = \frac{2}{3} \pi r^3$$

The ratio will be 3:1:2

29.

Sol. (c) 60°

$$\sin(A + B) = 1$$

$$\sin(A + B) = \sin 90^\circ$$

On comparing,

$$A + B = 90^\circ$$

...(1)

$$\cos(A - B) = \frac{\sqrt{3}}{2}$$

$$\cos(A - B) = \cos 30^\circ$$

On comparing,

$$A - B = 30^\circ$$

...(2)

On solving (1) & (2),

$$A = 60^\circ$$

30.

Sol. (c) $\frac{11}{36}$

If two dice are thrown,

$$n(S) = 36$$

$$\Rightarrow \text{No. of favorable outcomes} = \{(1,6), (2,6), (3,6), (4,6), (5,6), (6,6), (6,1), (6,2), (6,3), (6,4), (6,5)\}$$

$$\Rightarrow n(E) = 11$$

$$\Rightarrow \text{Probability} = \frac{\text{Number of Favorable Outcomes}}{\text{Total Number of Outcomes}} = \frac{11}{36}$$

PART - III : PHYSICS & CHEMISTRY

1.

Sol. (a) 14 m/sHere $H_{\max} = 10$ m and $v = 0$ m/s, $g = -9.8$ m/s²By applying $v^2 - u^2 = 2gh$,

$$u = 14 \text{ m/s}$$

2.

Sol. (d) All the above

Newton's third law states that action and reaction forces are equal in magnitude, opposite in direction, and act on two different bodies.

3.

Sol. (d) 10 sCar A covers distance $S_A = V_A \times t = 15t$. Car B, starting from rest, covers distance given by

$$S_B = u_B t + \frac{1}{2} a_B t^2 = (1/2)(3)t^2 = 1.5t^2.$$

For their second meeting: $15t = 1.5t^2 \Rightarrow t = 10$ s (apart from $t = 0$).

4.

Sol. (c) Concave

A concave reflector is used in a torch. When the bulb is placed near its focus, reflected rays emerge approximately parallel.

5.

Sol. (c) $x = 2$ Power of Lens, $P = 1/f$. If focal length is reduced to $f/2$,

$$P' = 1/(f/2) = 2/f = 2P.$$

Therefore, power becomes 2 times the original.

6.

Sol. (c) 120 cmArea magnification = (linear magnification)². Given area magnification = 16,

linear magnification = 4.

For a real image, $|m| = v/u = 4$. Given $u = 30$ cm, $v = 4 \times 30 = 120$ cm.

7.

Sol. (b) Increases

When light ray is travelling from water to glass it bends less as compared to when it travels from air to glass, hence focal length increases when a lens is submerged in water.

8.

Sol. (b) Half of the second

Resistance of a conductor is given by $R = \rho L/A$ and $A \propto d^2$ (d = diameter of the conductor).
for conductors of same material ρ is same.

For the first wire has $L_1 = 2L_2$ and $d_1 = 2d_2$, so $A_1 = 4A_2$.

Thus $R_1/R_2 = (2)/(4) = 1/2$.

9.

Sol. (a) 160 volt

The potential difference across the 8Ω resistor is given as 48V, which means the voltage across the entire parallel block is 48V.

Current through 8Ω resistor is : $I_1 = \frac{48}{8} = 6A$

Current through 24Ω resistor is : $I_2 = \frac{48}{24} = 2A$

Total current through the main circuit : $I = 8A$

Equivalent resistance of the top parallel section $20\Omega, 30\Omega$ and 60Ω will be = 10Ω

Equivalent resistance of the bottom parallel section of 24Ω and 8Ω will be = 6Ω

The total resistance is the sum of all components in series (3Ω resistor, top parallel section, bottom parallel section, and 1Ω resistor)

$$R_{net} = 3\Omega + 10\Omega + 6\Omega + 1\Omega = 20\Omega$$

Using Ohm's Law ($V = IR$) for the entire circuit:

$$V_{xy} = 8A \times 20\Omega = 160V$$

10

Sol. (c) Ohm/Ampere

Use $V = IR$, $P = VI$ to obtain unit of potential.

11.

Sol. (a) 14.006 amu

$$\frac{14.0031 \times 99.69 + 15.0001 \times 0.31}{100} = 14.006 \text{ a.m.u.}$$

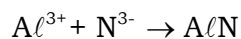
12.

Sol. (c) 56.14%

$$O\% = \frac{192}{342} \times 100$$

13.

Sol. (d) A/N



14.

Sol. (c) 2 moles

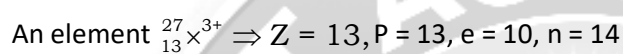
$$n = \frac{w}{m} = \frac{46}{23} = 2$$

15.

Sol. (d) All of these

16.

Sol. (b) 10



17.

Sol. (d) $1.6 \times 10^{-24} \text{g}$

18.

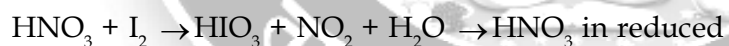
Sol. (a) 19 protons + 20 neutrons + 19 electrons

$$P = 19, e = 19, n = 20$$

19.

Sol. (a) $4\text{Fe} + 3\text{O}_2 + x\text{H}_2\text{O} \rightarrow 2\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

20.

Sol. (d) HNO_3 is reduced

PART - IV : BIOLOGY

1.

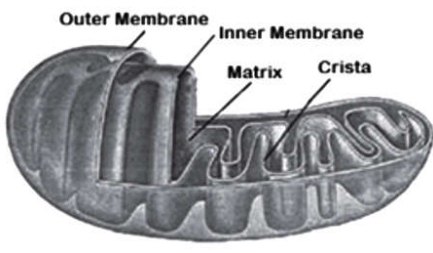
Sol. (a) Complex tissues in plants such as xylem and phloem are made up of many different types of cells.

2.

Sol. (a) Mesosome is the infoldings of cell membrane found in some bacteria and its mainly participate in aerobic respiration.

3.

Sol. (a)



4.

Sol. (b) Inner lining of stomach secretes a slimy substance called mucus, mucus protects the lining of stomach and gut from HCl and the enzymatic action

5.

Sol. (d) Sphygmomanometer is the instrument which uses for the measurement of blood pressure

6.

Sol. (a) Lactic acid produces in human skeletal muscles during heavy workout under anaerobic respiration

7.

Sol. (a) Xylem responsible for transportation of water and minerals in vascular plants

8.

Sol. (c) Kidneys are the part of excretory system

9.

Sol. (b) Bending movements of root or shoot towards light is called as phototropism

10.

Sol. (a) Among the Amoeba, Spirogyra and Yeast Spirogyra is multicellular but they all can reproduce by asexual reproduction.