

Quant Mega Quiz for SSC Tier - 1 (Solutions)

S1. Ans.(a)

Sol.

M + W + B	3		6
M	6	18	3
B	18		1

Efficiency of women

$$= 6 - 3 - 1 = 2$$

Women alone will take $= \frac{18}{2} = 9$ days

S2. Ans.(b)

Sol.

$$(A + B)'s\ 2\ day\ work = \frac{1}{3} \times 2 = \frac{2}{3}$$

$$A + B's\ 2\ days\ work = 1 - \frac{2}{3} = \frac{1}{3}$$

$$B's\ 2\ days\ work = \frac{2}{3} - \frac{1}{3} = \frac{1}{3}$$

$$B's\ 1\ day\ work = \frac{1}{6}$$

B will take $\rightarrow 6$ days

S3. Ans.(a)

Sol.

$$A\ 12\ 3$$

$$36$$

$$B\ 18\ 2$$

$$A + B's\ 2\ days\ work = 5$$

$$A + B's\ 4\ days\ work = 35$$

$$A\ will\ complete\ 1\ work\ is\ \Rightarrow \frac{1}{3}\ days$$

$$Total\ time = 14\frac{1}{3} = \frac{43}{3}$$

S4. Ans.(d)

Sol.

$$8 \times 12M = 4 \times 48W = 10 \times 24B$$

$$1M = 2W, W = \frac{5}{4}B$$

$$1M = \frac{5}{2}B, B = \frac{4}{5}W$$

$$10M + 4W + 10B$$

$$= 25B + 5B + 10B$$

$$= 40B$$

$$10 \times 24 = 40B \times \text{days}$$

$$\text{days} = 6$$

SSC

adda247

English Edition

**SSC
SUPREME**

BOOKS PACK 2021

By ADDA247

TOTAL 7 BOOKS

S5. Ans.(b)

Sol.

$$B = \frac{160}{100} A$$

$$A : B = 5 : 8$$

(Efficiency)

$$\text{Efficiency} \propto \frac{1}{\text{Time}}$$

Time taken Ratio of A : B

$$= 8 : 5$$

$$8 \text{ ratio} \rightarrow 12 \text{ days}$$

$$1 \text{ ratio} \rightarrow 12/8 \text{ days}$$

$$5 \text{ ratio} \rightarrow 60/8 \text{ days}$$

$$\text{Time taken by B} = 60/8$$

$$= 7\frac{1}{2} \text{ days}$$

S6. Ans.(d)

Sol.

$$9 \times 7 \times 15 = 6 \times 9 \times \text{days}$$

$$\text{days} = \frac{35}{2} \text{ days}$$

S7. Ans.(b)

Sol.

1 Women 1 days work

$$= \frac{1}{12 \times 162}$$

12 Women 1 day work

$$= \frac{1}{162}$$

1 Men 1 day work

$$= \frac{1}{18 \times 72}$$

4 Men's 1 days work

$$= \frac{4}{18 \times 72}$$

$$= \frac{1}{18 \times 18}$$

$$1 \text{ Children} = \frac{1}{9 \times 360}$$

10 Children's 1 day work

$$= \frac{10}{9 \times 360} = \frac{1}{9 \times 36}$$

Required time

$$= \frac{1}{162} + \frac{1}{324} + \frac{1}{324}$$

$$= \frac{2+1+1}{324} = \frac{4}{324}$$

$$= \frac{1}{81}$$

$$\Rightarrow 81 \text{ days}$$

SSC

adda247

S8. Ans.(d)

Sol.

$$10W \times 8 = 10C \times 12$$

$$W = \frac{3}{2}C$$

$$10 \times 12 = 12 \text{ Children} \times \text{days}$$

$$\text{days} = 10 \text{ days}$$

S9. Ans.(b)

Sol.

$$A \rightarrow \begin{array}{cc} 8 & 3 \\ & 24 \end{array}$$

$$B \rightarrow \begin{array}{cc} 12 & 2 \end{array}$$

$$\frac{1}{8} + \frac{1}{12} + \frac{1}{C} = \frac{1}{4}$$

$$\frac{1}{C} = \frac{1}{24}$$

$$C \rightarrow 24$$

$$A : B : C$$

$$= \frac{1}{8} : \frac{1}{12} : \frac{1}{24}$$

$$= 3 : 2 : 1$$

$$C's \text{ share} = 4500 \times \frac{1}{6}$$

$$= \text{Rs. } 750$$

S10. Ans.(b)

Sol.

Ratio of water of A, B, C

$$\Rightarrow 6 \times 5 : 4 \times 6 : 9 \times 4$$

$$= 30 : 24 : 36$$

$$= 5 : 4 : 6$$

$$A's \text{ share} = 1800 \times \frac{5}{15}$$

$$= 600 \text{ Rs.}$$

S11. Ans.(a)

Sol.

$$1.5a = 0.04b$$

$$\frac{b}{a} = \frac{1.5}{0.04} = \frac{150}{4}$$

By componendo and dividend

$$\frac{b-a}{b+a} = \frac{150-4}{150+4} = \frac{146}{154} = \frac{73}{77}$$

S12. Ans.(a)

Sol.

$$\frac{a^2+b^2+ab}{a^3-b^3} = \frac{a^2+b^2+ab}{(a-b)(a^2+b^2+ab)}$$
$$= \frac{1}{a-b}$$
$$= \frac{1}{11-9} = \frac{1}{2}$$

S13. Ans.(a)

Sol.

$$p = 999 \text{ (Given)}$$

$$\text{Now, } \sqrt[3]{p(p^2 + 3p + 3) + 1}$$
$$= \sqrt[3]{p^3 + 3p^2 + 3p + 1}$$
$$= \sqrt[3]{(p+1)^3}$$
$$= p+1 = 999+1$$
$$= 1000$$

S14. Ans.(c)

Sol.

$$\text{Here } x = 3, y = 5, z = 4$$

$$= \frac{x^2}{9} + \frac{y^2}{25} + \frac{z^2}{16}$$
$$= \frac{9}{9} + \frac{25}{25} + \frac{16}{16}$$
$$= 1 + 1 + 1 = 3$$

S15. Ans.(b)

Sol.

$$\text{Given } \frac{a^2-b^2-2bc-c^2}{a^2+b^2+2ab-c^2} = \frac{a^2-(b+c)^2}{(a+b)^2-c^2}$$
$$= \frac{[a+(b+c)][a-(b+c)]}{(a+b+c)(a+b-c)} = \frac{a-b-c}{a+b-c}$$

S16. Ans.(d)

Sol.

For Maximum value

$$a = b = c = d = \frac{1}{4}$$
$$(1+a)(1+b)(1+c)(1+d)$$
$$= \left(1+\frac{1}{4}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{4}\right)$$
$$= \left(\frac{5}{4}\right)^4$$

SSC

adda247

ENGLISH



SSC CGL

TIER-I / PRE E-KIT

Ace - Advanced | Arithmetic | English
Reasoning | General Awareness

Validity : 6 Months

S17. Ans.(a)

Sol.

$$\frac{1}{\sqrt[3]{4} + \sqrt[3]{2} + 1} = a\sqrt[3]{4} + b\sqrt[3]{2} + c$$

$$\Rightarrow \frac{1}{2^{\frac{2}{3}} + 2^{\frac{1}{3}} + 1} = a(2)^{\frac{2}{3}} + b(2)^{\frac{1}{3}} + c$$

On multiplying numerator and denominator by $(2^{\frac{1}{3}} - 1)$

$$\Rightarrow \frac{2^{\frac{1}{3}} - 1}{(2^{\frac{1}{3}} - 1)(2^{\frac{2}{3}} + 2^{\frac{1}{3}} + 1)} = a \cdot 2^{\frac{2}{3}} + b \cdot 2^{\frac{1}{3}} + c$$

$$\frac{2^{\frac{1}{3}} - 1}{2 - 1} = a \cdot 2^{\frac{2}{3}} + b \cdot 2^{\frac{1}{3}} + c$$

$$\therefore a = 0, b = 1, c = -1$$

$$a + b + c = 0 + 1 - 1 = 0$$

S18. Ans.(b)

Sol.

$$a = \frac{\sqrt{5}+1}{\sqrt{5}-1} = \frac{\sqrt{5}+1}{\sqrt{5}-1} \times \frac{\sqrt{5}+1}{\sqrt{5}+1}$$
$$= \frac{(\sqrt{5}+1)^2}{5-1} = \frac{5+1+2\sqrt{5}}{4}$$

$$a = \frac{3+\sqrt{5}}{2}$$

Similarly,

$$b = \frac{3-\sqrt{5}}{2}$$

$$a + b = \frac{3+\sqrt{5}}{2} + \frac{3-\sqrt{5}}{2} = 3$$

$$\text{and } ab = \frac{\sqrt{5}+1}{\sqrt{5}-1} \times \frac{\sqrt{5}-1}{\sqrt{5}+1} = 1$$

$$\frac{a^2 + ab + b^2}{a^2 - ab + b^2} = \frac{(a+b)^2 - ab}{(a+b)^2 - 3ab}$$

$$= \frac{3^2 - 1}{3^2 - 3} = \frac{9-1}{9-3} = \frac{8}{6} = \frac{4}{3}$$

S19. Ans.(c)

Sol.

$$x = (\sqrt[3]{a + \sqrt{a^2 + b^3}} + \sqrt[3]{a - \sqrt{a^2 + b^3}})$$

On cubing both sides.

$$x^3 = \left(\sqrt[3]{a + \sqrt{a^2 + b^3}} + \sqrt[3]{a - \sqrt{a^2 + b^3}} \right)^3$$

$$\begin{aligned}
&= \left(\sqrt[3]{a + \sqrt{a^2 + b^3}} \right)^3 + \left(\sqrt[3]{a - \sqrt{a^2 + b^3}} \right)^3 \\
&\quad + 3 \left(\sqrt[3]{a + \sqrt{a^2 + b^3}} \right) \left(\sqrt[3]{a - \sqrt{a^2 + b^3}} \right) \\
&\quad \left[\sqrt[3]{a + \sqrt{a^2 + b^3}} + \sqrt[3]{a - \sqrt{a^2 + b^3}} \right] \\
&= a + \sqrt{a^2 + b^3} + a - \sqrt{a^2 + b^3} + 3 \left[(a + \sqrt{a^2 + b^3})(a - \sqrt{a^2 + b^3}) \right]^{\frac{1}{3}} x \\
&= 2a + 3(a^2 - a^2 - b^3)^{\frac{1}{3}} x \\
\therefore x^3 &= 2a + 3(-b)x \\
x^3 + 3bx &= 2a
\end{aligned}$$

S20. Ans.(c)

Sol.

Average of x and $\frac{1}{x} = M$

$$\Rightarrow \frac{x + \frac{1}{x}}{2} = M, x + \frac{1}{x} = 2M$$

On squaring both sides

$$\left(x + \frac{1}{x} \right)^2 = (2M)^2$$

$$x^2 + \frac{1}{x^2} + 2 = 4M^2$$

$$\Rightarrow x^2 + \frac{1}{x^2} = 4M^2 - 2$$

$$\text{Average } x^2 + \frac{1}{x^2} = \frac{x^2 + \frac{1}{x^2}}{2}$$

$$= \frac{4M^2 - 2}{2} = \frac{2(2M^2 - 1)}{2}, = 2M^2 - 1$$

S21. Ans.(b)

Sol.

$$(a - b)^2 = a^2 - 2ab + b^2$$

$$x^4 - 2x^2 + K = (x^2)^2 - 2 \times x^2 \times 1 + K$$

$$K = (1)^2 = 1$$

S22. Ans.(c)

Sol.

Given, $x = 6$

$$= \frac{4 \times 6}{3} + 2P = 12$$

$$\Rightarrow 8 + 2P = 12$$

$$2P = 4$$

$$P = 2$$

S23. Ans.(b)

Sol.

$$a^{\frac{1}{3}} = 11$$

$$\Rightarrow a = 11^3 = 1331$$

$$\therefore a^2 - 331a = a(a - 331)$$

$$= 1331(1331 - 331)$$

$$= 1331 \times 1000 = 1331000$$

S24. Ans.(a)

Sol.

$$x + y + z = 0$$

$$\Rightarrow x + y = -z, y + z = -x, x + z = -y$$

$$\therefore (x + y)(y + z)(z + x) = (-z)(-x)(-y) = -xyz$$

S25. Ans.(a)

Sol.

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

Cubing both sides

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

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

$$\Rightarrow x^3 + \frac{1}{x^3} + 3\sqrt{3} = 3\sqrt{3}$$

$$x^3 + \frac{1}{x^3} = 0$$

$$x^6 + 1 = 0$$

$$\text{Now, } x^{18} + x^{12} + x^6 + 1$$

$$= x^{12}(x^6 + 1) + (x^6 + 1)$$

$$= x^{12} \times 0 + 0 = 0$$

S26. Ans.(b)

Sol.

$$\text{Given } x - \frac{1}{x} = 4$$

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

$$= 4^2 + 4 = 16 + 4$$

$$\left(x + \frac{1}{x}\right)^2 = 20$$

$$x + \frac{1}{x} = \sqrt{20} = \sqrt{2 \times 2 \times 5} = 2\sqrt{5}$$

S27. Ans.(b)

Sol.

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

$$\frac{1}{x} = \frac{1}{3 + 2\sqrt{2}} = \frac{1}{3 + 2\sqrt{2}} \times \frac{3 - 2\sqrt{2}}{3 - 2\sqrt{2}}$$

$$\frac{1}{x} = 3 - 2\sqrt{2}$$

$$x + \frac{1}{x} = 3 + 2\sqrt{2} + 3 - 2\sqrt{2}$$

$$x + \frac{1}{x} = 6$$

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

$$\left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2 = 6 - 2 = 4$$

$$\sqrt{x} - \frac{1}{\sqrt{x}} = 2$$

S28. Ans.(a)

Sol.

$$\left(x + \frac{1}{x}\right)^2 = 3, x + \frac{1}{x} = \sqrt{3}$$

$$x^3 + \frac{1}{x^3} = (\sqrt{3})^3 - 3\sqrt{3}$$

$$x^3 + \frac{1}{x^3} = 3\sqrt{3} - 3\sqrt{3}$$

$$x^6 + 1 = 0$$

$$x^{72} + x^{66} + x^{54} + x^{48} + x^{36} + x^{30} + x^{24} + x^{18} + x^6 + 1$$

$$= x^{66}(x^6 + 1) + x^{48}(x^6 + 1) + x^{30}(x^6 + 1) + x^{18}(x^6 + 1) + x^6 + 1$$

$$= x^{66} \times 0 + x^{48} \times 0 + x^{30} \times 0 + x^{18} \times 0 + 0 = 0$$

S29. Ans.(d)

Sol.

$$a^x = (x + y + z)^y, a^y = (x + y + z)^z, a^z = (x + y + z)^x$$

Multiplying the above equations

$$a^x \times a^y \times a^z = (x + y + z)^{x+y+z}$$

$$a^{x+y+z} = (x + y + z)^{x+y+z}$$

$$a = x + y + z$$

S30. Ans.(a)

Sol.

$$a^4 + b^4 - a^2b^2 = 0 \quad \dots(i)$$

Now,

$$\begin{aligned} a^6 + b^6 &= (a^2)^3 + (b^2)^3 \\ &= (a^2 + b^2)(a^4 + b^4 - a^2b^2) \end{aligned}$$

From equation (i)

$$a^6 + b^6 = 0$$

NRA-CET Ready

SSC
MAHA PACK

Live Class, Video Course,
Test Series, eBooks

Bilingual (with eBooks)
12 Months Validity

