

Quant Mega Quiz for SSC Tier - 1 (Solutions)

S1. Ans.(d)

Sol.

$$(34^{43} + 43^{34})/7 = [(35 - 1)^{43} + (42 + 1)^{34}/7]$$

Applying binomial theorem to $(35 - 1)^{43}$, all terms will be divisible by 35 (i.e. 7) except the last term which will be -1. Similarly, last term of $(42 + 1)^{34}$ will be +1.

Therefore, $34^{43} + 43^{34}$ will leave remainder $[(-1) + (+1)] = 0$, when divided by 7.

S2. Ans.(b)

Sol.

Two prime numbers greater than 2 must be odd.
Sum of two odd numbers must always be even, thus,
 $X + Y = 87$ is not possible.

S3. Ans.(b)

Sol. $7! + 8! + 9! + 10! + \dots + 100 = 7.6! + 8.7.6! + 9.8.7.6! + \dots + 100!$ Is completely divisible by 7 as each of the terms contain at least one 7 in it.

Now, $1! + 2! + 3! + 4! + 5! + 6! = 1 + 2 + 6 + 24 + 120 + 720 = 873$

which leaves a remainder of 5 when divided by 7.

S4. Ans.(a)

Sol.

Clearly, $(2272 - 875) = 1397$, is exactly divisible by N.

Now, $1397 = 11 \times 127$

∴ The required 3-digit number is 127, the sum of whose digits is 10.

S5. Ans.(d)

Sol.

$(3^{25} + 3^{26} + 3^{27} + 3^{28}) = 3^{25} \times (1 + 3 + 3^2 + 3^3)$
 $= 3^{25} \times 40 = 3^{24} \times 3 \times 4 \times 10 = (3^{24} \times 4 \times 30)$,
which is divisible by 30.

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S6. Ans.(b)

Sol. Let the common remainder be x . Then numbers $(34041 - x)$ and $(32506 - x)$ would be completely divisible by n .

Hence the difference of the numbers $(34041 - x)$ and $(32506 - x)$ will also be divisible by n or $(34041 - x - 32506 + x) = 1535$ will also be divisible by n .

Now, using options we find that 1535 is divisible by 307.

S7. Ans.(b)

Sol.

Given, L.C.M = 40 H.C.F

$$l = 40 h$$

And,

$$l + h = 1476$$

$$41h = 1476 \Rightarrow h = 36$$

We know,

$$\text{L.C.M} \times \text{H.C.F} = \text{I no.} \times \text{II no.}$$

$$40h \times h = 288 \times x$$

$$40 \times 36 \times 36 = 288 \times x$$

$$x = 180$$

Thus, the other no. 180

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S8. Ans.(b)

Sol.

$7^4/2400$ gives us a remainder of 1. Thus, the remainder of $7^{99}/2400$

would depend on the remainder of $7^3/2400 \rightarrow$ remainder = 343.

S9. Ans.(a)

Sol.

$$\text{Remainder} = 12$$

$$\text{Divisor} = 4 \times 12 = 48$$

$$\text{Quotient} = \frac{48}{8} = 6$$

$$\text{Dividend} = \text{divisor} \times \text{Quotient} + \text{remainder} = 48 \times 6 + 12$$

$$= 288 + 12 = 300$$

S10. Ans.(c)

Sol.

$$\begin{aligned} &= \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \dots \times \frac{98}{99} \times \frac{99}{100} \\ &= \frac{2}{100} = \frac{1}{50} \end{aligned}$$

S11. Ans.(d)

Sol.

$$I = \frac{12000 \times 8 \times 1}{100} = 960$$

$$\text{Desired gain on Rs. 20000} = 20000 \times \frac{10}{100} = 2000$$

$$\text{S.I. on Rs. 8000} = 2000 - 960 = 1040$$

$$\text{Rate} = \frac{\text{S.I.} \times 100}{P \times T} = \frac{1040 \times 100}{8000} = 13\%$$

S12. Ans.(a)

Sol.

$$A = P \left(1 + \frac{R}{100}\right)^T$$

$$3840 = P \left(1 + \frac{R}{100}\right)^4 \dots\dots\dots (i)$$

$$3936 = P \left(1 + \frac{R}{100}\right)^5 \dots\dots\dots (ii)$$

$$\frac{R}{100} = \frac{3936}{3840} - 1$$

$$R = \frac{96}{3840} \times 100 = 2.5\%$$

S13. Ans.(c)

Sol.

$$A = P \left(1 + \frac{R}{100}\right)^T$$

$$3 = 1 \left(1 + \frac{R}{100}\right)^3$$

$$9 = 1 \left(1 + \frac{R}{100}\right)^6$$

S4. Ans.(c)

Sol.

$$\text{C.I.} = P \left[\left(1 + \frac{R}{100}\right)^T - 1 \right]$$

$$= 5000 \left[\left(1 + \frac{5}{100}\right)^4 - 1 \right] = 1077.5$$

$$\text{S.I.} = \frac{5000 \times 10 \times 2}{100} = 1000$$

$$\text{Diff.} = 77.5$$

S15. Ans.(b)

Sol.

$$\frac{500 \times 4 \times r}{100} + \frac{600 \times 3 \times r}{100} = 190$$

$$38r = 190$$

$$r = 5\%$$



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S16. Ans.(c)

Sol.

$$\frac{800+800 \times 12 \times T}{100} = \frac{910 \times 10 \times T}{100}$$

$$800 + 96T = 910 + 91T$$

$$5T = 910 - 800$$

$$5T = 110$$

$$T = 22 \text{ years}$$

S17. Ans.(c)

Sol.

$$\frac{1P}{16} = \frac{P \times r \times r}{100}$$

$$r^2 = \frac{100}{16}$$

$$r = \frac{10}{4} = \frac{5}{2}\% = 2\frac{1}{2}\%$$

S18. Ans.(c)

Sol.

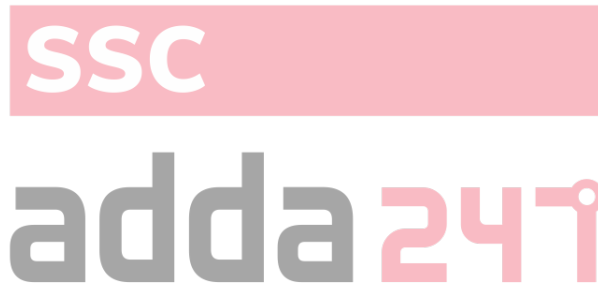
$$\frac{P \times 6 \times 3}{100} + \frac{P \times 9 \times 5}{100} + \frac{P \times 13 \times 3}{100}$$

$$= 8160$$

$$18P + 45P + 39P = 816000$$

$$102P = 816000$$

$$P = 8000$$



S19. Ans.(b)

Sol.

$$\frac{n_1-1}{T_1} = \frac{n_2-1}{T_2}$$

$$\frac{2}{20} = \frac{1}{t_1}$$

$$t_1 = 10 \text{ years}$$

S20. Ans.(b)

Sol.

Let two parts be x : y

$$\frac{x \times 3 \times 12}{100} = \frac{y \times 16 \times 9}{200}$$

$$x : y = 1 : 2$$

S21. Ans.(c)

Sol.

A + B → 12 days , B + C → 16 days , 5A + 7B + 13C = 1

$$5(A + B) + 2(B + C) + 11C = 1$$

$$\frac{5}{12} + \frac{2}{16} + \frac{11}{x} = 1$$

$$\frac{11}{x} = 1 - \frac{5}{12} - \frac{1}{8}$$

$$\frac{11}{x} = \frac{24 - 10 - 3}{24}$$

$$\frac{11}{x} = \frac{11}{24}, x = 24 \text{ days}$$

$$\frac{1}{B} + \frac{1}{24} = \frac{1}{16}$$

$$\frac{1}{B} = \frac{1}{16} - \frac{1}{24}$$

$$\frac{1}{B} = \frac{3-2}{48}, B = 48 \text{ days}$$

$$\frac{1}{A} + \frac{1}{48} = \frac{1}{12}$$

$$\frac{1}{A} = \frac{1}{12} - \frac{1}{48}$$

$$\frac{1}{A} = \frac{4-1}{48}$$

$$A = 16 \text{ days}$$



S22. Ans.(a)

Sol.

Filling capacity ⇒ x m³/min

Emptying capacity = (x + 10) m³/min

ATQ,

$$\frac{2400}{x} - \frac{2400}{x+10} = 8$$

$$2400 \left(\frac{x+10-x}{x(x+10)} \right) = 8$$

$$3000 = x(x+10)$$

$$50 \times 60 = x(x+10)$$

$$x = 50 \text{ m}^3/\text{min}$$

S23. Ans.(c)

Sol.

$$A + B + C = 5h$$

$$C = 2 \times B$$

$$C : B = 2 : 1$$

$$B : A = 2 : 1$$

$$\text{Efficiency} \rightarrow C : B : A = 4 : 2 : 1$$

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$$\text{day} \left(\propto \frac{1}{\text{Efficiency}} \right) C : B : A = \frac{1}{4} : \frac{1}{2} : 1 = 1 : 2 : 4$$

A → 4x hours

B → 2x hours

C → x hours

$$\frac{1}{x} + \frac{1}{2x} + \frac{1}{4x} = \frac{1}{5}$$

$$\frac{4 + 2 + 1}{4x} = \frac{1}{5}$$

$$x = \frac{35}{4}$$

Time taken by pipe A to fill the tank = $4x = \frac{35}{4} \times 4 = 35$ hours

S24. Ans.(a)

Sol.

Total work

A 15 20

B 20 300 15

C -25 -12

Tank filled in 1 hour = $20 + 15 - 12 = 23$

Work done in 10 hours = 230

Remaining work = $300 - 230 = 70$

70 work will be done by A & B in = $\frac{70}{20 + 15} = 2$ hours

Work gets completed in = $10 + 2 = 12$ hours

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S25. Ans.(d)

Sol.

A 12 3

36

B 18 2

2 minutes work = $(3 + 2) \times 2 = 10$

Remaining work = 26

B will finish the remaining work = $\frac{26}{2} = 13$ minute

S26. Ans.(b)

Sol.

ATQ,

$$\frac{33 \times 117 \times 8}{\frac{4}{7}} = \frac{13 \times x \times 9}{\frac{3}{7}}$$

x = 198

More men required = $198 - 117 = 81$

S27. Ans.(b)

Sol.

	<u>Totalwork</u>	<u>Efficiency</u>
First 3 → 12 min		5
Last 3 → 15 min	300	4
1 st + 4 th → 20 min		3
I + II + III = 5		
II + III + IV = 4		
Ist + IV = 3		
2 (Ist + IInd + IIIrd + IVth) = 12		
Ist + IInd + IIIrd + IVth = 6		
Time taken by all the Inlets to fill the dam		
$= \frac{60}{6} = 10 \text{ min}$		

S28. Ans.(b)

Sol.

	<u>Totalwork</u>	<u>Efficiency</u>
14		8
112		
16		7

Time taken to fill the tank = $\frac{112}{15} = 7\frac{7}{15} = 7 \text{ hour } 28 \text{ minutes}$

With leak in the bottom time taken = 7 h 28 m + 32 min = 8 hours

Let leak takes x hours to empty the tank

$$\frac{1}{14} + \frac{1}{16} + \frac{1}{x} = \frac{1}{8}$$

$$\frac{15}{15} + \frac{1}{x} = \frac{1}{8}$$

$$\frac{112}{15} + \frac{1}{x} = \frac{1}{8}$$

$$\frac{112}{15} - \frac{1}{8} = \frac{1}{x}$$

$$\frac{112 - 14}{15 \times 8} = \frac{1}{x}$$

$$\frac{1}{112} = \frac{1}{x}$$

$$x = 112 \text{ h}$$

S29. Ans.(a)

Sol.

$$4M \times 12 = 6W \times 10$$

$$M = \frac{5W}{4}$$

$$6W \times 10 = 8C \times 9$$

$$W = \frac{6C}{5}$$

$$1M + 1W + 1C = \frac{5W}{4} + W + \frac{5W}{6} = \left(\frac{15+12+10}{12}\right)W = \frac{37W}{12}$$

$$2W + 5C = 2W + 5 \times \frac{5W}{6} = \frac{37W}{6}$$

$$M_1D_1 = M_2D_2$$

$$\frac{37}{12} \times 10 = \frac{37}{6} \times \text{Days}$$

$$\text{Days} = 5$$

S30. Ans.(a)

Sol.

Efficiency $\rightarrow A : B = 1 : 2$

Efficiency $\rightarrow B : C = 1 : 1$

$A : B : C = 1 : 2 : 2$

Days Ratio ($\propto \frac{1}{\text{Efficiency}}$) = $1 : \frac{1}{2} : \frac{1}{2}$

= $2 : 1 : 1$

$2r \rightarrow 14$ days

$1r \rightarrow 7$ days

	<u>Totalwork</u>	<u>Efficiency</u>
A \rightarrow 14 days		1
B \rightarrow 7 days	14	2
C \rightarrow 7 days		2

Work done by A & B in 3 days = $3 \times 3 = 9$

Remaining work = $14 - 9 = 5$

Time taken by A, B & C to finish 5 work = $\frac{5}{5} = 1$

More days required = 1

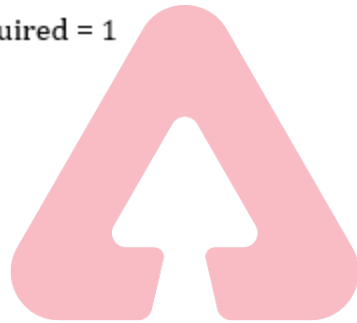


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