Quant Mega Quiz for SSC Tier – 1 (Solutions)

S1. Ans.(a)
Sol.
$m^2 - n^2 = (m - n)(m + n)$
Since (m – n) is an even number, (m + n) will also be an even number.
We know that product of two even numbers will always be divisible by 4.
[(m – n) × (m + n) = (2 × 2) (...) = 4 (...)]

S2. Ans.(c)
Sol.
Let the numbers be x and y.
x+ y = 7a
x- y = a
x.y = 24a
on solving we get x = 4a & y = 3a
$x. y = 12a^2$
$12a^2 = 24\ a$, a= 2
Required product = 24*2 = 48

S3. Ans.(a)
Sol.
Let x, y be the required digits.
The number is to be divisible by 99, i.e., 9 and 11 both.
∴ Sum of digits is to be divisible by 9, i.e.,
3 + 4 + 2 + 2 + 2 + 1 + 3 + x + y = 17 + x + y
is to be divisible by 9 and,
(y + 3 + 2 + 2 + 3) – (x + 1 + 2 + 4) = 0
or, multiple of 11, i.e., y – x + 3 = 0 or multiple of 11
now check from option.
∴ x = 1, y = 9.

S4. Ans.(b)
Sol.
Last digit of $3^{41} \times 4^{19} \times 5^{17}$
Last digit of $3^{41} = 3^1 = 3$
Last digit of $4^{19} = 4 \times 4 \times 4 = 4$
Last digit of $5^{17} = 5$
Last digit of $3^{41} \times 4^{19} \times 5^{17} = 3 \times 4 \times 5 = 0$

S5. Ans.(a)
Sol.
$86400 = 2^7 \times 3^3 \times 5^2$
Number of factor = (7 + 1) (3 + 1) (2 + 1)
= 8 × 4 × 3 = 96

S6. Ans.(a)
Sol.
$a^3b = abc = 180$
$a^3b = 2 \times 2 \times 3 \times 3 \times 5$
⇒ a must be equal to 1 and b = 180
(because there is no any factor which repeats three time)
abc = 180
1 × 180 × c = 180
c = 1

S7. Ans.(d)
Sol.
Last digit of dividend = 1
Last digit of divisor = 7
Last digit of quotient should b 3
4767 × 3 = 14301
4767 × 20 = 95340
4767 × 100 = 476700
4767 × (3 + 20 + 100) = 586341
Missing digit are = 586

S8. Ans.(b)
Sol. The number is 68 × 269 = 18292. 18292, when divided by 67, leaves a remainder of 1.

S9. Ans.(d)
Sol.
10x + y − (x + y) = 81
or, 10x + y − x − y = 81
or, 9x ⇒ 81 ∴ x = 9
Hence, all such numbers are as follows: 90, 91, 92, 93, ... 99.

S10. Ans.(a)
Sol.
We have, difference of the two digits $\frac{27}{9} = 3$
Sum of the two digits = 11
Now, the two digits are $\frac{11+3}{2}$ and $\frac{11-3}{2}$, i.e., 7 and 4
Thus, the number is 47 because 47 < 74.
You can check it: 74 − 47 = 27.

S11. Ans.(b)
Sol.

	Faster	:	Slower
Length →	3	:	4
Speed →	4	:	3

Now,

$$\frac{3x + 240}{4x + 240} = \frac{24}{40} \times \frac{4}{3}$$

$\Rightarrow x = 240$ m

	Faster	Slower
∴ Length =	720 m	960 m

	Faster		Slower
Speed =	4	:	3
	×10 ↓		↓ ×10
	40		30

Required time = $\frac{720 + 960}{70}$ = 24 sec

S12. Ans.(c)
Sol.

$\frac{12\pi}{h} = \frac{\pi r^2}{R^3}$

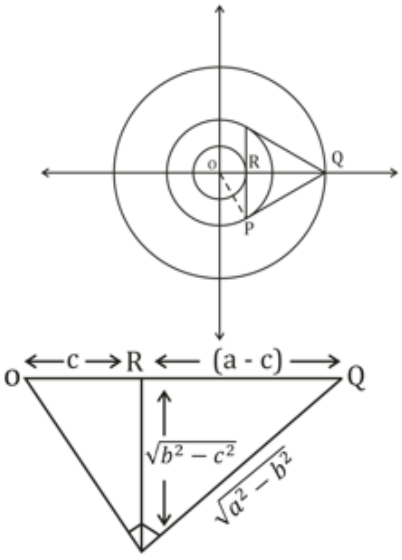
$12R^3 = r^2h$

$N \times \frac{4}{3}\pi R^3 = \pi r^2 h$

$N \times \frac{4}{3}\pi R^3 = \pi(12R^3)$

$N = 9$

S13. Ans.(a)
Sol.



From Δ PQR

$\left(\sqrt{b^2 - c^2}\right)^2 + (a - c)^2 = \left(\sqrt{a^2 - b^2}\right)^2$

$b^2 - c^2 + a^2 + c^2 - 2ac = a^2 - b^2$

$b^2 = ac$ & $b^m = a^n c^p$

$m = 2, n = 1$ & $p = 1$

$m^2 + n^2 + p^2 - 4 = 6 - 4 = 2$

S14. Ans.(d)
Sol.
cosec (57° + θ) - sec (33° – θ) = 0
$\sin 15° \sec 75° = \frac{\sin 15°}{\cos 75°} = 1$
sin46° sec44° = 1
cosec (30°)= 2
so, final value of given function is 2.

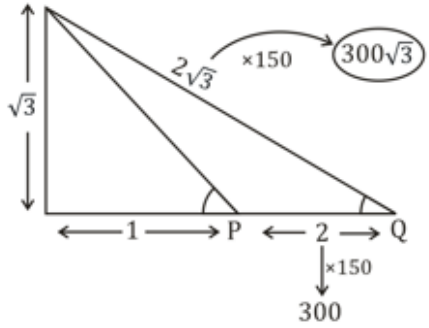
S15. Ans.(c)
Sol. Let $x^{3.5}$ = y
Then, $x^{10.5} = y^3$
Given,
$y + \frac{1}{y} = 3$
$= y^3 + \frac{1}{y^3} + 2$
18 + 2 = 20

S16. Ans.(c)
Sol. abcabc is divisible by 7, 11, 13.
So,
a = 7
b = 8
c = 9
$(a + b + c)^2 - 76 = 576 - 76 = 500.$

S17. Ans.(a)
Sol.
$= \frac{4}{16} \times 8 + 5(8) - 8$
= 2 + 40 – 8 = 34

S18. Ans.(d)
Sol.
Exterior angle = $\frac{360°}{n} = \frac{360}{17}$
n = 17
req. Ratio ⇒ $\frac{n(n-3)}{2} : n$
7: 1

S19. Ans.(c)
Sol.



S20. Ans.(b)

Sol.

If $a^3 + b^3 + c^3 - 3abc = 0$

Then $(a - b)^2 + (b - c)^2 + (c - a)^2 = 0$

$(-x + 6)^2 + (2x - 12)^2 + (-x + 6)^2 = 0$

$x = 6$

S21. Ans.(b)

Sol.

$z = 3, y = 5, x = 1$

Satisfies

$1^{5^3} = 1, 5^3 = 125$ & $3^5 = 243$

$9x + 10y - 18z = 9 + 50 - 54 = 5$

S22. Ans.(b)

Sol.

$\frac{2\pi rh}{2\pi r^2} = \frac{2}{1}$

$h/r = 2/1$; $h = 2r$

$2\pi rh + 2\pi r^2 = 23100$

$4\pi r^2 + 2\pi r^2 = 23100$ [$h = 2r$]

$6\pi r^2 = 23100$

$r^2 = \frac{23100 \times 7}{22 \times 6}$

$r = 35, h = 70$

Volume of cylinder = $\pi r^2 h$

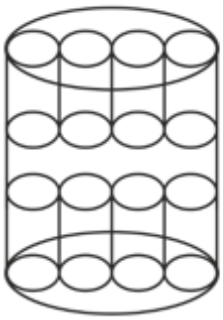
$= \frac{22}{7} \times 35 \times 35 \times 70$

$= 269500\ cm^3$

S23. Ans.(b)

Sol.

Total surface area of the remaining part



= TSA + 8 × C.S.A

$= 2\pi r(r + h) + 8 \times 2\pi r_1 h_1$

$= 2\pi [14(14 + 15) + 8 \times 3.5 \times 5]$

$= 2\pi [14 \times 29 + 140]$

$= 2 \times \frac{22}{7} \times 546 = 3432$

S24. Ans.(a)

Sol.

Height of cylinder in bullet = 3.5 – 2.1 = 1.4

$$\text{Total bullets} = \frac{\text{Volume of solid cylinder}}{\text{Volume of cylinder in Bullet+Volume of hemisphere}}$$

$$= \frac{\pi \times (7)^2 \times 21}{\pi \times (2.1)^2 \times 1.4 + \frac{2}{3} \times \pi \times (2.1)^3} \cong 83$$

S25. Ans.(b)

Sol.

Let q = r = 0

$p^3 = 4$

a = 0

b = p

c = p

$a^3 + b^3 + c^3 - 3abc$

$= 0 + p^3 + p^3 - 0$

= 8

S26. Ans.(a)

Sol.

Let a = b = 1

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

2 = 2 (satisfies)

$(1)^4 + (1)^4 = 2$

S27. Ans.(b)

Sol.

$$\underset{27}{a^3} + \underset{64}{b^3} = 91 \quad \Big| \quad \underset{64}{b^3} + \underset{8}{c^3} = 72 \quad \Big| \quad \underset{27}{a^3} + \underset{8}{c^3} = 35$$

a = 3, b = 4, c = 2

a + b + c = 9

3 + 4 + 2 = 9

9= 9 (Satisfies)

abc = 3 × 4 × 2 = 24

S28. Ans.(c)

Sol.

$x^3 - 4x^2 + 19 = 6(x - 1)$

$x^2(x - 4) = 6x - 25$

$x^2(x - 4) = 6(x - 4) - 1$

$$x^2 = 6 - \frac{1}{x - 4}$$

$$x^2 + \frac{1}{x - 4} = 6$$

S29. Ans.(b)

Sol.

$xy = 12$

$(x, y) \rightarrow (4, 3)$

$(x, y) \rightarrow (6, 2)$

Verifying

$x^4 + y^4 + (x^2 + y^2)$ $[x, y \rightarrow 4, 3]$

$= 256 + 81 + 144$

$= 481$ (satisfied)

$x^2 - xy + y^2 = (4)^2 - 4 \times 3 + (3)^2$

$= 16 - 12 + 9$

$= 13$

S30. Ans.(b)

Sol.

$y^{x+z} = 1024 \Rightarrow 2^{10}$ *or* 4^5

$z^{x+y} = 729 \Rightarrow 9^3$ *or* 3^6

$x^{y+z} = 1 \Rightarrow$ implies $x = 1$

Let $z = 9$ & $y = 2$

$z^{x+y} = 9^{1+3} \Rightarrow 729$ [Satisfies]

$y^{x+z} = 2^{1+9} \Rightarrow 1024$

$(z + 1)^{y+x+1} = (9 + 1)^{2+1+1}$

$= 10^4 = 10000$