Quant Mega Quiz for SSC Tier-1 (Solutions)

S1. Ans. (d);
Sol.

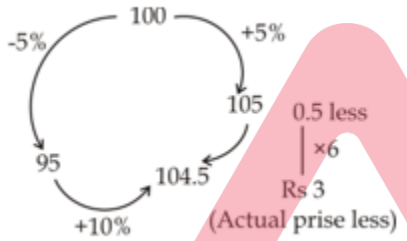
Maximum value of $asin\theta + bsin\theta$ is given by $\sqrt{a^2 + b^2}$

Here $a = -1,\ b = 1$

So, $\sqrt{(-1)^2 + 1^2} = \sqrt{2}$

S2. Ans. (a);
Sol.

Let CP = 100



∴ CP of the article = 100 × 6 = Rs 600

S3. Ans, (b)
Sol. Two triangles are said to be similar, If ratio of sides of both triangles is same i.e.,

$$\frac{PQ}{DE} = \frac{2.5}{5} = \frac{1}{2}$$

$$\& \frac{QR}{EF} = \frac{2}{4} = \frac{1}{2}$$

$$\frac{PR}{DF} = \frac{3}{6} = \frac{1}{2}$$

$$\Rightarrow \frac{PQ}{DE} = \frac{QR}{EF} = \frac{PR}{DF}$$

$\Delta PQR \sim \Delta DEF$

S4. Ans.(c)
Sol.

Former speed $= \frac{600}{8} = 75$ km/hr

latter speed $= \frac{420}{6} = 70$ km/hr

Required percent $= \frac{75 - 70}{75} \times 100 = 6\frac{2}{3}\%$

S5. Ans.(b)

Sol.

The value of $\cos24° + \cos55° + \cos125° + \cos204° + \cos300°$

We know that, $\cos(180° \pm \theta) = -\cos\theta$

$\Rightarrow \cos24° + \cos55° + \cos(180° - 55°) + \cos(180° + 24°) + \cos(360° - 60°)$

$\Rightarrow \cos24° + \cos55° - \cos55° - \cos24° + \cos60°$

$= \cos60° = \frac{1}{2}$

S6. Ans. (d);

Sol.

Let he buys x tickets of first class

& y tickets of second class.

$x + y = 18$ ...(i)

$10x + 3y = 110$ ...(ii)

By solving eqn. (i) & (ii)

$x = 8$

$y = 10$

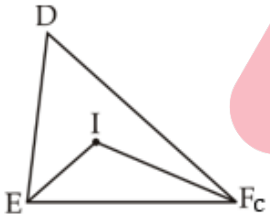
total cost after interchange of no. of tickets

$= 10 \times 10 + 8 \times 3$

$= 124$ Rs.

S7. Ans.(c)

Sol.



$\angle EIF = 90° + \frac{1}{2}\angle EDF$

$= 90 + \frac{1}{2} \times 110$

$= 145°$

S8. Ans.(c)

Sol.

In cyclic quadrilateral □PRQT

$\angle PRQ + \angle PTQ = 180°$

$\angle PTQ = 130°$

S9.Ans (a)

Sol.

∠CAB and ∠ACD are supplementary

∴ ∠CAB + ∠ACD = 180°

And AB || CD

∴ ∠DCB = ∠ABC

∠OAC = ∠OCA = 30°

∴ ∠AOC = 120° ⇒ ∠ABC = 60°

⇒ ∠DCB = ∠ABC = 60°

∠OCD = 90°

∠OCB = ∠OCD - ∠DCB

∠OCB = 90° – 60°

∠OCB = 30°

S10.Ans (c)

Sol.

∠CDE = ∠ABC = 90°

∠DEC = ∠BAC

Δ ABC ~ Δ EDC

$\frac{AB}{BC} = \frac{ED}{CD}$

$\frac{24}{60} = \frac{10}{CD}$

CD = 25 cm

S11. Ans.(b)

Sol.

Time → A : B ⇒ 3 : 1

B : A ⇒ 1 : 3

Time → A : C ⇒ 2 : 1

Time → B : A : C ⇒ 2 : 6 : 3

Let B takes → 2x days

A takes → 6x days

C takes ⇒ 3x days

ATQ ⇒ $\frac{1}{6x} + \frac{1}{2x} + \frac{1}{3x} = 1$

$\frac{1+3+2}{6x} = 1$

$6 = 6x \Rightarrow x = 1$

A will take → 6 days.

S12. Ans.(d)

Sol. 12, 16, 20 → are Pythagorean triplets.

So, the length of median to hypotenuse is half of the hypotenuse.

Length of median = $\frac{20}{2} = 10\ cm$

S13. Ans.(a)

Sol.

$\frac{4+\sqrt{5}}{4-\sqrt{5}} = \frac{4+2.236}{4-2.236} = \frac{6.236}{1.764} = 3.535$

S14. Ans.(a)

Sol.

$\Rightarrow \left(\frac{1}{5}-\frac{1}{6}\right)^{-1} - \left(\frac{1}{2}-\frac{1}{3}\right)^{-1}$

$\Rightarrow \left(\frac{1}{30}\right)^{-1} - \left(\frac{1}{6}\right)^{-1}$

$\Rightarrow 30 - 6 = 24$

S15. Ans.(b)

Sol.

$\sqrt{7-2\sqrt{10}} + \sqrt{5+2\sqrt{6}}$

$\Rightarrow \sqrt{5+2-2\sqrt{5}\times\sqrt{2}} + \sqrt{2+3+2\sqrt{2}\sqrt{3}}$

$\Rightarrow \sqrt{(\sqrt{5}-\sqrt{2})^2} + \sqrt{(\sqrt{2}+\sqrt{3})^2}$

$\Rightarrow \sqrt{5}-\sqrt{2}+\sqrt{2}+\sqrt{3}$

$\Rightarrow \sqrt{5}+\sqrt{3}$

S16. Ans.(a)

Sol.

Sum of square of 1st N natural Number $\Rightarrow \frac{n(n+1)(2n+1)}{6}$

Sum of square of 1st 12 natural number

$= \frac{12\times(12+1)(2\times12+1)}{6} = 2\times13\times25 = 650$

$4^2 + 5^2 + \cdots + 12^2 = 650 - 1 - 4 - 9 = 636$

S17. Ans.(a)

Sol.

$2\pi r = 11$

$2\times\frac{22}{7}\times r = 11$

$r = \frac{7}{4}$

Area of sector $= \pi r^2 \frac{c}{360}$

C $\Rightarrow$ central angle made by sector

$= \frac{22}{7}\times\frac{49}{16}\times\frac{90}{360} = \frac{77}{32}$

$= 2\frac{13}{32}\ cm^2$

S18. Ans.(d)

Sol.

Value after discount $= 100\times\frac{80}{100}\times\frac{70}{100}\times\frac{60}{100} = 33.6$

Single discount $= 100 - 33.6 = 66.4\%$

S19. Ans.(c)
Sol.

$SP = 100 \times \frac{120}{100} = 120$ rs.

$MP \times \frac{80}{100} = 120$

$MP = \frac{120 \times 100}{80} = 150$ rs.

S20. Ans.(a)
Sol.

$\frac{a}{3} = \frac{b}{5} = \frac{c}{7} = k$

a = 3k, b = 5k, c = 7k

$\frac{a+b+c}{b} = \frac{3k+5k+7k}{5k} = \frac{15k}{5k} = 3$

S21. Ans.(b)
Sol.

Remaining work = $1 - \frac{2}{3} = \frac{1}{3}$

$\frac{120 \times 64}{2/3} = \frac{(120 - x) \times 60}{1/3}$

$64 = 120 - x$

$x = 120 - 64 = 56$ men

S22. Ans.(a)
Sol.

A	→	10		6
B	→	12	60	5
C	→	15		4

(A + B + C)'s 2 days work = 15 × 2 = 30

(B + C)'s 2 days work = 9 × 2 = 18

Remaining work = 60 – (30 + 18)

= 60 – 48 = 12

Time required by B to finish 12 work = $\frac{12}{5}$

Total time = $2 + 2 + 2\frac{2}{5}$

= $6\frac{2}{5}$ days

S23. Ans.(a)

Sol.

A + B → x days

A → x + 12 days

B → x + 3 days

$$\frac{1}{x+12}+\frac{1}{x+3}=\frac{1}{x}$$

$$\frac{x+3+x+12}{(x+12)(x+3)}=\frac{1}{x}$$

$2x^2 + 15x = x^2 + 15x + 36$

$x^2 = 36$

x = 6 days

A alone will take = 6+12=18 days

S24. Ans.(b)

Sol.

A	→	10		6
B	→	12	60	5
C	→	15		4

A + B + C will finish the work in = $\frac{60}{15}$ = 4 days

A's work = Efficiency × Time = 6 × 4 = 24

B's work = 5 × 4 = 20

C's work = 4 × 4 = 16

Wages are distributed in the ratio of work

A : B : C = 24 : 20 : 16 = 6 : 5 : 4

A's share = $750 \times \frac{6}{15}$

= Rs. 300

S25. Ans.(c)

Sol.

2M × 3 = 3W × 4 days = 4C × 6 days

6M = 12W	6M = 24C
1M = 2W	1M = 4C

1M + 2 Children = $1M + 2 \times \frac{1}{4}M$

$= 1M + \frac{1}{2}M$

$= \frac{3}{2}M$

$2 \times 3 = \frac{3}{2} \times t$

t = 4 days

S26. Ans.(b)

Sol.

$A \rightarrow \frac{7}{10} \rightarrow 15$ days

$(A + B) \rightarrow 1 - \frac{7}{10} \rightarrow 4$ days

$\frac{3}{10} \rightarrow 4$ days

1 work $\rightarrow \frac{4 \times 10}{3}$ days

$= \frac{40}{3}$ days

S27. Ans.(c)

Sol.

$\tan\theta = \frac{27}{19}$

$$\frac{1 + 2\sin\theta\cos\theta}{1 - 2\sin\theta\cos\theta} = \frac{\sin^2\theta + \cos^2\theta + 2\sin\theta\cos\theta}{\sin^2\theta + \cos^2\theta - 2\sin\theta\cos\theta}$$

$$= \frac{(\sin\theta + \cos\theta)^2}{(\sin\theta - \cos\theta)^2}$$

$$= \frac{\cos^2\theta\left(\frac{\sin\theta}{\cos\theta} + 1\right)^2}{\cos^2\theta\left(\frac{\sin\theta}{\cos\theta} - 1\right)^2}$$

$$= \frac{(\tan\theta + 1)^2}{(\tan\theta - 1)^2}$$

$$= \left(\frac{\frac{27}{19} + 1}{\frac{27}{19} - 1}\right)^2$$

$$= \left(\frac{46}{8}\right)^2$$

$$= \left(\frac{23}{4}\right)^2$$

$$= \frac{529}{16}$$

S28. Ans.(c)

Sol.

$2\sin\alpha + 15(1 - \sin^2\alpha) = 7$

$2\sin\alpha + 15 - 15\sin^2\alpha = 7$

$15\sin^2\alpha - 2\sin\alpha - 8 = 0$

$15\sin^2\alpha - 12\sin\alpha + 10\sin\alpha - 8 = 0$

$3\sin\alpha(5\sin\alpha - 4) + 2(5\sin\alpha - 4) = 0$

$(5\sin\alpha - 4)(3\sin\alpha + 2) = 0$

$\sin\alpha = 4/5$, $\sin\alpha = -3/2$ [sin is not –ve between $0 \le \alpha \le \pi/2$]

$$\cos\alpha = \sqrt{1 - \sin^2\alpha} = \sqrt{1 - \frac{16}{25}} = \frac{3}{5}$$

$$\cot\alpha = \frac{\cos\alpha}{\sin\alpha} = \frac{\frac{3}{5}}{\frac{4}{5}} = \frac{3}{4}$$

S29. Ans.(a)

Sol.

$2 - \cos^2\theta = 3\sin\theta\cos\theta$

$\frac{2}{\cos^2\theta} - 1 = \frac{3\sin\theta\cos\theta}{\cos^2\theta}$

$\frac{2}{\cos^2\theta} - 1 = \frac{3\sin\theta}{\cos\theta}$

$2\sec^2\theta - 1 = 3\tan\theta$

$2(1 + \tan^2\theta) - 1 = 3\tan\theta$

$2 + 2\tan^2\theta - 1 = 3\tan\theta$

$2\tan^2\theta - 3\tan\theta + 1 = 0$

$2\tan^2\theta - 2\tan\theta - \tan\theta + 1 = 0$

$2\tan\theta(\tan\theta - 1) - 1(\tan\theta - 1) = 0$

$(2\tan\theta - 1)(\tan\theta - 1) = 0$

$\tan\theta = \frac{1}{2}, \tan\theta = 1$

$\tan\theta = \frac{1}{2}$

S30. Ans.(d)

Sol.

SP of 32 orange = Rs 1

C.P of 32 orange $= 1 \times \frac{100}{(100 - 40)}$

$= \frac{100}{60} = \frac{5}{3}$

S.P. of 32 orange $= \frac{5}{3} \times \frac{120}{100}$

= Rs 2

Rs 2 → 32

Rs 1 → 16 mangoes