Quant Mega Quiz for SSC Tier-1 (Solutions)

S1. Ans.(a)

Sol.

Volume of Milk in Conical flask = Volume of conical flask

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

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

Let the x be the height of solution level in the flask

Volume of cylindrical thermos = $\pi r^2 h$

$= \pi p^2 x$

Volume of cylindrical thermos upto x height of solution = Volume of Milk in conical flask

$\pi p^2 x = \frac{1}{3}\pi a^2 \times h$

$x = \frac{a^2 h}{3p^2}$

S2. Ans.(b)

Sol.

Volume of water in cylindrical tub = $\pi r^2 h$

$= \pi \times (12)^2 \times 20$

$= 2880\pi$

Volume of water in cylindrical tub after dripping spherical iron ball

$= \pi (12)^2 (20 + 6.75)$

$= \pi \times 144 \times 26.75$

$= 3852\pi$

Volume of spherical Ball

$= 3852\pi - 2880\pi$

$= 972\pi$

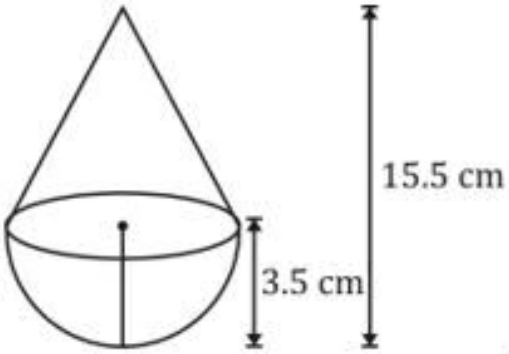
$\frac{4}{3}\pi r^3 = 972\pi$

$r^3 = 243 \times 3$

$r = 9$ cm

S3. Ans.(b)

Sol.



Total surface area of cone= $\pi rl + \pi r^2$

radius of cone = 3.5 cm

height of cone = 15.5 – 3.5

= 12 cm

Slant height of cone

$= \sqrt{h^2 + r^2}$

$= \sqrt{144 + 12.25}$

$= \sqrt{156.25}$

= 12.5

Total surface area of cone

$= \pi \times 3.5 \times 12.5 + \pi(3.5)^2$

$= 43.75\pi + 12.25\pi$

$= 56\pi$

Surface area of Hemisphere

$= 2\pi r^2$

$= 2\pi \times (3.5)^2$

$= 24.5\pi$

Surface area of Toy

$= 24.5\pi + 56\pi - \pi r^2$

$= 80.5\pi - \pi r^2$

$= 80.5 \times \frac{22}{7} - \frac{22}{7} \times (3.5)^2$

$= (80.5 - 12.25) \times \frac{22}{7}$

$= 68.25 \times \frac{22}{7}$

$= 214.5\ cm^2$

S4. Ans.(d)

Sol.

Volume of ice cream in cylindrical container

$= \pi r^2 h$

$= \pi \times (6)^2 \times 15$

$= 36 \times 15\pi$

Volume of 1 cone with hemispherical tops

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

$= \frac{1}{3}\pi r^2 4r + \frac{2}{3}\pi r^3$ [$\because$ h = 2d= 4r]

$= \frac{4}{3}\pi r^3 + \frac{2}{3}\pi r^3$

$= \frac{6}{3}\pi r^3$

$= 2\pi r^3$

$10 \times 2\pi r^3 = 36 \times 15\pi$

$r^3 = 9 \times 3$

$r = 3$ cm

Diameter of ice cream cone $= 3 \times 2$

$= 6$ cm

S5. Ans.(c)

Sol. Surface area of tent = surface area of cylindrical portion + surface area of conical portion

$= 2\pi rh + \pi rl$

$= 2\pi \times 70 \times 3 + \pi \times 70 \times 80$

$= 420\pi + 5600\pi$

$= 6020 \times \frac{22}{7}$

$= 860 \times 22$

$= 18920$

Length of canvas $= \frac{18920}{2} = 9460$

S6. Ans.(b)

Sol.

Perimeter of rectangular park

$= 12 \text{ km/hr} \times \frac{8}{60} \text{ hr}$

$= \frac{8}{5} km$

$= \frac{8}{5} \times 1000 \text{ m} = 1600\text{m}$

$2(l + b) = 1600$

$l + b = 800$

$l : b = 3 : 2$

$l = 800 \times \frac{3}{5}$

= 160 × 3
= 480 m

$b = 800 \times \frac{2}{5}$

= 320 m

Area of park = 480 × 320
= 153600

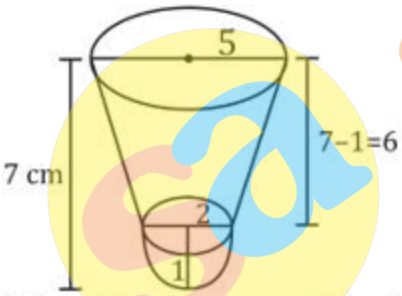
S7. Ans.(b)

Sol.

Volume of cube = Volume of metal sheet
$a^3 = 27 \times 8 \times 1$
$a^3 = 216$
a = 6
Curved surface area of metal sheet
= 2h (l + b)
= 2 × 1 (27 + 8)
= 2 × 35
= 70 cm^2
Curved surface area of cube
= $4a^2$
= 4 × 36
= 144
Difference = 144 – 70
= 74 cm^2

S8. Ans.(b)

Sol.



External surface area of shuttlecock frustum – Surface area of + surface area of hemisphere
= π (R + r) l + $2\pi r^2$

$= \pi (R + r)\sqrt{h^2 + (R - r)^2} + 2\pi r^2$

$= \pi (2.5 + 1)\sqrt{(6)^2 + (2.5 - 1)^2} + 2\pi(1)^2$

$= \pi \times 3.5\sqrt{36 + 2.25} + 2\pi$

$= \frac{22}{7} \times 3.5\sqrt{38.25} + 2 \times \frac{22}{7}$

$= \frac{22}{7} \times 3.5 \times 6.18 + 6.28$

= 22 × 0.5 × 6.18 + 6.28
= 67.98 + 6.28
= 74.26 cm^2

S9. Ans.(b)
Sol.
Dimensions of Room
$= 10 \times 7 \times 5$
Area of walls
$= 2 \times h\,(l + h)$
$= 2 \times 5\,(10 + 7) = 170\ m^2$
Area covered by door & window
$= 2\,(1 \times 3) + 2 \times 1.5 + 2\,(1 \times 1.5)$
$= 6 + 3 + 3$
$= 12\ m^2$
Area to be painted
$= 170 - 12$
$= 158$
Total cost of painting wall $= 3 \times 158$
$= 474$ Rs.

S10. Ans.(d)
Sol.
Circumference of 1st cylinder
$2\pi r = 30$
$r = 15/\pi$
Circumference of 2nd cylinder
$2\pi r = 18$
$r = 9/\pi$
Ratio of volumes

$$= \frac{\pi\left(\frac{15}{\pi}\right)^2 \times 18}{\pi\left(\frac{9}{\pi}\right)^2 \times 30}$$

$= 5 : 3$

S11. Ans.(c)
Sol.
Interest $= 1656 - 1440 = 216$
Rate $= \frac{216}{1440} \times 100 = 15\%$

S12. Ans.(b)
Sol.
Rate $\rightarrow 25\% \rightarrow \frac{1}{4}$

3 years →	Original	:	Final
1st year →	4	:	5
2nd year →	4	:	5
3rd year →	4	:	5
	64	:	125

125r → 10000000
1r → 80000
64r → 5120000

2 years →	Original	:	Final
1st year →	4	:	5
2nd year →	4	:	5
	16	:	25

25r → 10000000
1r → 400000
16r → 6400000
Difference = 6400000 – 5120000= 1280000

S13. Ans.(d)

Sol.

Rate = 10% = $\frac{1}{10}$
Let Principal = $(10)^3$ = 1000
1st year ⇒ $\frac{1000}{10}$ = 100
2nd year ⇒ $\frac{1000}{10} + \frac{100}{10}$ = 110
3rd year ⇒ $\frac{1000}{10} + \frac{100}{10} + \frac{110}{10}$= 100 + 10 + 11= 121
ATQ ⇒
(121 – 110)r → 1100
11r → 1100
1r → 100 Rs.
1000r → 100000 Rs.

S14. Ans.(a)

Sol.

Let A's sum → x , B's sum → y
ATQ,

$$x\left(1+\frac{4}{100}\right)^7 = y\left(1+\frac{4}{100}\right)^9$$

$$\frac{x}{y} = \frac{676}{625}$$

x : y = 676 : 625
A → 676
B → 625

S15. Ans.(b)
Sol.

Rate = $30\% = \frac{30}{100} = \frac{3}{10}$

Let Principal $\Rightarrow$ 1000

C.I 1st year $\rightarrow 1000 \times \frac{3}{10} = 300$

C.I 2nd year $\rightarrow 1000 \times \frac{3}{10} + 300 \times \frac{3}{10} \Rightarrow 300 + 90 \Rightarrow 390$

C.I 3rd year $\Rightarrow 1000 \times \frac{3}{10} + 300 \times \frac{3}{10} + 390 \times \frac{3}{10} = 300 + 90 + 117 = 507$

Total C.I = 300 + 390 + 507 = 1197

S.I = 300 + 300 + 300 = 900

$\% = \frac{1197-900}{900} \times 100 = \frac{297}{9} = 33\%$

S16. Ans.(d)
Sol.

S.I for 2 years $= \frac{16000 \times 15 \times 2}{100} = 4800$

Principal for C.I = 16000 + 4800 = 20800

C.I Rate $\rightarrow 12\% = \frac{12}{100} = \frac{3}{25}$

Compound Interest for 1st year $= 20800 \times \frac{3}{25} = 2496$

C.I for 2nd year $= 20800 \times \frac{3}{25} + 2496 \times \frac{3}{25} = 2496 + 299.52 = 2795.52$

Total Interest after 4 years $= 4800 + 2496 + 2795.52 = 10091.52$

S17. Ans.(d)
Sol.

Principal $= \frac{8730 \times 100}{3 \times 6} = 48500$ Rs.

C.I Rate $= 6\% = \frac{6}{100}$

C.I 1st year $= 48500 \times \frac{6}{100} = 2910$

C.I 2nd year $= 48500 \times \frac{6}{100} + 2910 \times \frac{6}{100} = 2910 + 174.6 = 3084.6$

Total C.I = 2910 + 3084.6 = 5994.6

S18. Ans.(d)
Sol.

$C.I - S.I = \left(\frac{R}{100}\right)^2$

$72 = 5000\left(\frac{R}{100}\right)^2$

$\frac{36}{2500} = \left(\frac{R}{100}\right)^2$

$\frac{6}{50} = \frac{R}{100}$

R = 12%

S19. Ans.(b)

Sol.

Distance = 63 Miles
Men's speed = 4 m/h
Women's speed = 3 m/h
Time taken to meet each other = $\frac{63}{7}$ = 9 hours
Distance Travelled by Men = 9 × 4 = 36 miles
Distance Travelled by Women = 9 × 3 = 27 miles

S20. Ans.(d)

Sol.

$$\text{Present} \longrightarrow P : Q \longrightarrow \overset{3}{\frown}\ 5 : 8$$

$$4 \text{ years} \longrightarrow P : Q \longrightarrow 2 : 3\ \underset{1}{\smile}$$

$$\text{Present} \longrightarrow P : Q \longrightarrow 5 : 8$$

$$\text{After 4 years} \longrightarrow P : Q \longrightarrow 6 : 9$$

(9 − 8)r → 4 years
1r → 4 years
Q's Present age = 8 × 4 = 32 years

S21. Ans.(a)

Sol.

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

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

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

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

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

S22. Ans.(c)

Sol.

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

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

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

S23. Ans.(c)

Sol.

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

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

$$S.I. = \frac{5000\times10\times2}{100} = 1000$$

Diff. $= 77.5$

S24. Ans.(a)

Sol.

Volume of cylinder $= \pi(10+x)^2 \times 4$

Again height increased by x cm

Volume of cylinder $= \pi \times 10^2(4+x)$

$\Rightarrow \pi \times 10^2.(4+x) = \pi(10+x)^2 \times 4$

$x = 5$ cm

S25. Ans.(c)

Sol.

Volume of required water $= 2 \times$ volume of cone

$= 2 \times 27\pi = 54\pi$ cm^3

S26. Ans.(b)

Sol.

$AB + BC = 12$

$BC + CA = 14$

$CA + AB = 18$

$\Rightarrow 2(AB + BC + CA) = 44$

$2\pi r = 22$

$r = \frac{7}{2}$ cm

S27. Ans.(a)

Sol.

$$\text{Area} = \frac{1000}{\frac{1}{4}} = 4000 \text{ m}^2$$

$$\text{Length} = \frac{4000}{50} = 80 \text{ m}$$

New length of field $= 100$ m

Area $= 100 \times 50 = 5000$ m^2

Req. Expenditure $= 5000 \times \frac{1}{4} = 1250$

S28. Ans.(b)

Sol.

Volume of rain water = Area of base × height

$= 100000 \times \frac{2}{100} = 20000\ m^3$

Water stored in pool $= 10000\ m^3$

Req. water level $= \frac{10000}{1000} = 10\ m$

S29. Ans.(c)

Sol.

$$\text{Increased water level} = \frac{\text{Volume of sphere}}{\text{Area of base of cylinder}}$$

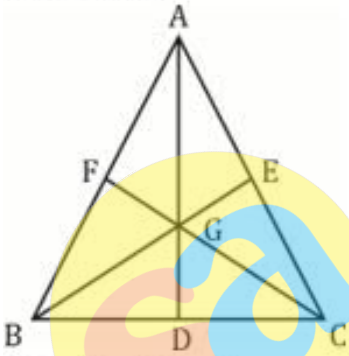
$= \frac{\frac{4}{3}\pi r^3}{\pi r^2} = \frac{4}{3}r = \frac{14}{3}\ cm$

Req. water level $= 7 - \frac{14}{3} = \frac{7}{3}\ cm$

S30. Ans.(b)

Sol.

$AG = 6\ cm$



$BG = \frac{2}{3} \times 12 = 8\ cm$

$GC = \frac{2}{3} \times 15 = 10\ cm$

Area of $\Delta ABG = \frac{1}{2} \times 6 \times 8 = 24$ sq. cm

Area of $\Delta ABC = 3 \times 24 = 72$ sq. cm