SSC TIER II (MATHS) MOCK TEST - 28 (SOLUTION)

1. (C) The numbers exactly divisible by the greatest number are 821 – 5 and 1030 – 6 = 816 and 1024
H.C.F of 816 and 1024 = 16.
Hence, the greatest number = 16.

2. (C) As 258 is a multiple of 43, then

$$43\overline{)95}\,(2$$
$$\underline{86}$$
$$09$$

$\therefore$ Required remainder = 9.

3. (D) Let the numbers = x and y
and the divisor = z
then,
$x = az + 5$ .... (i)
and
$y = bz + 7$ .... (ii)
A.T.Q
$x + y = az + 5 + bz + 7$
= (a + b) z + 2 = 12 ....(iii)
but
$x + y = cz + 2$ .... (iv)
On comparing equation (iii) and (iv)
$z = 10$
Hence, required divisor = 10

4. (A) Let the total distance = x km
According to question,

$$\frac{x}{25} - \frac{x}{45} = \frac{15}{4}$$

$$\Rightarrow \frac{20x}{25 \times 45} = \frac{15}{4}$$

$$\Rightarrow x = \frac{75 \times 45}{4 \times 4} = 210.94\text{km}$$

Hence, Total distance = 210.94 km

5. (B) Yesterday Speed of Neha = 80 word/minute

Today speed of Neha = $\frac{80 \times 75}{100}$

= 60 word/minute

Difference in time = $\frac{7000}{60} - \frac{7000}{80}$

$= \frac{7000(4-3)}{240}$ = 29.17 min.

Hence, required difference = 30 min (Approximate)

6. (A) A.T.Q

$$\sin A + \cos A = \frac{7}{25}$$

$$\Rightarrow \cos A = \frac{7}{5} - \sin A$$

$$\Rightarrow \sin A \cos A = \frac{12}{25}$$

$$\Rightarrow \sin A\left(\frac{7}{5} - \sin A\right) = \frac{12}{5}$$

$\Rightarrow 7\sin A - 5\sin^2 A - 12 = 0$
$\Rightarrow 5\sin^2 A - 35\sin A + 12 = 0$

$$\Rightarrow \sin A = \frac{3}{5} \text{ or } \frac{4}{5}$$

$$\Rightarrow \cos A = \frac{4}{5} \text{ or } \frac{3}{5}$$

7. (A) $\frac{M_1 \times H_1 \times D_1}{W_1} = \frac{M_2 \times H_2 \times D_2}{W_2}$

$$\frac{15 \times 8 \times 32}{\frac{2}{5}} = \frac{20 \times 3 \times D_2}{\frac{3}{5}}$$

$\Rightarrow D_2$ = 96 days
Hence, work will be complete in 96 days

8. (A) 6M = 12F and 8F = 10B

$$\frac{M}{F} = \frac{2}{1} \qquad \frac{F}{B} = \frac{5}{4}$$

Ratio of efficiency of male, female and boy = 10 : 5 : 4
$(13 \times 10 + 6 \times 4) \times 9 \times 18$
$= (16 \times 5 + 16 \times 4) \times 6 \times D$
$\Rightarrow 154 \times 27 = 144D$

$$\Rightarrow D = 28\frac{7}{8} \text{ days}$$

Hence, required days

$$= 28\frac{7}{8} \text{ days}$$

9. (B) Let the amount taxable purchases be = ₹ x
A.T.Q,

$$5\% \text{ of } x = \frac{25}{100}$$

$$\Rightarrow x = \frac{25}{100} \times \frac{100}{5} = 5$$

$\therefore$ Cost of tax free items = [45 – (5 + .25)]
= ₹ 39.75

10. (B) A.T.Q

$\cos\theta - \sin\theta = \sqrt{2}\sin\theta$

Squaring on both sides, we get

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

$\Rightarrow \cos^2\theta + \sin^2\theta - 2\sin\theta\cos\theta = 2\sin^2\theta$

$\Rightarrow 2\sin\theta\cos\theta = \cos^2\theta + \sin^2\theta - 2\sin^2\theta$

$\Rightarrow 2\sin\theta\cos\theta = (\cos\theta + \sin\theta)(\cos\theta - \sin\theta)$

$\Rightarrow 2\sin\theta\cos\theta = (\cos\theta + \sin\theta)\sqrt{2}\sin\theta$

$\Rightarrow \sqrt{2}\cos\theta = \cos\theta + \sin\theta$

$\therefore \cos\theta + \sin\theta = \sqrt{2}\cos\theta$

11. (C) Let the number of workers = x

According to question,

80% of $x = 64 + \frac{3}{4} \times 64$

$\Rightarrow x = \frac{112 \times 100}{80}$

$\Rightarrow x = 140$

Total numbers of workers = 140 workers

12. (C) According to question

$\Rightarrow$ Sum of unit digits of numbers from 1 to 99
= 10(1 + 2 + 3 + 4 .... + 9)

$= 10\left(\frac{9 \times 10}{2}\right) = 450$

$\Rightarrow$ Sum of ten's digits of numbers from 1 to 99
= 10(1 + 2 + 3 .... + 9)

$= 10\left(\frac{9 \times 10}{2}\right) = 450$

$\Rightarrow$ Sum of digits of 100 = 1

$\therefore$ Required sum = 450 + 450 + 1 = 901

13. (C) According to question

Amount of alcohol and water taken out from Ist bottle = 6 litre and 10 litre

Amount of Alcohol and water taken out from 2nd bottle = 12 l and 10 l

Total amount of alcohol and water from Ist and 3rd bottle = 18 l and 20 l

Now, from options

Let amount of total mixture taken from 2nd bottle = 24 l

Amount of alcohol = $24 \times \frac{7}{12} = 14\ l$

Amount of water = $24 \times \frac{5}{12} = 10\ l$

Now, total amount of alcohol and water from three bottles = (18 + 14) l and (20 + 10) l = 32 l and 30 l

Ratio of alcohol and water in final mixture

= 32 : 30 = 16 : 15

Hence, option (c) is correct.

14. (D) According to question,

Total run scored when his last inning is of 93 runs = 87 × 9 = 783 runs

$\therefore$ Total runs he scored in 9 innings
= 783 – (93 – 82) = 772 runs

15. (C) In right angle ΔABD

$AB^2 = BD^2 - AD^2$

$\Rightarrow AB^2 = (26)^2 - (24)^2 = 676 - 576$

$\Rightarrow AB = \sqrt{100}$

$\Rightarrow$ AB = 10 cm

Area of trapezium ABCD

$= \frac{1}{2}$(sum of parallel sides) × h

$= \frac{1}{2} \times (24 + 17) \times 10 = 205\text{cm}^2$

16. (D) According to question,

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

$\therefore x^6 = -1$

then,

$x^{108} + x^{96} + x^{84} + x^{102} + x^{90} + x^{78} + x^6 + 1$

$= x^{108} + x^{102} + x^{96} + x^{90} + x^{84} + x^{78} + x^6 - 1$

$= x^{102}(x^6 + 1) + x^{90}(x^6 + 1) + x^{78}(x^6 + 1) - 1 - 1$

$= x^{102}(0) + x^{90}(0) + x^{78}(0) - 2 = -2$

17. (A) $x^2 + y^2 + 2x + 2y - 2 = 0$

$\Rightarrow x^2 + y^2 + 2x + 2y - 1 - 1 = 0$

$\Rightarrow (x - 1)^2 + (y - 1)^2 = 0 \Rightarrow x = 1$ and $y = 1$

$\therefore x^{89} + y^{107} = (1)^{89} + (1)^{107} = 2$

18. (A) $\frac{-17}{13} \times -6 \times \frac{26}{34} = 6$

19. (C) According to question,

$2p - q = \sqrt{p^2 + q^2}$

squaring on both sides, we get

$(2p - q)^2 = \left(\sqrt{p^2 + q^2}\right)^2$

$\Rightarrow 4p^2 + q^2 - 4pq = p^2 + q^2$

$\Rightarrow 3p^2 = 4pq$

$\Rightarrow 3p = 4q$

$\therefore$ Required ratio = 4 : 3

20. (C) According to question

$$x = \frac{\sqrt{15}+\sqrt{12}}{\sqrt{15}-\sqrt{12}} \times \frac{\sqrt{15}+\sqrt{12}}{\sqrt{15}+\sqrt{12}} = \frac{1}{y}$$

$$\Rightarrow x = \frac{15+12+2\sqrt{180}}{15-12}$$

$$\Rightarrow x = \frac{27+12\sqrt{5}}{3}$$

$\Rightarrow x = 9 + 4\sqrt{5}$ and $y = 9 - 4\sqrt{5}$

$\Rightarrow x^2 + y^2 + 5xy = (81+80) + 5 = 327$

21. (A) According to question,

Ratio of their periods of investment = 7 : 3 : 5

Ratio of their profits = 2 : 1 : 2

$\therefore$ Ratio of their investment = $\frac{2}{7} : \frac{1}{3} : \frac{2}{5}$

$= 105 \times \frac{2}{7} : \frac{105}{3} : \frac{2}{5} \times 105 = 30 : 35 : 42$

22. (A) According to question,

(9% – 6%) = ₹ 630

$\Rightarrow$ 3% = ₹630

$\Rightarrow$ 100% = ₹21000

$\therefore$ Q's share $\left(\frac{3}{8}\text{th of the total profit}\right)$

= 21000

Remaining profit = $\frac{21000}{3} \times 5$ = ₹ 35000

Hence, P's profit = ₹ 17500

23. (D) According to question,

α and β are roots of equation $= x^2 + px + q = 0$

$\alpha + \beta = -p$ .... (i)

$\alpha\beta = q$ .... (ii)

then, Sum of roots of required equation

$\Rightarrow \alpha^2+\alpha\beta+\beta^2+\alpha\beta = (\alpha+\beta)^2 = p^2$

Products of roots of required equation

$\Rightarrow (\alpha^2+\alpha\beta)(\beta^2+\alpha\beta) = qp^2$

Hence, required equation

$= x^2 -$ (sum of roots)$x +$ (product of roots) $= 0$

$\Rightarrow x^2 - p^2 x + qp^2 = 0$

24. (B) According to question,

$\sqrt{9\sqrt{9\sqrt{9......}}} = (6561)^{x-1}$

$\Rightarrow \alpha = \sqrt{9\sqrt{9\sqrt{9\sqrt{9....}}}}$

Squaring on both sides we get,

$\alpha^2 = 9x$

$\Rightarrow \alpha^2 - 9x = 0$

$\alpha(\alpha - 9) = 0$

$\Rightarrow \alpha = 9 = (9^4)^{x-1}$

$\therefore 9 = (9)^{4x-4}$

$\Rightarrow 4\alpha - 4 = 1$

$\alpha = \frac{5}{4}$

25. (B) Let length, breath and height = $7x$, $5x$ and $4x$

According to question,

Area of floor = $\frac{980}{7} = 140$

$\therefore 7x \times 5x = 140$

$\Rightarrow x^2 = \frac{140}{35} = 4$

$\Rightarrow x = 2$

$\therefore$ length, breath and height are 14 m, 10m and 8 m respectively

$\therefore$ Total area of walls = $2(lh + bh)$

= 2(14 × 8 + 80) = 2 × 192

Total cost of covering walls = 384 × 3.50 = ₹1344

26. (C) According to question,

Area of base

$= \frac{1}{2}$(sum of parallel sides) × height

$= \frac{1}{2}(25) \times 12 = 150\ cm^2$

Area of prism = Area of base × height

1200 = 150 × h

h = 8 cm

27. (B) $a^2 + a + 1 = 0$ .... (i)

We know that,

$\Rightarrow a^3 - 1 = (a-1)(a^2 + a + 1)$

$\Rightarrow a^3 - 1 = 0$

$\Rightarrow a^3 = 1$

$\Rightarrow a^5 + a^4 + 1$

$\Rightarrow a^3\, a^2 + a^3.\, a + 1$

$\Rightarrow a^2 + a + 1 = 0$

$\therefore a^5 + a^4 + 1 = 0$

28. (A) Orthocentre of ΔABC = B

Circumcentre of ΔABC = D

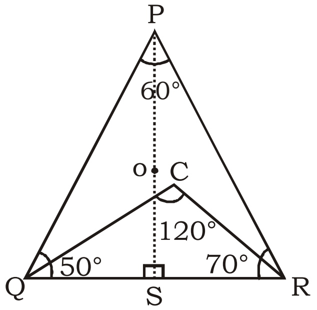
In ΔBDN,

$BD^2 = BN^2 + ND^2$

$\Rightarrow 24^2 + 10^2 = 26^2$

$\Rightarrow$ BD = 26

29. (A)



According to question,
In triangle PQR, C is the circumcenter

$\therefore\ \angle QPR = \frac{1}{2}\angle QCR$

$\Rightarrow \angle QPR = 60°$

and $\angle QPR + \angle PQR + PRQ = 180°$

$60° + 50° + \angle PRQ = 180°$

$\Rightarrow \angle PRQ = 70°$

Now, In triangle PSR

$90° + 70° + \angle RPS = 180°$

$\Rightarrow \angle RPS = 180° - 160°$

$\Rightarrow \angle RPS = 20°$

30. (A) According to question,
Taking option (A) as this number
Let D = 64
A.T.Q
$\Rightarrow P = (6 + 4) = (10)^2 = 100$
Now, P – D = 100 – 64 = 36
$\therefore$ Required number = 64

31. (D) According to question,
Let cost of Ist radio $= 19x$
cost of 2nd ratio $= 27x$

$$\frac{19x + \frac{120}{100}}{27x + 657} = \frac{13}{25}$$

$570x = 351x + 13 \times 657$
$219x = 13 \times 657$
$x = 39$
$\therefore$ The cost of 2nd radio in beginning
$= 27 \times 39 =$ ₹1053

32. (C) According to question,
Sum of remaining three numbers
$= 37 \times 21 - 18 \times 34 = 165$
$\therefore$ Greatest number between remaining three numbers $= \frac{165}{15} \times 7 = 77$

33. (D) A.T.Q

$\frac{x+1}{x-1} = \frac{a}{b}$ and $\frac{1-y}{1+y} = \frac{b}{a}$

Using componendo and dividendo, we get

$\frac{2x}{2} = \frac{a+b}{a-b}$ and $\frac{-1}{y} = \frac{a+b}{b-a}$

$\Rightarrow y = \frac{a-b}{a+b}$

$$\Rightarrow \frac{x-y}{1+xy} = \frac{\frac{(a+b)}{(a-b)} - \frac{(a-b)}{(a+b)}}{1 + \frac{(a+b)}{(a-b)}\frac{(a-b)}{(a+b)}}$$

$$= \frac{(a+b)^2 - (a-b)^2}{(a^2-b^2) - (1+1)}$$

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

$$= \frac{2ab}{a^2-b^2}$$

34. (D) According to question,

$\therefore$ Required number $= \frac{3\times5 - 4\times2}{(3+5)-(4+2)}$

$= \frac{15-8}{8-6} = \frac{7}{2}$

35. (B) According to question
Change in volume

$$= \left[\left(\frac{100-20}{100}\right)\left(\frac{100+10}{100}\right)\left(\frac{100-25}{100}\right) - 1\right] \times 100$$

$$= \left[\left(\frac{80}{100} \times \frac{110}{100} \times \frac{75}{100}\right) - 1\right] \times 100$$

$$= \left[\frac{33}{50} - 1\right] \times 100 = \frac{-17}{50} \times 100$$

$\therefore$ Its volume decreased by 34%.

36. (A) Let $y = \sin x + \sqrt{3}\cos x$

$$\left(\frac{1}{2}\sin x + \frac{\sqrt{3}}{2}\cos x\right)$$

$[\cos 60° \sin x + \sin 60° \cos x)$
$2\sin(x + 60°)$
when $\sin(x + 60°)$ is maximum, then y will be maximum
$\therefore \sin(x + 60°) = 1 = \sin 90°$
then

$x + 60° = 90°$
then $x + 60° = 90°$
$\Rightarrow x = 30°$

37. (A) Let speed of Anuj = x km/hr
and speed of Amit = y km/hr
A.T.Q

$$\frac{42}{x} - \frac{42}{y} = 3$$

$\Rightarrow 42y - 42x = 3xy$ .... (i)

Now, $\frac{42}{y} - \frac{42}{3x} = \frac{3}{2}$

$252x - 84y = 9xy$............... (ii)
Solving equation (i) and (ii) we get,

$$\begin{aligned} 84y - 84x &= 6xy \\ \underline{-84y + 252x} &\underline{= 9xy} \\ 168x &= 15xy \end{aligned}$$

$\Rightarrow y = \frac{168}{15}$

$\Rightarrow y = 11.2$ km/hr
Hence, speed of Amit = 11.2 km/hr

38. (B) According to question,
Let

MP 500, SP 200

$\underbrace{500 \quad 200}_{\text{Discount } + \frac{3}{5}th}$

CP = $\frac{200 \times 100}{80} = 250$

MP = 500
CP = 250
Hence, the cost price is half of marked price

39. (C) According to question,

$12\% = \frac{12}{100} = \frac{3}{25}$ – Profit / – CP

$4\% = \frac{4}{100} = \frac{1}{25}$ – Profit / – CP

	CP	SP	
Ist cow	25	28	×6
2nd cow	25	24	×7

168 same

CP	SP
150	168
175	168
325	336

Hence, Profit % = $\frac{(336-325)}{325} \times 100$

$= 3\frac{5}{13}\%$

40. (C) According to question,
Two successive discounts of 40% and 10%

$= 40 + 10 - \frac{40 \times 10}{100} = 46\%$

Two successive discounts of 30% and 20%

$= 30 + 20 - \frac{30 \times 20}{100} = 44\%$

Hence, required difference

$= \frac{4500}{100} \times (46 - 44) =$ ₹ 90

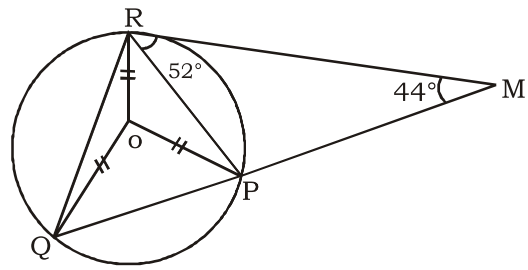
41. (B) A.T.Q,

$$\sin 2A = \frac{2\tan A}{1+\tan^2 A} = \frac{\frac{2}{2}}{1+\frac{1}{4}} = \frac{4}{5}$$

and, $\cos 2B = \frac{1-\tan^2 B}{1+\tan^2 B} = \frac{1-\frac{1}{9}}{1+\frac{1}{9}} = \frac{\frac{8}{9}}{\frac{10}{9}} = \frac{4}{5}$

$\therefore \sin 2A = \cos 2B$

42. (B) According to question,



In ΔRPM
$\angle RPM = 180° - \angle PRM - \angle PMR$
$= 180° - 52° - 44 = 84°$
and, $\angle ORP = 90° - \angle PRM = 90° - 52° = 38°$
$\angle ORP = \angle OPR$ (opp. sides are equal OP and OR are radius)
$\angle OPQ = 180° - \angle RPM - \angle OPR$
$\Rightarrow \angle OPQ = 180° - 84° - 38° = 58°$
$\angle POQ = 180° - \angle PQO - \angle QPO = 180° - 116°$
$= 64°$

43. (C) A.T.Q,
$(55)^{725} = (55)^{724} \times (55)^1$
$(73)^{5310} = (73)^{5308} \times (73)^2$
$(22)^{853} = (22)^{852} \times (22)^1$
Sum of unit place digit = 5 + 9 + 2 = 16
$\therefore$ Unit's place of expression = 6

44. (B) Let amount = ₹ 700
S.I = ₹ 300
Principle = ₹ 400

Rate of interest = $\frac{300 \times 100}{15 \times 400}$

= 5% per annum

45. (D) Let amount = 144 unit
According to question,

S.I = $\left(\frac{144 \times 5 \times 10}{12 \times 100}\right) + \left(144 \times \frac{1}{3} \times \frac{8}{100}\right) +$

$\left(144 \times \frac{1}{4} \times \frac{6}{100}\right) = \left(\frac{600+384+216}{100}\right)$

$= \frac{1200}{100} = 12$ unit

when interest is 12 unit, then capital = 144 unit

when interest is interest ₹ 666, then

capital = $\frac{144}{12} \times 666$ = ₹ 7992

46. (C)

	x	y	z
expenditure	12	9	8
Savings	20%	25%	20%

x: 80% – 12, 100% —— 15
y: 75% – 9, 100% —— 12
z: 80% – 8, 100% —— 10

sum of their income

$\Rightarrow 37\alpha$ = ₹ 2590

$\alpha = \frac{2590}{37} = 70$

Income of z's = 10 × 70 = ₹ 700

47 (D) According to question,
Price $\alpha\,(wt)^2$
Price = $k\,(wt)^2$
Ratio of gold after breaking = 4 : 3 : 2
= $4x, 3x, 2x$
Initial price = $k\,(4x + 3x + 2x)^2$
= $k\,(9x)^2$
= $k\,(81x^2)$
Price after breaking = $k[16x^2 + 9x^2 + 4x^2]$
= $k\,[29x^2]$
losses = $k\,(81x^2 - 29x^2]$
$\Rightarrow 4732 = k\,(52x^2)$
$\Rightarrow kx^2 = 91$
Initial price = $k(81x^2)$
= 91 × 81
= ₹ 7371

48. (A) A.T.Q,

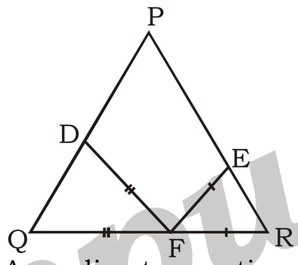
P – 15 — 5
Q – 25 — 3
→ 75

tank filled by P in 7 hours = 7 × 5 = 35 unit
tank filled by both P and Q = 75 – 35 = 40 unit

time taken by Q = $\frac{40}{8}$ = 5 hours

49. (C) Relative speed of two cars = $\frac{120}{18} \times \frac{18}{5}$
= 24 km/hr
$\therefore$ Speed of car = 60 – 24 = 36 km/hr

50. (C)



According to question,
QF = DF and FR = EF
$\angle$QPR = 60°
In ΔPQR
Let $\angle$Q and $\angle$R are α and β
$\therefore\ \alpha + \beta + 60° = 180°$
$\Rightarrow \alpha + \beta = 120°$
$\angle DFE = 180° - [180° - 2\alpha + 180° - 2\beta]$
$\Rightarrow \angle DFE = 180° - [360° - 240°]$
$\Rightarrow \angle DFE = 180° - 120° = 60°$

51. (B) A.T.Q
Quantity of oil A in 1200 litre of mixture = $\frac{1200 \times 5}{8}$ = 750 l

Quantity of oil B in 1200 litre of mixture = $\frac{1200 \times 3}{8}$ = 450 l

from given ratio

$\frac{3x}{4} + y = 750$
$\Rightarrow y = 750 - 675$
$\Rightarrow y = 75$
Hence, required amount = 75 l

52. (C) Ratio between the light of stick and its shadow = 20 : 16 = 5 : 4
As at the same time the ratio between the tower and its shadow will also be the

same = 5 : 4

$\therefore$ Height of the tower = $\frac{5}{4} \times 60 = 75$cm

53. (A) According to question,
Total age of husband, wife and son = 44 × 3 = 132 years
Increase in their age, when child is 6 years old = 7 × 3 = 21 years
Increases in age of daughter-in-law = 7 years
Child's age now = 6 years
Total age of all five members = 38 × 5 = 190 years
Daughters-in-low age at the time of marriage = 190 – (132+21+7+6) = 24 years

54. (B) According to question,
The houses meet first
= L.C.M of 2, 3, 4, 5, 6 = 60
$\therefore$ The numbers of time they meet together on the same days = $\frac{180}{60}$ = 3 times

55. (A) According to question,
length of the rectangular sheet
= circumference of base of cylinder
= 44 = $2\pi r$
r = 7
and, breath at rectangular sheet = height of cylinder
volume of cylinder = $\pi r^2 h$
= $\frac{22}{7} \times 7 \times 7 \times 20 = 3080$ cm^2

56. (C) According to question,

$\tan 2\alpha = \frac{h}{60}$

and, $\tan\alpha = \frac{h}{160}$

$\therefore \tan 2\alpha = \frac{\tan\alpha}{1-\tan^2\alpha}$

$$\frac{h}{60} = \frac{\frac{2h}{160}}{1-\left(\frac{h}{160}\right)^2}$$

$$\frac{h}{60} = \frac{h}{160} \times \frac{(160)^2}{(160-h)(160+h)}$$

$$\frac{h}{60} = \frac{h}{160} \times \frac{(160)^2}{(160+h)(160-h)}$$

$(160 + h)(160 - h) = 9600 \times 2$

$\Rightarrow 25600 = h^2 = 19200$
$\Rightarrow h^2 = 6400$
$\Rightarrow h = 80$
$\therefore$ Height of the tower is 40 *cm.*

57. (A) Ratio of capital of A and B = 25000 : 40000

A's share = $\frac{5}{13}$

B's share = $\frac{8}{13}$

New share of A and B are $\frac{1}{3}$ and $\frac{1}{3}$ respectively.
Ratio of premium is divided between A and B

$\left(\frac{5}{13}-\frac{1}{3}\right)\left(\frac{8}{13}-\frac{1}{3}\right) = \frac{2}{39} : \frac{11}{39} = 2 : 11$

58. (A) A's gain
$= \left(300000 \times \frac{110}{100}\right) - \left(330000 \times \frac{95}{100}\right)$
= ₹16500

59. (B) According to question
His total income from 01.01.2003 to 30.09.2003 = 420 × 9 = ₹3780
His total income from 01.10.2003 to 01.10.2004 = 480 × 12 = ₹ 5760
His income from 01.10.2004 to 01.10.2005 = ₹540 × 12 = ₹6480
His income from 01.10.2005 to 31.12.2005 = ₹600 × 3 = ₹1800
Average income of his last 3 years

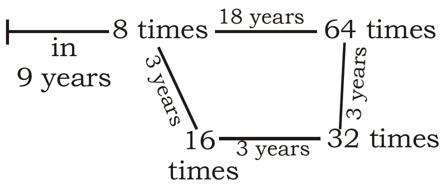
= ₹ $\frac{(3780+5760+6480+1800)}{36}$

= ₹$\frac{17860}{36}$ = ₹496

Hence, his pension = $\frac{496}{2}$ = ₹ 248

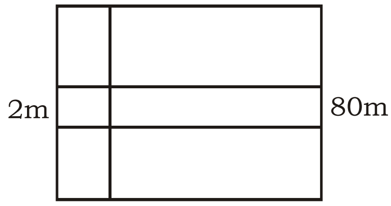
60. (A) $24^4 \times 5^{12} = (2^3 \times 3)^4 \times 5^{12}$
$= (2^3)^4 \times 3^4 \times 5^{12} = 2^{12} \times 5^{12} \times 3^4$
$= 81 \times (10)^{12}$
= 81 × 1000000000000
$\therefore$ Number of digits = 14

61. (A) According to question,



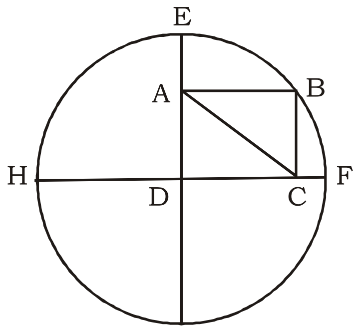
In 15 years it will become 32 times of itself.

62. (C)



Area of the play ground = 120 × 80 = 9600 m^2
Area of the both paths = $(2 \times 80 + 2 \times 120 - 2^2)$
= 160 + 240 – 4 = 396 m^2
Area of remaining ground = 9600 – 396
= 9204 m^2

63. (A)



DE = EA + AD = (9 + 6) = 15cm
DE radius of the circle
∴ DB = 15 cm (radius of circle)
and AC = DB
(Diagonals of rectangle are equal in length)
AC = 15 cm
In ΔADC
$DC^2 = AC^2 - AD^2 = 15^2 - 9^2 = 225 - 81$
$\Rightarrow DC^2 = 144$
$\Rightarrow$ DC = 12cm
∴ Perimeter of rectangle ABCD
= 2 (12 + 9) = 42 cm

64. (B) According to question,

$40\% = \frac{40}{100} = \frac{2}{5}$

Initial	Now
5	7
28	
140	

$\Rightarrow \frac{140 \times 110}{100} = 154$

∴ Required consumption = $\frac{154}{7}$ = 22 kg

65. (B) Let, $x = 1 + \frac{4}{7} + \frac{9}{7^2} + \frac{16}{7^3}$ ...... (i)

Divided by 7

$\frac{x}{7} = \frac{1}{7} + \frac{4}{7^2} + \frac{9}{7^3} + \frac{16}{7^4}$ .... (ii)

Subtracting equation (ii) from (i)

$\frac{6x}{7} = 1 + \frac{3}{7} + \frac{5}{7^2} + \frac{7}{7^3}$ .... (iii)

Divide by 7

$\frac{6x}{49} = \frac{1}{7} + \frac{3}{7^2} + \frac{5}{7^3}$ .... (iv)

subtracting (iv) from (iii)

$\frac{36x}{49} = 1 + \frac{2}{7} + \frac{2}{7^2} + \frac{2}{7^3}$ ....

$\Rightarrow \frac{36x}{49} - 1 = \frac{2}{7} + \frac{2}{7^2} + \frac{2}{7^3}$ .....

$S_\infty = \frac{a}{1-r}$

$\therefore \frac{36x}{49} - 1 = \frac{\frac{2}{7}}{1-\frac{1}{7}}$

$\Rightarrow \frac{36x}{49} = \frac{4}{3}$

$\Rightarrow x = \frac{49}{27}$

66. (A) $13^2 + 84^2 = 85^2$
$\Rightarrow$ 169 + 7056 = 7225
$\Rightarrow$ 7225 = 7225

∴ Area of triangle = $\frac{1}{2} \times 13 \times 84 = 546$ cm^2

67. (D) Amount due in 4 years = $22000 \times \left(\frac{125}{100}\right)$

A = ₹27500
Amount of each annual installment

$= \frac{100A}{100 \times t + \frac{t(t-1)r}{2}}$

$= \frac{100 \times 27500}{100 \times 5 + \frac{5 \times 4 \times 5}{2}}$

$= \frac{100 \times 27500}{550}$ = ₹5000

68. (A) Covered surface area of cone = πrl

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

$l = \sqrt{8^2 + 6^2}$ = 10 cm

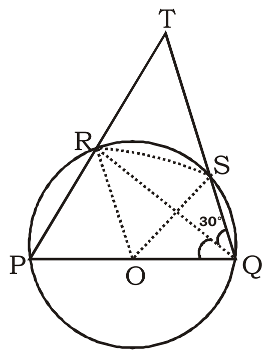
A.T.Q

$\pi \times 8 \times 10 = 2\pi \times 4 \times h \times 2$

h = 5 cm

Height of cylinder = 5 cm

69. (A)



In ΔROS

$\angle$ ROS = 60° (OS = OR = RS)

and $\angle RQS = \frac{1}{2} \angle ROS$

($\because$ The angle subtended by arc at centre is double of angle subtended by arc at any point)

$\angle$ RQS = 30°

and

$\angle$ PRQ = 90° (angle in the semi-circle)

$\angle$ TRQ = 180° – 90° = 90°

In RQT

$\angle$ RTQ = 180° – 90° – 30° = 60°

$\therefore$ $\angle$ RTQ = 60°

70. (B) Rate = $\frac{80}{5}$ = 16%

$16\% = \frac{16}{100} = \frac{4}{25}$

Principal = 20000

Ist year interest = 3200

IInd year interest = 3200 + 512

3rd year interest = 3200 + 1024 + 81.92

= 11217.92

71. (B) Due to stoppages, bus travels less km

= (80 – 72) km = 8 km

$\therefore$ Time taken to cover = $\frac{8}{80} \times 60 = 6$ m

72. (B)

Speed	11	9
distance	9	11

time taken to cover distance 63 km is

1 hr 40 min. 48 sec = $1 + 40 + \frac{48}{60}$

$= \frac{126}{75}$ hr

Speed of the train = $\frac{63}{126} \times 75$ km/hr

9 unit = $\frac{75}{2}$

1 unit = $\frac{75}{2 \times 9}$

11 unit = $\frac{75}{2 \times 9} \times 11 = 45.53$ km/hr

73. (D) Sum of interior angle and exterior angle of a polygon is 180°

We know that,

Exterior angle of a polygon = $\frac{360°}{n}$

$\therefore$ Interior angle of a polygon

$= 180° - \frac{360°}{n}$

A.T.Q

$\Rightarrow \left(180° - \frac{360°}{n}\right) = 8\left(\frac{360°}{n}\right)$

$180° = \frac{9 \times 360°}{n}$

$n = 18$

$\therefore$ Number of sides = 18

74. (D) A.T.Q

$\frac{4}{3}\pi r^3 = \frac{1}{3}\pi R^3$

[r : radius of smaller sphere]

[R : radius of larger sphere]

$\Rightarrow r^3 = \frac{R^3}{4}$

$\Rightarrow r = \frac{R}{\sqrt[3]{4}}$

$\therefore \frac{\text{surface area of smaller sphere}}{\text{surface area of larger sphere}}$

$= \frac{4\pi r^2}{4\pi R^2} = \left(\frac{R}{\sqrt[3]{4}}\right)^2 : R^2 = 1 : \left(\sqrt[3]{4}\right)^2$

$= 1 : 2^{4/3}$

75. (D) A.T.Q

$ab + bc + ca = 0$ and

$c(a + b) = -ab$

then,

$a(b + c) = -bc$

and $b(c + a) = -ca$

$\Rightarrow \left(\frac{(a-b)}{c(a+b)(a-b)}\right) + \frac{(b-c)}{c(b+c)(b-c)} + \left(\frac{c-a}{b(c+a)(c-a)}\right)$

$= \frac{c+a+b}{-abc}$

$= \frac{-a-b-c}{abc}$

76. (A) A.T.Q

$\Rightarrow$ Total volume of three cubes = $(4)^3 + (5)^3 + (6)^3 = 64 + 125 + 216 = 405$ cm^2

$\Rightarrow$ Remaining material

$= 405 \times \left[\left(100 - \frac{140}{3}\right)/100\right] = 216$ cm^3

$\therefore$ volume of new cube = 216 cm^3 radius

Hence, Sides of new cube = $\sqrt[3]{216}$ cm^3

= 6 cm

77. (A) A.T.Q

$x + \frac{2}{x} = 3 \Rightarrow x^2 - 3x = -2$

$\Rightarrow (x-1)(x-2) = 0$

$\Rightarrow x = 1, 2$

Now,

$\frac{x^4 + x^3 + 2x + 4}{x^4 - 3x^3} = \frac{1+1+2+4}{1-3} = -4$

78. (D) A.T.Q

$\Rightarrow \sqrt{1 + \frac{195}{289}} = 1 + \frac{x}{17}$

$\Rightarrow \sqrt{\frac{484}{289}} = \frac{22}{17} = 1 + \frac{x}{17}$

$\Rightarrow x = 5$

Hence, required value of $x = 5$

79. (A) A.T.Q

$\Rightarrow$ [5M + 3B] × 7 = [9M + 5B] × 4

$\Rightarrow$ 35M + 21B = 36M + 20B

$\Rightarrow$ M = B

$\Rightarrow \frac{M}{B} = \frac{1}{1}$

Total wages paid = ₹6000

$\Rightarrow$ Ratio of wages of boys and men = 2 : 3

$\Rightarrow$ Amount paid to boy= $\frac{6000}{5} \times 2$ = ₹2400

$\Rightarrow$ Amount paid a boy in a day = $\frac{2400}{6 \times 4}$

= ₹100

80. (B) A.T.Q

$a^2 + b^2 + c^2 = 25$, $x^2 + y^2 + z^2 = 36$ and $ax + by + cz = 0$

then,

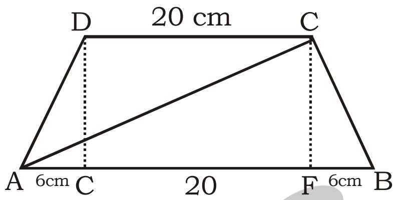
put $a = 5$, $b = 0$, $c = 0$ and

$x = 6$, $y = 0$, $z = 0$

Satisfy all the three equations

$\therefore$ Hence, $\frac{a^2 + b^2 + c^2}{x^2 + y^2 + z^2} = \frac{(5)^2}{(6)^2} = \frac{25}{36}$

81. (A) A.T.Q



Area of the trapezium

$= \frac{1}{2}$ (sum of parallel sides) × h

$\Rightarrow 416 = \frac{1}{2} \times 13x \times \frac{4}{13} \times 13x$

$\Rightarrow x = 4$ cm

$\therefore$ Height of trapezium =4 × 4 = 16 cm

length of parallel sides = 8 × 4 and 5 × 4 = 32 cm and 20 cm

$\Rightarrow$ As it is a isosceles trapezium

$\therefore$ AE = BF = 6 cm

In ΔAFC, $\angle$F = 90°

$\therefore$ AC^2 = AF^2 + FC^2 = $(26)^2 + (16)^2$

$\Rightarrow$ AC = $\sqrt{676 + 256} = \sqrt{932}$

$\Rightarrow$ AC = $2\sqrt{233}$ cm

82. (B) A.T.Q

Average number of factories of village A in given years

$= \frac{75 + 125 + 175 + 200 + 275 + 300}{6}$

$= \frac{1150}{6} = 191.67$

$\therefore$ In 2015, 2016 and 2017 year number of factories of village A is more than the average number of factories village.

Hence, required number = 3

83. (A) A.T.Q

Required % = $\frac{100 \times 100}{175}$ = 57.14%

84. (B) A.T.Q

Required percentage = $\frac{25}{125}\times 100$ = 20%

85. (B) Number of factories of village A in 2013 and 2014 = 125 + 175 = 300

Number of factories village B in 2016 and 2017 = 200 + 250 = 450

Required % = $\frac{300}{450}\times 100 = 66\frac{2}{3}\%$

86. (A) A.T.Q

Total number of factories in village A over years

= 75 + 125 + 175 + 200 + 275 + 300 = 1150

Total number of factories in village B over the years = 125 + 100 + 100 + 175 + 200 + 250 = 950

Hence, Required ratio = 1150 : 950

= 23 : 19

87. (A) A.T.Q

$\Rightarrow$ AM = $\frac{7\tan\theta + 8\cot\theta}{2}$

GM = $\sqrt{56}$

By the AM, GM inequality, then,

$\Rightarrow \frac{7\tan\theta + 8\cot}{2} \geq \sqrt{56}$

$\Rightarrow$ 7tanθ + 8cot $\geq 4\sqrt{14}$

Hence, the minimum of 7tanθ + 8cotθ is $4\sqrt{14}$

88. (C) A.T.Q

$\text{cosec}\,\theta\left(\frac{1+\cos}{\sin\theta}+\frac{\sin\theta}{1+\cos\theta}\right) - 2\cot^2\theta$

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

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

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

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

$= 2\text{cosec}^2\theta - 2\cot^2\theta$

$= 2(\text{cosec}^2\theta - \cot^2)$

$= 2 \times 1 = 2$

89. (B) A.T.Q

$x^2 = p^2\cos^2\theta\sec^2\alpha$

$y^2 = q^2\cos^2\theta\tan^2\alpha$

$z^2 = r^2\sin^2\theta$

$\therefore \frac{x^2}{p^2} - \frac{y^2}{q^2} + \frac{z^2}{c^2}$

$= \cos^2\theta\sec^2\alpha - \cos^2\theta\tan^2\alpha + \sin^2\theta$

$= \cos^2(\sec^2\alpha - \tan^2\alpha) + \sin^2\theta$

$= \cos^2\theta + \sin^2\theta$

$\Rightarrow \frac{x^2}{p^2} - \frac{y^2}{q^2} + \frac{z^2}{r^2} = 1$

90. (C) A.T.Q

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

$= \left(\frac{\sec^2\theta - \tan^2\theta}{\tan^2\theta}\right) + \left(\frac{\tan^2\theta - \sec^2\theta}{\sec^2\theta}\right) + 2$

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

$= \frac{\sec^2\theta - \tan^2\theta}{\tan^2\theta\sec^2\theta} + 2$

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

$= \frac{1}{\tan^2\theta + \tan^4\theta} + 2$

91. (B) Let daily average income of men = ₹x

$\therefore$ daily average income of women = ₹ $(x - 10)$

$\therefore$ Daily average income of boys = $(x - 20)$

A.T.Q

$6(x) + 9(x - 10) + 2(x - 20) = 237.5 \times 17$

$\Rightarrow 6x + 9x - 90 + 2x - 40 =$ ₹4037.5

$\Rightarrow$ 17x = 4037.5 + 130

$\Rightarrow x = \frac{4167.5}{17}$ = ₹245.14

92. (B) Let, number of friends who attended picnic = x

According to the question,

$\frac{10800}{x} - \frac{10800}{x+20} = 18$

$\Rightarrow x = 100$

93. (B) Let the volume of water in one litre of mixture = a
A.T.Q
$a.1000 + (1-a)1450 = 1150$
$\Rightarrow 1000a + 1450 - 1450a = 1150$
$\Rightarrow 450a = 300$
$\Rightarrow a = \frac{2}{3}$
$\therefore$ Required ratio = 2 : 1

94. (D) A.T.Q
$p[p^2 + 3p + 3] = p^3 + 3p^2 + 3p$ .... (i)
Subtracting and adding 1 in equation (i) we get
$\Rightarrow p^3 + 1 + 3p^2 + 3p - 1 = (p+1)^3 - 1$
$= (99+1)^3 - 1 = 1000000 - 1 = 999999$

95. (B) 3 × 304 = 912
and 3 × 340 = 1020
$\therefore$ multiples of 3 = 37
7 × 131 = 917
and, 7 × 145 = 1015
$\therefore$ multiples of 7 = 15
and multiple of 21 = 5
Hence, total number of multiples
= 37 + 15 – 5 = 47

96. (A) Population of village E below poverty line
$$= \frac{52}{100}\left(\frac{54000}{27}\times 15\right) = 15600$$

97. (C) Let total population = x
A.T.Q
$$\frac{x\times 21}{100}\times\frac{46}{100} : \frac{x\times 11}{100}\times\frac{42}{100}$$
$\Rightarrow 23 : 11$
$\therefore$ Required ratio = 23 : 11

98. (C) Population of E = $15600 \times \frac{100}{52} = 30,000$
Required population
$$= \frac{30000}{15}\times 10\times\frac{58}{100} = 11600$$

99. (B) Required ratio
$$= \frac{x\times 21}{100}\times\frac{46}{100} : \frac{x\times 27}{100}\times 54 = 161 : 243$$

100. (A) Required %
$$= \frac{(15600-11600)}{11600}\times 100 = 34.4 \sim 34\%$$
(see question number 98)

SSC TIER II (MATHS) MOCK TEST - 28 (ANSWER-KEY)

1.	(C)	11.	(C)	21.	(A)	31.	(D)	41.	(B)	51.	(B)	61.	(A)	71.	(B)	81.	(A)	91.	(B)
2.	(C)	12.	(C)	22.	(A)	32.	(C)	42.	(B)	52.	(C)	62.	(C)	72.	(B)	82.	(B)	92.	(B)
3.	(D)	13.	(C)	23.	(D)	33.	(D)	43.	(C)	53.	(A)	63.	(A)	73.	(D)	83.	(A)	93.	(B)
4.	(A)	14.	(D)	24.	(B)	34.	(D)	44.	(B)	54.	(B)	64.	(B)	74.	(D)	84.	(B)	94.	(D)
5.	(B)	15.	(C)	25.	(B)	35.	(B)	45.	(D)	55.	(A)	65.	(B)	75.	(D)	85.	(B)	95.	(B)
6.	(A)	16.	(D)	26.	(C)	36.	(A)	46.	(C)	56.	(C)	66.	(A)	76.	(A)	86.	(A)	96.	(A)
7.	(A)	17.	(A)	27.	(B)	37.	(A)	47	(D)	57.	(A)	67.	(D)	77.	(A)	87.	(A)	97.	(C)
8.	(A)	18.	(A)	28.	(A)	38.	(B)	48.	(A)	58.	(A)	68.	(A)	78.	(D)	88.	(C)	98.	(C)
9.	(B)	19.	(C)	29.	(A)	39.	(C)	49.	(C)	59.	(B)	69.	(A)	79.	(A)	89.	(B)	99.	(B)
10.	(B)	20.	(C)	30.	(A)	40.	(C)	50.	(C)	60.	(A)	70.	(B)	80.	(B)	90.	(C)	100.	(A)

Note:- If your opinion differs regarding any answer, please message the mock test and question number to 8860330003

Note:- Whatsapp with Mock Test No. and Question No. at 7053606571 for any of the doubts. Join the group and you may also share your suggestions and experience of Sunday Mock

Note:- If you face any problem regarding result or marks scored, please contact 9313111777