SSC TIER II (MATHS) MOCK TEST - 37 (SOLUTION)

1. (B) A.T.Q

$$\frac{a+b}{\sqrt{ab}} = 4$$

$$\Rightarrow \frac{a+b}{2\sqrt{ab}} = \frac{4}{2}$$

Using componendo and dividendo, we get

$$\frac{a+b+2\sqrt{ab}}{a+b-2\sqrt{ab}} = \frac{3}{1}$$

$$\Rightarrow \frac{(a+b)^2}{(a-b)^2} = 3$$

$$\Rightarrow \frac{a+b}{a-b} = \sqrt{3}$$

$$\Rightarrow a + b = \sqrt{3}a - \sqrt{3}b$$

$$\Rightarrow a : b = \left(\sqrt{3}+1\right) : \left(\sqrt{3}-1\right)$$

2. (C) Let total number of workers = n

A.T.Q,

$\therefore$ Time taken to work done

$= n + n - 1 + n - 2 + n - 3$ ..... $+3+ 2 +1$

$$= \frac{n(n+1)}{2}$$

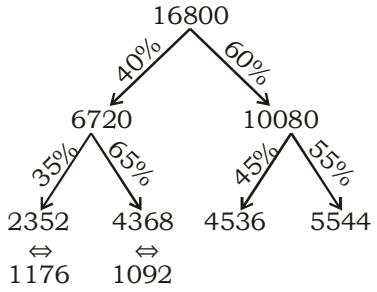
and,

$$\frac{n(n+1)}{2} = n\left(\frac{(3n)}{4}\right)$$

$\Rightarrow n = 2$

$\therefore$ Total number of worker = 2

3. (D) A.T.Q,



$\therefore$ Total number of females

$= 1176 + 1092 + 4536 = 6804$

4. (C) A.T.Q,

$= 6.7 + 0.67 + 0.067 + 0.0067 = 7.4437$

5. (D) A.T.Q,

$$\frac{\text{H.C.F of } 8, 16, 18 \text{ and } 21}{\text{L.C.M of } 9, 25, 35 \text{ and } 44} = \frac{1}{69300}$$

6. (A) A.T.Q,

$$\frac{6^{12} \times 35^{28} \times 15^{16}}{6^{12} \times 21^{11}} = 7^{17} \times 3^5 \times 5^{44}$$

$\therefore$ Number of prime factor = 66

7. (D) A.T.Q,

Total fraction of Q in the product

$$= \frac{4}{7} \times \frac{2}{3} + \frac{3}{7} \times \frac{1}{4} = \frac{41}{84}$$

$\therefore$ The amount of Q in 840 units of the product $= 840 \times \frac{41}{84} = 410$ units

$\therefore$ Total quantity of final mixture = 410 × 4 = 1640 units

$\therefore$ Required amount of water = 1640 – 840 = 800 units

8. (B) A.T.Q,

Ratio of their profit = 200000 × 12 : 250000 × 8 : 50000 × 6 = 24 : 20 : 3

Now,

Profit of Naveen

$$= \frac{(200000 - 100000)}{47} \times 24 = ₹51063.8$$

9. (D) Let the number of floors be x and number of rooms at each floor is y.

A.T.Q,

$xy = 600$ ..... (i)

Now,

$(x - 5)(y + 5) = 450$

$\Rightarrow xy - 5y + 5x - 25 = 450$

$\Rightarrow 600 - 5(y - x) - 25 = 450$

$\Rightarrow -5(y - x) = -125$

$\Rightarrow y - x = 25$ ..... (ii)

$\Rightarrow y = 40$

$\Rightarrow x = 15$

10. (A) A.T.Q,

$100x + 10y + z + 54 = 100x + 10z + y$

$\Rightarrow 54 = 9z - 9y$

$\Rightarrow z - y = 6$

Required possible value of unit place digit = 9, 8, 7, 6

11. (D) A.T.Q,

Total number of coins in 64th pot

= sum of factors of 64

$= 1 + 2 + 4 + 8 + 16 + 32 + 64 = 127$

12. (C) A.T.Q,

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

$\Rightarrow 3x^2 - 6x = -1$

and,

$\left(3x + \frac{1}{x}\right)^3 = (6)^3$

$\Rightarrow 27x^3 + \frac{1}{x^3} + 54 = 216$

$\Rightarrow 27x^3 + \frac{1}{x^3} = 162$

$\therefore 3x^2 + 27x^3 + \frac{1}{x^3} - 6x = 161$

13. (B) A.T.Q,

$a + b = 21$

$\Rightarrow (a + b)^2 = (21)^2$

$\Rightarrow a^2 + b^2 + 2ab = 441$

$\Rightarrow 2ab = 441 - 121$

$\Rightarrow ab = 160$

14. (C) Let B gets ₹x.

A.T.Q,

$x + x + 500 = 2000$

$\Rightarrow x = 750$

Ratio of their efficiency = 1250 : 750 = 5 : 3

Ratio of their time = 3 : 5

↓

2 units

Now,

2 units = 8

Time taken by A = $\frac{8}{2} \times 3 = 12$ days

Time taken by B = $\frac{8}{2} \times 5 = 20$ days

Required number of days

$= \frac{1}{\frac{1}{12} + \frac{1}{20}} = \frac{15}{2} = 7\frac{1}{2}$ days

15. (D) A.T.Q,

Ratio of number of men, women and children = $\left(\frac{16}{4} : \frac{9}{3} : \frac{8}{2}\right) = 4 : 3 : 4$

Now,

$4x + 3x + 4x = 22$

$x = 2$

$\therefore$ Number of women

$= 2 \times 3 = 6$

$\therefore$ Earnings of each women in a day

$= \frac{4400}{33} \times \frac{9}{6} =$ ₹200

16. (B) A.T.Q,

	A		B		C
	2	:	3		
			3	:	4
	6	:	9	:	12
Ratio of efficiency	2	:	3	:	4
Ratio of time	6	:	4	:	3

Now total work = 6 × 2 = 4 × 3 = 12

Time taken by A to finish the work = 6

Time taken by B and C to finish the work = $\frac{12}{3+4} = \frac{12}{7}$

Time taken by all to finish the work

$= \frac{12}{9} = \frac{4}{3}$

Now,

$\frac{30}{7}$ units = 90 days

$\therefore$ Required number of days

$= \frac{90}{30} \times 7 \times \frac{4}{3} = 28$ days

17. (C) A.T.Q,

24 M × 8 = 27 W × 8

$\frac{M}{W} = \frac{9}{8}$

$\therefore$ Number of women

$= \frac{24 \times 9 \times 8 - 12 \times 9 \times 4}{6 \times 8} = 27$

18. (D) A.T.Q,

	Male		Female
	100	:	150
Number	2	:	3

$\therefore$ Number of male worker = $\frac{20}{5} \times 2 = 8$

Number of female worker = $\frac{20}{5} \times 3 = 12$

	Male		Female
Efficency	300	:	200
	3	:	2

4 men and 3 female work for

(28 – 4) = 24 days

Total work done by 4 men and 3 female in 24 days

= (4 × 3 + 3 × 2) × 24 = 432 unit

If they had not left the work, then 432 units work would be done by 20 members in

$= \frac{432}{8 \times 3 + 12 \times 2} = 9$ days

$\therefore$ Required number of days

= (20 – 9 – 4) = 7 days

19. (A) A.T.Q,

Pipe A → 20 ⟍ ⟋ 3
60
Pipe B → 30 ⟋ ⟍ 2

$\therefore$ Required time = $\dfrac{60+\left(3\times\dfrac{20}{100}\times4\right)}{3+2}$

$= \dfrac{60+2.4}{5} = 12\dfrac{12}{25}$ minutes

20. (A) Let the number of inlet pipes = x

A.T.Q,

Inlet tap → 16 ⟍ ⟋ $6\times x = 6x$
96
Outlet tap → 24 ⟋ ⟍ $4\times(19-x) = 76-x$

Net efficiency of tank = $\dfrac{96}{24} = 4$

Now,

$6x - 76 + 4x = 4$

$\Rightarrow 10x = 80$

$\Rightarrow x = 8$

$\therefore$ Number of outlet tapes = 19 – 8 = 11

21. (B) Let the 10th number = x

A.T.Q

$x + x + 6 + x + 7$

$= 12 \times 23 - \left(\dfrac{59}{3}\times3+\dfrac{35}{2}\times6\right)$

$\Rightarrow 3x + 13 = 112$

$\Rightarrow x = 33$

$\therefore$ Twefth number = 33 + 7 = 40

22. (C) A.T.Q,

Required average of girls

$= \dfrac{5M-3(M+2)}{2} = \dfrac{2M-6}{2} = M-3$

23. (A) A.T.Q,

$\dfrac{10x+y}{10y+x} = \dfrac{7}{4}$

$\Rightarrow 40x + 4y = 70y + 7x$

$\Rightarrow \dfrac{x}{y} = \dfrac{2}{1}$

$\therefore$ Required numbers = 21, 42, 63 and 84

$\therefore$ Required sum = 210

24. (A) A.T.Q,

	Girls		Boys	
Class A	3	:	4	= 7 × 99
Class B	5	:	6	=11 ×63
In both Classes	4	:	5	=09× 77

693

3×99 ⟍ ⟋ 5×63
4×77
7 : 11

$\therefore$ Required percentage = $\dfrac{7}{11}\times100$

= 63.63%

25. (D) A.T.Q.

Required average

$= \dfrac{100+100}{\dfrac{100}{60}+\dfrac{100}{40}} = 48$ pages/hr

26. (A)

25% ⟍ ⟋ 30%
x
45 : 55
(30–x) (–25)

Now,

$\dfrac{30-x}{x-25} = \dfrac{45}{55}$

$\Rightarrow 330 - 11x = 9x - 225$

$\Rightarrow 20x = 555$

$\Rightarrow x = 27.75\%$

27. (D) A.T.Q,

	Alchol		Water	
Ist	5	:	1	= 6× 1 × 35
Iind	3	:	2	= 5× 2 × 42
IIIrd	4	:	3	= 7× 3 × 30

Now,

	Alchol		Water
Ist	175	:	35
Iind	252	:	168
IIIrd	360	:	270
Final mixture	787	:	473

28. (B) A.T.Q,

$\dfrac{x-y}{3} = \dfrac{x+y}{5} = \dfrac{xy}{7} = k$

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

$\Rightarrow x + y = 5k$ ..... (ii)

and,

$xy = 7k$

$\therefore 4k.k = 7k$

$\Rightarrow k = \dfrac{7}{4}$

$\therefore$ Required value of $xy = 7 \times \dfrac{7}{4} = \dfrac{49}{4}$

29. (C) A.T.Q,

$3^{x+4} = (3)^7$

$\Rightarrow x + 4 = 7 \Rightarrow x = 3$

$\therefore$ Required value $= (2)^{3+3} = 64$

30. (D) A.T.Q,

$x - 3y = 5$

Cubing on both sides, we get

$(x - 3y)^3 = (5)^3$

$\Rightarrow x^3 - 27y^3 - 3 \cdot x \cdot 3y\,(x - 3y) = 125$

$\Rightarrow x^3 - 27y^3 - 45xy - 25 = 100$

31. (A) A.T.Q,

$$\text{Required proportion} = \frac{\left(\sqrt{p^2+q^2}\right)^2}{\frac{p^2+q^2}{pq}} = pq$$

32. (C) A.T.Q,

$$\frac{x\times100}{100\times3} + \frac{y\times45}{2\times100} = 8$$

$$\Rightarrow \frac{x}{3} + \frac{9y}{40} = 8$$

$\Rightarrow 40x + 27y = 960$ ..... (i)

and,

$$\frac{y\times45}{2\times100} - \frac{x\times100}{3\times100} = 1$$

$$\Rightarrow \frac{9y}{40} - \frac{x}{3} = 1$$

$\Rightarrow 27y - 40x = 120$ ..... (i)

Solving equation (i) and (ii)

$$\Rightarrow x = \frac{21}{2}$$

$\Rightarrow y = 20$

$$\therefore 3y - 4x = 60 - 4 \times \frac{21}{2} = 18$$

33. (A) A.T.Q,

$$\text{Required value} = \frac{9}{5} \times \frac{7}{2} \times 5 = 31.5$$

34. (C) A.T.Q,

$x = 7 + 4\sqrt{3}$

$$\therefore \frac{1}{x} = 7 - 4\sqrt{3}$$

and,

$$\frac{5x^2 - 6x + 5}{6x^2 - 7x + 6} = \frac{5x\left(x + \frac{1}{x} - \frac{6}{5}\right)}{6x\left(x + \frac{1}{x} - \frac{7}{6}\right)}$$

$$= \frac{5\left(14 - \frac{6}{5}\right)}{6\left(14 - \frac{7}{6}\right)} = \frac{64}{77}$$

35. (A) A.T.Q,

$$\frac{\sqrt{x+3} + \sqrt{x-3}}{\sqrt{x+3} - \sqrt{x-3}} = \frac{4}{3}$$

$$\Rightarrow 3\sqrt{x+3} + 3\sqrt{x-3} = 4\sqrt{x+3} - 4\sqrt{x-3}$$

$$\Rightarrow 7\sqrt{x-3} = \sqrt{x+3}$$

$$\Rightarrow \frac{x+3}{x-3} = 49$$

$$\Rightarrow x = \frac{150}{48} = \frac{25}{8}$$

$$\therefore 8x = \frac{25}{8} \times 8 = 25$$

36. (C) A.T.Q,

In 2010 = 90 + 70 + 60 = 220

and,

In 2011 = 100 + 80 + 40 = 220

$\therefore$ Required years = 2010 and 2011

37. (B) A.T.Q,

Required percentage

$$= \frac{\frac{80+40+60+50+70+100+130}{7}}{\frac{50+90+120+90+60+80+100}{7}} \times 100$$

$= 89.83\%$

38. (D) A.T.Q,

In 2012 = 120 – 100 = 20

39. (C) A.T.Q,

Required difference

$$= \frac{120+60+30}{3} - \frac{80+50+20}{3} = 20$$

40. (B) A.T.Q,

Average export of company C

$$= \frac{80+40+60+50+70+100+130}{7}$$

$= 75.71$

$\therefore$ In years 2006, 2011 and 2012 export of company C is heigher than its average export.

41. (A) A.T.Q,

$$\frac{80(x-y)}{100} = \frac{60(x+y)}{100}$$

$4x - 4y = 3x + 3y$

$x = 7y$

$\therefore$ Required percentage

$$= \frac{1}{7} \times 100 = 14.28\%$$

42. (D) Let Number of boys = x

A.T.Q,

$$x + \frac{x \times 50}{100} = 75$$

$x = 50$

Number of boys playing cricket

$$= \frac{50 \times 70}{100} = 35$$

Number of boys only play cricket

$$= \frac{50 \times 60}{100} = 30$$

$\therefore$ Number of boys who play both cricket and football = 35 – 30 = 5

$\therefore$ Number of children playing only football = $\frac{75 \times 40}{100} = 30$

Total number of boys playing football = 50 – 30 = 20

Total number of boys playing only football = 20 – 5 = 15

Total number of girls playing only football = 30 – 15 = 15

Total number of girls playing both cricket and football both = 9 – 5 = 4

$\therefore$ Number of girls playing only cricket = 25 – (15 + 4) = 6

43. (A) A.T.Q,

Required marked price

$$= \frac{880 \times 125 \times 100}{100 \times 80} = ₹1375$$

44. (D) A.T.Q,

$$\text{M.R.P} = \frac{27 \times 400}{300} = 36$$

Now,

$$36\left(1 - \frac{x}{100}\right)^2 = 29.16$$

$$\Rightarrow 1 - \frac{x}{100} = 0.9$$

$\Rightarrow x = 10$

Now,

$$\frac{36 \times 110 \times 110}{100 \times 100} = 43.56$$

$\therefore$ Required percentage

$$= \frac{16.56 - 2.16}{2.16} \times 100$$

$= 666.67\%$

45. (A) A.T.Q,

25% $\Rightarrow$ 4 – 3

28% $\Rightarrow$ 25 – 18

35% $\Rightarrow$ 20 – 13

2000 702

$\therefore$ Required discount

$$= \frac{2000 - 702}{2000} \times 100 = 64.9\%$$

46. (B) Let the cost price for Sandeep = ₹x

A.T.Q,

$$\frac{x \times 120 \times 125 \times 130}{100 \times 100 \times 100} = 7800$$

$\Rightarrow x = 4000$

47. (C) A.T.Q,

Total cost price = ₹(60 × 15 + 100 × 16)

= ₹2500

$\therefore$ Required selling price = $\frac{2500 \times 125}{100 \times 160}$

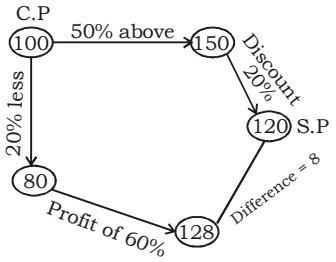
= ₹19.5/kg

48. (D) A.T.Q,

Required loss percentage = $\frac{25 \times 25}{100}$

$= 6.25\%$

49. (A) A.T.Q,



$\therefore$ Required percentage

$$= \frac{8}{120} \times 100 = 6.67\%$$

50. (D) A.T.Q,

$$\text{Required difference} = 0.9 - \frac{0.9}{100} = 0.891$$

51. (B) A.T.Q,

$$\text{Required sum} = \frac{\text{S.I} \times \text{T.D}}{\text{S.I} - \text{T.D}} = \frac{105 \times 100}{105 - 100}$$

= ₹2100

52. (C) A.T.Q,

Selling price all 52 apples

$$= \frac{1 \times 130}{100} = ₹1.30$$

$\therefore$ Required number of apples

$$= \frac{52}{1.30} \times 1 = 40$$

53. (D) A.T.Q,

$40^2 - 39^2 = (40 - 39)(40 + 39)$

Value of the expression = sum of number from 21 to 40

Required value

$$= \frac{40\times41}{2} - \frac{20\times21}{2} = 610$$

54. (B) A.T.Q,

$p + q = 2\cot A$ ..... (i)

$p - q = 2\cos A$ ..... (ii)

Multipling equation (i) and (ii), we get

$p^2 - q^2 = 4\cot A.\cos A$

and,

$pq = \cot^2 A - \cos^2 A$

$$\Rightarrow pq = \frac{\cos^2 A}{\sin^2 A} - \cos^2 A$$

$$\Rightarrow pq = \cos^2 A\left(\frac{1-\sin^2 A}{\sin^2 A}\right)$$

$\Rightarrow pq = \cos^2 A \cdot \cot^2 A$

$\Rightarrow \sqrt{pq} = \cos A \cot A$

$\therefore p^2 - q^2 = 4\sqrt{pq}$

55. (B) A.T.Q,

$A + B = 60°$ ..... (i)

$A - B = 30°$ ..... (ii)

Solving equation (i) and (ii), we get

$A = 45°$

and, $B = 15°$

56. (B) A.T.Q,

Minimum value $= -\sqrt{5^2+12^2} + 15 = 2$

Maximum value $= \sqrt{5^2+12^2} + 15 = 28$

57. (B) A.T.Q,

$3a = 2b + \sqrt{2a^2 + 4b^2}$

$\Rightarrow 3a - 2b = \sqrt{2a^2 + 4b^2}$

Squaring on both sides, we get

$(3a - 2b)^2 = 2a^2 + 4b^2$

$\Rightarrow 9a^2 + 4b^2 - 12ab = 2a^2 + 4b^2$

$\Rightarrow 7a^2 = 12ab$

$\therefore$ Required ratio = 12 : 7

58. (C) A.T.Q,

$(1 + \sec 65° + \cot 25°)(1 - \operatorname{cosec} 65° + \tan 25°)$

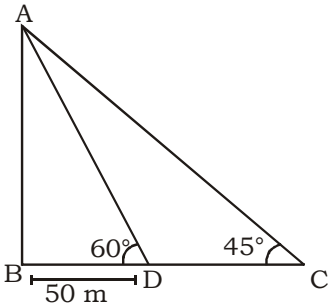
$$= \left(1 + \frac{1}{\sin 25°} + \cot 25°\right)\left(1 - \frac{1}{\cos 25°} + \tan 25°\right)$$

$$= \left(\frac{\sin 25° + \cos 25° + 1}{\sin 25°}\right)\left(\frac{\cos 25° + \sin 25° + 1}{\cos 25°}\right)$$

$$= \frac{(\sin 25° + \cos 25°)^2 - 1^2}{\sin 25°.\cos 25°}$$

$$= \frac{1 + 2\sin 25°.\cos 25° - 1}{\sin 25°.\cos 25°} = 2$$

59. (A) A.T.Q,



In ΔABD,

$$\frac{AB}{BD} = \tan 60°$$

$\Rightarrow AB = 50\sqrt{3}$ m

In ΔABC,

$$\frac{AB}{BC} = \tan 45°$$

$\Rightarrow BC = 50\sqrt{3}$ m

and,

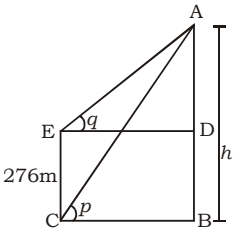
$DC = 50\sqrt{3} - 50$

$= 50\left(\sqrt{3} - 1\right)$ m $= \frac{73}{10}$ m

$\therefore$ Speed of boat $= \frac{73}{10}\times\frac{18}{5}$

$= 26.28$ km/hr

60. (C) A.T.Q,



In ΔADE,

$$\frac{AD}{DE} = \tan q$$

$$\Rightarrow \frac{5}{12} = \frac{h - 276}{DE}$$

$$\Rightarrow DE = \frac{12(h-276)}{5}$$

In ΔABC, $\frac{AB}{BC} = \tan p$

$\Rightarrow \frac{4}{5} = \frac{h}{BC}$

Now,

$\Rightarrow BC = \frac{5h}{4}$

Now, $\frac{12(h-276)}{5} = \frac{5}{4}h$

$\Rightarrow 23h = 276 \times 4 \times 12$

$\Rightarrow h = 576$

$\therefore$ AD = 576 – 276 = 300 m

Now,

$\frac{AD}{AE} = \frac{5}{13}$

$\Rightarrow$ AE = 780 m

61. (B) A.T.Q,

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

Dividing by $\sin^2\theta$

$2\text{cosec}^2\theta - 1 = 3\cot\theta$

$\Rightarrow 2\cot^2\theta + 1 = 3\cot\theta$

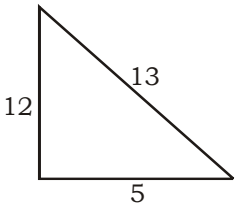
$\Rightarrow 2\cot^2\theta - 3\cot + 1 = 0$

$\Rightarrow 2\cot^2\theta - 2\cot\theta - \cot\theta + 1 = 0$

$\Rightarrow 2\cot\theta(\cot\theta - 1) - 1(\cot\theta - 1) = 0$

$\Rightarrow \cot\theta = \frac{1}{2}$ or 1

62. (C) A.T.Q,



$\sec\theta + \tan\theta = 5$ ..... (i)

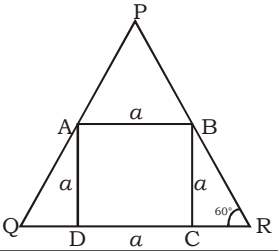
$\sec\theta - \tan\theta = \frac{1}{5}$ ..... (ii)

Solving equation (i) and (ii), we get

$\Rightarrow \sec\theta = \frac{13}{5}$

$\therefore \sin\theta = \frac{12}{13}$

63. (B) A.T.Q,



QR||AB

In ΔBCR,

$\frac{a}{CR} = \tan 60°$

$\Rightarrow CR = \frac{a}{\sqrt{3}}$

and, $CR = QD = \frac{a}{\sqrt{3}}$

$QR = a + \frac{a}{\sqrt{3}} + \frac{a}{\sqrt{3}} = \frac{(\sqrt{3}+2)a}{\sqrt{3}}$

Area of equilateral triangle

$= \frac{\sqrt{3}}{4}a^2\left(\frac{\sqrt{3}+2}{\sqrt{3}}\right)^2$

$= \frac{\sqrt{3}}{4}a^2 \times \left(\frac{7+4\sqrt{3}}{3}\right) = \left(\frac{7+4\sqrt{3}}{4\sqrt{3}}\right)a^2$

and, area of the square = a^2

$\therefore$ Required ratio = $a^2 : \frac{a^2(7+4\sqrt{3})}{4\sqrt{3}}$

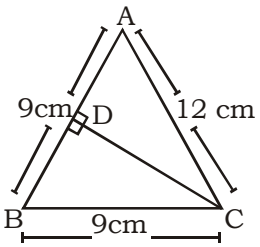
$= 4\sqrt{3} : 7 + 4\sqrt{3} = 173 : 348$

64. (B) A.T.Q,

Required number of diagonals

$= \frac{(10-3)(10)}{2} = 35$

65. (C) A.T.Q,



Semi-perimeter of triangle

$= \frac{9+9+12}{2} = 15$ cm

Area of triangle

$= \sqrt{15(6)(6)(3)} = 18\sqrt{5}$ cm^2

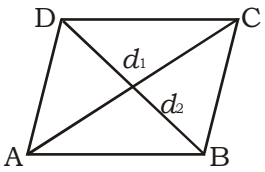
Now,

$18\sqrt{5} = \frac{1}{2} \times CD \times 9$

$\Rightarrow CD = 4\sqrt{5}$

$\therefore$ Length of altitude = $4\sqrt{5}$ cm

66. (C) A.T.Q,



$\frac{1}{2} d_1 \times d_2 = 120$

$\Rightarrow d_1 d_2 = 240\ cm$

and, side of the rombus

$= \frac{52}{4} = 13\ cm$

We know that

$d_1^2 + d_2^2 = 4a^2$

$\Rightarrow (d_1 + d_2)^2 - 2d_1 d_2$

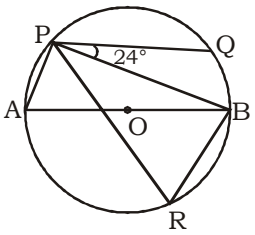
$= 4 \times 13 \times 13$

$\Rightarrow (d_1 + d_2)^2 = 676 + 480$

$= 1156$

$\therefore$ Required sum = 34 *cm*

67. (D) A.T.Q,



$\angle BPQ = \angle PBA = 24°$

(alternate interior angles)

and,

$\angle BPA = 90°$

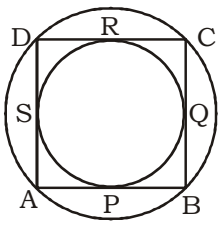
$\therefore \angle PAB = 180° - 90° - 24° = 66°$

$\Rightarrow \angle PAB$

$= \angle PRB = 66°$

(angles in the same segment)

68. (B) A.T.Q,



Radius of the outer circle = *a* cm

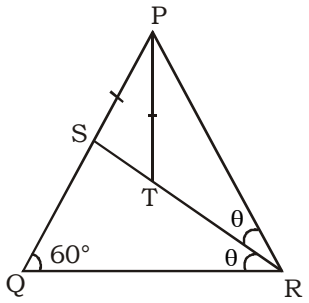
$\therefore$ Side of the ABCD = $\sqrt{2}a$

and,

radius of the inner circle = $\frac{a}{\sqrt{2}}$

$\therefore$ Required ratio = $2\pi a : \pi \left(\frac{a}{\sqrt{2}}\right)^2 = 4 : a$

69. (C) A.T.Q,



Let $\angle QRS = PRS = \theta$

$\angle PST = \angle PTS = 60° + \theta$

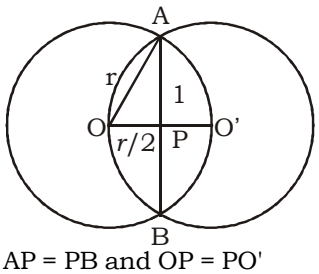
and,

$\angle PTR = 180° - 60° - \theta = 120° - \theta$

$\therefore \angle RPT = 180° - 120° + \theta - \theta$

$\Rightarrow \angle RPT = 60°$

70. (C) A.T.Q,



AP = PB and OP = PO'

Now,

In ΔAPO,

$AP^2 = OA^2 - OP^2$

$\Rightarrow AP^2 = r^2 - \left(\frac{r}{2}\right)^2$

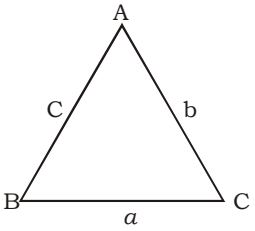
$\Rightarrow AP^2 = \frac{3r^2}{4}$

$\Rightarrow AP = \frac{\sqrt{3}r}{2}$

$AB = \sqrt{3}\, r$

$\therefore$ Required ratio = $\sqrt{3}\, r : r = \sqrt{3} : 1$

71. (D) A.T.Q,



$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

$\Rightarrow \frac{a}{\sin A} = \frac{b}{\sin B}$

$\Rightarrow \frac{\sin A}{\sin B} = \frac{a}{b}$

$\Rightarrow \frac{1}{2} = \frac{a}{b}$

and, $\frac{\sin B}{\sin C} = \frac{b}{c} \Rightarrow \frac{b}{c} = \frac{2}{\sqrt{2}}$

a : b : C

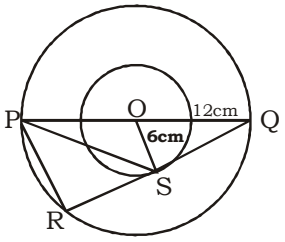
1 : 2

: 2 : $\sqrt{2}$

Ratio of sides = 2 : 4 : 2 $\sqrt{2}$

Required ratio = $\frac{4\times4}{8+4}$ = 4 : 3

72. (A) A.T.Q,



In Δ OSQ,

$QS^2 = OQ^2 - OS^2$

$\Rightarrow QS^2 = 12^2 - 6^2 = 108$

$\Rightarrow QS = 6\sqrt{3}$ cm

and, PR = 2 × OS

PR = 12 cm

Now,

In Δ PRS,

$\Rightarrow PS^2 = 144 + 108$

$\Rightarrow PS = \sqrt{252} = 6\sqrt{7}$ cm

73. (C) Let revolution done by front wheel = x

A.T.Q,

$x(45) = (x-6)(54)$

$\Rightarrow 45x = 54x - 324$

$\Rightarrow x = 36$

$\therefore$ Total distance travel = 36 × 45 = 1620 m

74. (B) A.T.Q,

$\frac{1}{2}(4x + 5x) \times 15 = 540$

$\Rightarrow 9x = 72$

$\therefore$ Required sum = 72 cm

75. (B) Let the length, breath and height of the box be x, y and z respectively.

A.T.Q,

$x + y + z = 14$

and,

$2(xy + yz + zx) = 98$

$\Rightarrow x^2 + y^2 + z^2 + 2xy + 2yz + 2zx = 196$

$\Rightarrow x^2 + y^2 + z^2 = 196 - 98 = 98$

$\therefore$ Required length of rod= $7\sqrt{2}$ cm

76. (B) A.T.Q,

$3\pi r^2 = 462$

$\Rightarrow r = 7$ cm

Now,

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

$\Rightarrow 14 = h$

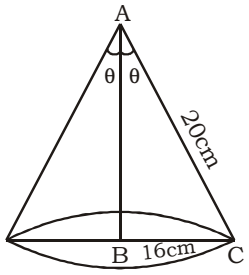
77. (B)

	A		B
Area $\rightarrow$	1	:	9
Radius $\rightarrow$	1	:	3
Volume $\rightarrow$	1	:	27

$\therefore$ Required percentage = $\frac{(27-1)}{27}\times100$

= 96.2%

78. (B) A.T.Q,



Circumference of the remaining sheet

= $\frac{288}{360} \times 2 \times \pi \times 20 = 32\pi$

$\therefore$ Circumference of base of the cone

$2\pi r = 32\pi \Rightarrow r = 16$

In ABC,

$AB^2 = (20)^2 - (16)^2$

$\Rightarrow AB = 12$ cm

$\therefore \cos\theta = \frac{12}{20} = \frac{3}{5}$

$\Rightarrow \theta = \cos^{-1}\left(\frac{3}{5}\right)$

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

79. (A) A.T.Q,

Total number of one side pointed

= 2[(6 – 2)(8 – 2) + (8 – 2) (10–2) + (10–2)(6–2)]

= 2[24 + 48 + 32] = 208

80. (A) A.T.Q,

Side of square = $\sqrt{1296}$ = 36 m

$\therefore$ Radius of circle = $\frac{36}{2}$ = 18m

and, length of rectangle = $18 \times \frac{2}{3}$ = 12m

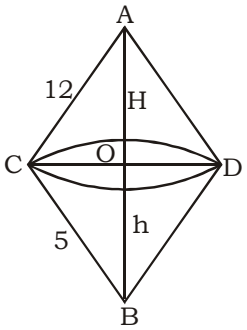
Now,

Breadth of rectangle = $13^2 - 12^2$ = 5m

Hence,

Perimeter of rectangle = 2(12 + 5) = 34 m

81. (A)



AB = $\sqrt{5^2+12^2}$ = 13 cm

Now,

In ABC,

$\frac{1}{2} \times 5 \times 12 = \frac{1}{2} \times 13 \times OC$

$\Rightarrow OC = \frac{60}{13}$ cm

$\Rightarrow r = \frac{60}{13}$ cm

$\therefore$ Volume of double cone

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

$= \frac{1}{3} \times \frac{22}{7} \times \frac{60}{13} \times \frac{60}{13} \times 13$

$= 290.10 \text{ cm}^3$

82. (C) Let the total distance = x km/hr.

A.T.Q,

$\frac{x}{15} - \frac{x}{21} = \frac{40}{60}$

$\Rightarrow \frac{7x-5x}{105} = \frac{40}{60}$

$\Rightarrow x = 35$

Let t is time at which he will reach office on time.

$t = \frac{35}{15} - \frac{24}{60} = \frac{29}{15}$ hr.

$\therefore$ Required speed

$= \frac{35}{29} \times 15 = 18\frac{3}{29}$ km/hr.

83. (B) A.T.Q,

Ratio of their speed = 120 : 180 = 2 : 3

$\therefore$ They will meet at = $745 \times \frac{2}{5} + 1 = 299$

84. (C) Let the original speed = x km/hr

A.T.Q,

$\frac{x(x+6)}{6} \times \frac{20}{60} = \frac{x(x-4)}{4} \times \frac{40}{60}$

$\Rightarrow x^2 + 6x = 3x^2 - 12x$

$\Rightarrow 2x^2 = 18x$

$\Rightarrow x = 9$

$\therefore$ Required distance = $\frac{9(9+6)}{6}$ = 22.5 km

85. (D) A.T.Q,

Distance travel in first hour = P

Distance travel in second hour = $p \times \frac{2}{3}$

Distance travel in third hour

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

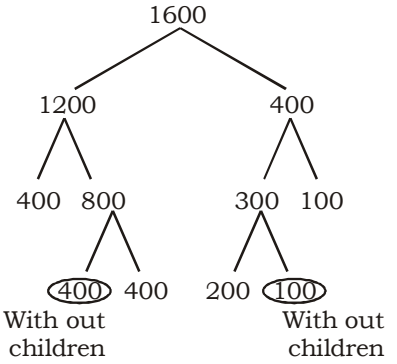
Maximum distance travel

$= \left[p + \frac{2p}{3} + \left(\frac{2}{3}\right)^2 p ..... \left(\frac{2}{3}\right)^n p \right]$

$= P\left[1 + \frac{2}{3} + \left(\frac{2}{3}\right)^2 ..... \right] = \frac{p}{1-\frac{2}{3}} = 3P$

86. (C) Let the total number of workers = 1600

A.T.Q,



$\therefore$ Required part = $\frac{1000}{1600} = \frac{10}{16} = \frac{5}{8}$

87. (B) Let the speed of man = x km/hr

the speed of current = y km/hr

and distance between A and C = 2a

A.T.Q,

$\frac{a}{x+y} + \frac{a}{x-y} = 12$ ..... (i)

and,

$\Rightarrow \frac{2a}{x+y} = 6$

$\Rightarrow \frac{a}{x+y} = 3$ ..... (ii)

From equation (i) and (ii)

$\frac{a}{x-y} = 9$ ..... (iii)

By solving equations (ii) and (iii)

$$\frac{x-y}{x+y} = \frac{1}{3}$$

$\Rightarrow 3x - 3y = x + y$

$\Rightarrow 2x = 4y$

$\Rightarrow \frac{x}{y} = \frac{2}{1}$

$\therefore$ Required ratio = 2 : 1

88. (A) A.T.Q,

Difference of ages of both sons

= 15 – 13 = 2 years

Ratio of distribution of amount

$$= \left(1+\frac{4}{100}\right)^2 = \left(\frac{26}{25}\right)^2 = \frac{676}{625}$$

$\therefore$ 1301 unit = 143110

Hence,

$$\text{Required difference} = \frac{143110}{1301}\times 51$$

= ₹ 5610

89. (C) Ratio of amount to principle in 3 years

$$= \frac{6000}{5000} = \frac{6}{5}$$

The amount after 15 years

$$= 6000 \times \frac{6}{5}\times\frac{6}{5} = ₹8640$$

90. (A) A.T.Q,

Principal – 1000

Ist year – 200

2nd year – 200 + 40

3rd years – 200 + 40 + 40 + 8

4th year – 200+40+40+40+8+8+8+1.6

$$\therefore \text{Requied ratio} = \frac{40\times 2+8}{40\times 3+8\times 3+1.6}$$

$$= \frac{55}{91}$$

91. (A) Let the amount invested in three banks x, y and z respectively.

	x	y	z
Rate –	6%	9%	12%
Time –	4	4	4
Amount –	$124x = 136y = 148z$		
	$31x = 34y = 37z$		

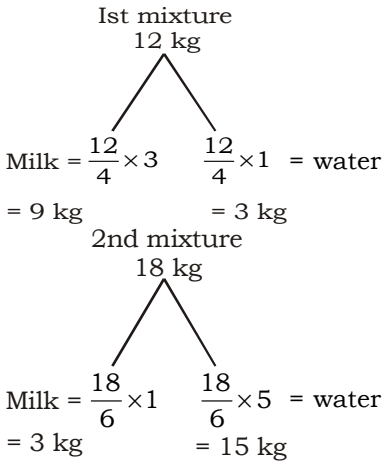
Ratio of principle = 34 × 37 : 31 × 37 : 31 × 34

= 1258 : 1147 : 1054

$\therefore$ Amount deposited in first bank

$$= \frac{345900}{3459}\times 1258 = ₹125800$$

92. (B) A.T.Q,



Let the quantity of pure milk be x kg.

$$\frac{x+9+3}{3+15} = \frac{4}{3}$$

$\Rightarrow 3x + 36 = 72$

$\Rightarrow x = 12$

$\therefore$ Weight of mixture = 12 + 18 + 12 = 42 kg

93. (B) Let the total number of articles be x

A.T.Q,

$$\frac{60}{x} - \frac{60}{x+3} = 1$$

$$\Rightarrow \frac{60x+180-60x}{x(x+3)} = 1$$

$\Rightarrow x^2 + 3x - 180 = 0$

$\Rightarrow x^2 + 15x - 12x - 180 = 0$

$\Rightarrow x(x + 15) - 12(x + 15) = 0$

$\Rightarrow x = 12$

Hence, Cost price of articles = $\frac{60}{12}$ = ₹5

94. (A) A.T.Q,

When we divide L.C.M by H.C.F

We get co-prime pairs.

$\therefore \frac{385}{5}$ Now, possible co-prime = 11, 7

$\therefore$ Required numbers

= 11 × 5 and 7 × 5 = 55 and 35

$\therefore$ Required sum = 90

95. (B) Let lady has x one-rupee notes and y 25-paise coins.

A.T.Q,

$$\Rightarrow \frac{2}{3}\left(x+\frac{y}{4}\right) = \left(\frac{4x+y}{4}\right) - \left(\frac{4y+x}{4}\right)$$

$\Rightarrow 8x + 2y = 9x - 9y$

$\Rightarrow x = 11y$

$$\Rightarrow \frac{x}{y} = \frac{11}{1}$$

Hence, Lady spends

= (11 × 1 + .25 × 1 – 11 × .25 + 1 × 1) = ₹7.50

96. (D) A.T.Q,

Total sum

$$= 6000 \times \frac{15}{100} \times \frac{7}{12} + 6000 \times \frac{1}{3} \times \frac{20}{100} +$$

$$6000 \times \frac{10}{100} \times \frac{7}{15} + 6000 \times \frac{30}{100} \times \frac{3}{10}$$

$$6000 \times \frac{25}{100} \times \frac{2}{5}$$

$\therefore$ Required average $= \frac{2345}{5} = 469$

97. (A) A.T.Q,

Required number of girls

$$= \left(6000 \times \frac{20}{100} \times \frac{2}{3} + 6000 \times \frac{25}{100} \times \frac{3}{5}\right)$$

$= 1700$

98. (A) Required difference

$$= \left(6000 \times \frac{25}{100} \times \frac{3}{5} - 6000 \times \frac{15}{100} \times \frac{5}{12}\right)$$

$= 525$

99. (C) A.T.Q,

Required ratio

$$= 6000 \times \frac{30}{100} \times \frac{7}{10} : 6000 \times \frac{10}{100} \times \frac{7}{15}$$

$= 9 : 2$

100. (B) A.T.Q,

Total number of girls

$$= 6000\left(\frac{15}{100} \times \frac{5}{12} + \frac{20}{100} \times \frac{2}{3} + \frac{10}{100} \times \frac{8}{15} + \frac{30}{100} \times \frac{7}{10} + \frac{25}{100} \times \frac{3}{5}\right)$$

$= 3655$

SSC TIER II (MATHS) MOCK TEST - 37 (ANSWER KEY)

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

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, also share your suggestions and experience of Sunday Mock

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