SSC TIER II (MATHS) MOCK TEST - 42 (SOLUTION)

1. (C) Le the two consecutive even numbers are x and $x + 2$
A.T.Q,
$x(x + 2) = 4224$
$\Rightarrow x^2 + 2x - 4224 = 0$
$\Rightarrow x^2 + 66x - 64x - 4224 = 0$
$\Rightarrow (x - 64)(x + 66) = 0$
$\Rightarrow x = 64$
$\therefore$ Square root of smaller number
$= \sqrt{64} = 8$

2. (B) Let the number is x
A.T.Q,
$16(3653 - x^2) = 34112$
$\Rightarrow 3653 - x^2 = 2132$
$\Rightarrow x^2 = 1521 \Rightarrow x = 39$
$\therefore$ Required number = 39

3. (D) A.T.Q,
$(n^3 - n)(n^2 - 9) = n(n^2 - 1)(n - 3)(n + 3)$
$= n(n - 1)(n + 1)(n - 3)(n + 3)$
Because $n > 3$ but $n = 4$
$= 4(3)(5)(1)(7) = 420$

4. (C) Given lines are
$7x - 4y + 6 = 0$ and $3x - 11y + 4 = 0$
$\therefore m_1 = \frac{7}{4}$ and $m_2 = \frac{3}{11}$
If the angle between the given lines is θ,
then $\tan\theta = \left|\frac{m_1 - m_2}{1 + m_1 m_2}\right|$
$\Rightarrow \tan\theta = \left|\frac{\frac{7}{4} - \frac{3}{11}}{1 + \frac{7}{4}\times\frac{3}{11}}\right|$
$\Rightarrow \tan\theta = 1 \Rightarrow \theta = 45°$

5. (D) A.T.Q,
$\frac{1}{18} + \frac{1}{54} + \frac{1}{108} + \frac{1}{180} + \frac{1}{270}$
$= \frac{1}{3\times6} + \frac{1}{6\times9} + \frac{1}{9\times12} + \frac{1}{12\times15} + \frac{1}{15\times18}$
$= \frac{1}{3}\left[\frac{1}{3} - \frac{1}{6} + \frac{1}{6} - \frac{1}{9} + \frac{1}{9} - \frac{1}{12} + \frac{1}{12} - \frac{1}{15} + \frac{1}{15} - \frac{1}{18}\right] = \frac{1}{3}\left[\frac{1}{3} - \frac{1}{18}\right]$
$= \frac{1}{3}\left[\frac{6-1}{18}\right] = \frac{1}{3}\times\frac{5}{18} = \frac{5}{54}$

6. (B) A.T.Q,
$= \sqrt{\frac{(0.4)^2 + (0.41)^2 + (0.041)^2}{(0.04)^2 + (0.041)^2 + (0.0041)^2}}$
$= \sqrt{\frac{\frac{4^2}{100} + \frac{41^2}{10000} + \frac{41^2}{1000000}}{\frac{4^2}{10000} + \frac{41^2}{1000000} + \frac{41^2}{100000000}}}$
$= \sqrt{\frac{100000000}{1000000}} = \sqrt{100} = 10$

7. (C) Let the number is x
A.T.Q,
$\therefore$ Required percentage
$= \frac{\frac{5}{4}x - \frac{4}{5}x}{\frac{5}{4}x} \times 100$
$= \frac{9x}{20} \times \frac{4}{5x} \times 100 = 36\%$

8. (D) A.T.Q,
L.C.M of 3, 6, 9, 12, 15 and 18 = 180
$\therefore$ The bell will toll together after every = 180sec (3min)
Hence,
In 45 minute , they will toll together
$= \frac{45}{3} + 1 = 16$ times

9. (A) A.T.Q,
$(9)^{21} \times (36)^4 \times (4)^8 \times 144 \times 169$
$= (3)^{42} \times 2^8 \times 3^8 \times (2)^{16} \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 13 \times 13$
Number of factor
$= 42 + 8 + 8 + 16 + 4 + 2 + 2 = 82$

10. (B) We known that HCF of
$(a^m - 1)$ and $(a^n - 1)$
$= (a^{\text{HCF of m and n}} - 1)$
A.T.Q,
$\therefore$ HCF of $(3^6 - 1)(3^8 - 1)$
$= (3^2 - 1) = 9 - 1 = 8$

11. (C) Value of 8th result
$= (8 \times 57 + 8 \times 65) - 15 \times 60 = 76$

12. (D) A.T.Q,
Total runs scored in 30 overs $= 30 \times 4.6$
$= 138$ runs
$\therefore$ Required run rate in last 20 overs
$= \frac{290 - 138}{20} = \frac{152}{20} = 7.6$ run

13. (C) A.T.Q,
Weight of the fourth man
= (80 × 4 – 84 × 3) = 68 kg
and
Weight of fifth man = 68 + 3 = 71kg
Now,
Total weight after replacing fifth to one of first three = 79 × 4 = 316 kg
Weight of two from first three = 316 – 68 – 71 = 177 kg.
Weight of replaced man = (84 × 3 – 177) = 75 kg

14. (B) $\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$

$\Rightarrow \frac{1\times1\times(6+4)}{1}$

$= \frac{1\times1\times(6+6+x)}{1\frac{1}{2}}$

$\Rightarrow 10 = \frac{(12+x)2}{3}$

$\Rightarrow 30 = 24 + 2x$

$\Rightarrow x = 3$

Hence, required time period = 3 hours

15. (D) A.T.Q
Total work = 25 × 7 = 175
Work done oby first man on first day = 5 units
Work done on the second day = 5 + 10 =15 units
Work done on the third day = 5 + 10 + 15 = 30 units
Work done on the fourth day = 5 + 10 + 15 + 20 = 50 units
Work done on the fifth day = 5 + 10 + 15 + 20 + 25 = 75 units
Work done in 5 days = 5 + 15 + 30 + 50 + 75 = 175 units
Hence, work will be finish in 5 days

16. (A) New solution = $300 \times \frac{60}{100} \times \frac{100}{40} = 450$
Required quantity = 450 – 300 = 150 gms

17. (A) A.T.Q,

	A	:	C
Efficiency –	4	:	3
Time–	3	:	4

1 unit = 3
∴ Number of days taken by A = 3 × 3 = 9 days.
and, Number of days taken by C = 3 × 4 = 12 days
Now,

	A	:	B	:	C
Time–			2	:	3
	A	:	B	:	C
Time	9	:	8	:	12

A — 9, B — 8, C — 12 → 72 ← 8, 9, 6

∴ Number of days taken by A to do the remaining work

$= \frac{72-(9+6)3}{8} = \frac{27}{8} = 3\frac{3}{8}$ days

18. (B) A.T.Q,

$\frac{150\times25}{\frac{1}{4}} = \frac{100\times60}{W_2} \Rightarrow W_2 = \frac{2}{5}$

Remaining work = $1 - \frac{1}{4} - \frac{2}{5} = \frac{7}{20}$

Now, $\frac{x\times35}{\frac{7}{20}} = \frac{150\times25}{\frac{1}{4}}$

$\Rightarrow x \times 20 \times 35$
$= 150 \times 25 \times 4 \times 7$
$\Rightarrow x = 150$
∴ Required number of men = 150

19. (C) Pipe$_1$ → 9, 2 → 18
Pipe$_2$ → 6, 3

Required time
$= \frac{18}{(3-2)} \times \frac{5}{6} = 15$ hours

20. (A) A.T.Q,

	B	:	A+C		C	:	A+B
Time –	5	:	2		3	:	1
Efficiency–	2	:	5	= 7× 4	1	:	3 = 4 × 7

1 unit = 3

Now,

Efficiency –	8	:	20 = 28		7	:	21 = 28

∴ Efficiency of A, B and C is 13, 8 and 7 respectively
∴ Time taken by A to finish the work alone

$= \frac{(13+8+7)\times12}{13} = 25\frac{11}{13}$ days

21. (B) A.T.Q,

$$\begin{matrix} A+B-9 \\ B+C-12 \end{matrix} \Big\rangle 36 \Big\langle \begin{matrix} 4 \\ 3 \end{matrix}$$

Wordk done by A and B in 5 days
$= 4 \times 5 = 20$ units
Work done by B and C in 3 days
$= 3 \times 3 = 9$ units

$\therefore$ Efficiency of C $= \frac{36-20-9}{7} = 1$

$\therefore$ Required number of days

$= \frac{36}{1} = 36$ days

22. (C) A.T.Q,
$5M + 7W = 1450$ ..... (i)
$3M + 4W = 850$ ..... (ii)
Solving equation (i) and (ii), we get
$W = 100$
and $M = 150$
6 men and 8 women earn in 9 days
$= (6 \times 150 + 8 \times 100) \times 9 = ₹15300$

23. (D) A.T.Q,
Now

	Milk	:	Water
Same 3×	4	:	3
4×	3	:	4

Now,

Milk	:	Water	
12	:	9	] 7units
12	:	16	]

$\therefore$ 7 units = 56 litre
1 units = 8 litre
$\therefore$ Required difference
$= 16 \times 8 - 12 \times 8 = 32$ litre

24. (C) A.T.Q,

$$\begin{matrix} \text{First candle} - 4 \\ \text{Second candle} - 5 \end{matrix} \Big\rangle 20 \Big\langle \begin{matrix} 5 \\ 4 \end{matrix}$$

$$\frac{20-5t}{20-4t} = \frac{3}{4}$$

$\Rightarrow 80 - 20t = 60 - 12t$

$\Rightarrow t = \frac{5}{2} = 2\frac{1}{2}$ hours

25. (B) A.T.Q,

$$\begin{matrix} 7 & & 9 \\ & 20 & \\ 3 & & 4 \end{matrix}$$

27 : 28

$\therefore$ Required ratio = 28 : 27

26. (A) Let the capacity two vessels = 18 litre

First vessel	Second vessel
Ist time	
18 liter milk	12 liter water

+ 6 liter milk

IInd time -	12 liter water
12 liter milk	+ 6 liter milk

+(4 liter water and 2 liter milk)

IIIrd time -	
14 liter milk +	8 liter water +
4 liter water	4 liter milk

$+\frac{14}{3}$ litre milk and 4/3 liter water
Now,
The quantity of milk and water in second vessel = $4+\frac{14}{3}$ and $8+\frac{4}{3}$

$\therefore$ Required ratio = $\frac{26}{3} : \frac{28}{3} = 13 : 14$

27. (A) A.T.Q,
Ratio of A and B investment
$= 2250 : 1500 = 3 : 2$

Profit of B = $\frac{420}{3} \times 2 = ₹280$

And, profit of C = $1260 - 420 - 280 = ₹560$
Hence, investment of C

$= \frac{2250}{420} \times 560 = ₹3000$

28. (D) A.T.Q,

A	:	B	:	C
2	:	3		
		4	:	5
8	:	12	:	15

$\therefore$ Ratio of investment of A, B and C
$= 8 : 12 : 15$
$\therefore$ The amount received by B

$= \frac{28000}{35} \times 12 = ₹\ 9600$

29. (C) A.T.Q,
Required difference = 300 – 30 = 270

30. (D) Let present age of B = x years
A.T.Q,
$x + 13 + 6 = (x - 2)4$
$\Rightarrow x + 19 = (x - 2)4$
$\Rightarrow 27 = 3x$
$\Rightarrow x = 9$
$\therefore$ Present age of A = 9 + 13 = 22 years

31. (C) A.T.Q,

Required average

$= \frac{50000+60000+40000+80000+70000}{5}$

$= \frac{300000}{5} = 60000$

32. (C) A.T.Q,

Required percentage $= \frac{10000}{60000} \times 100$

$= 16\frac{2}{3}\%$

33. (C) A.T.Q,

Required average

$= \frac{20000+30000+15000+40000+25000}{6}$

$= \frac{130000}{5} = 26000$

34. (C) A.T.Q,

Required ratio = 20000 : 10000 = 2 : 1

35. (A) A.T.Q,

Required average $= \frac{40000}{50000} \times 100 = 80\%$

36. (B) A.T.Q,

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

$\Rightarrow 16 = 4(x^2 + y^2 - xy)$

$\Rightarrow x^2 + y^2 - xy = 4$ ..... (i)

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

$\Rightarrow 16 - 3xy = 4$

$\Rightarrow xy = 4$ ..... (ii)

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

$x^2 + y^2 = 8$

Now,

$x^4 + y^4 = (x^2 + y^2)^2 - 2x^2y^2$

$\Rightarrow x^4 + y^4 = 64 - 32 \Rightarrow x^4 + y^4 = 32$

37. (D) A.T.Q,

$5 - 8x - x^2$

$= 5 - (x + 4)^2 + 16$

$= 21 - (x + 4)^2$

Hence, maximum value of the expression = 21

38. (B) A.T.Q,

$x + \frac{1}{x} = 4$

$\Rightarrow x^2 + \frac{1}{x^2} = 16 - 2$

$\Rightarrow x^2 + \frac{1}{x^2} = 14$

and,

$\Rightarrow x^3 + \frac{1}{x^3} = 64 - 12$

$\Rightarrow x^3 + \frac{1}{x^3} = 52$

Now,

$\left(x^2 + \frac{1}{x^2}\right) + \left(x^3 + \frac{1}{x^3}\right) = 14 + 52$

$\Rightarrow x^3 + \frac{1}{x^2} = 66 - 25$

$\Rightarrow x^3 + \frac{1}{x^2} = 41$

39. (B) A.T.Q,

$x^2 + \frac{1}{x^2} = \frac{17}{16}$

$\Rightarrow \left(x + \frac{1}{x}\right)^2 = \frac{17}{16} + 2$

$\Rightarrow x + \frac{1}{x} = \frac{7}{4}$

Now,

$\left(x + \frac{1}{x}\right)^3 = \left(\frac{7}{4}\right)^3$

$\Rightarrow x^3 + \frac{1}{x^3} = \frac{343}{64} - \frac{21}{4}$

$\Rightarrow x^3 + \frac{1}{x^3} = \frac{343 - 336}{64}$

$\Rightarrow x^3 + \frac{1}{x^3} = \frac{7}{64}$

40. (C) A.T.Q,

$2x = \sqrt{5} + \frac{1}{\sqrt{5}}$

$\Rightarrow x = \frac{5+1}{2\sqrt{5}} = \frac{3}{\sqrt{5}}$

$\Rightarrow x^2 = \frac{9}{5}$

$\Rightarrow x^2 - 1 = \frac{4}{5}$

Now,

$\frac{\sqrt{x^2-1}}{1-\sqrt{x^2-1}} = \frac{\sqrt{\frac{4}{5}}}{1-\sqrt{\frac{4}{5}}}$

$= \frac{\frac{2}{\sqrt{5}}}{\frac{\sqrt{5}-2}{\sqrt{5}}} = \frac{2}{\sqrt{5}-2} = 2\sqrt{5} + 4$

41. (A) A.T.Q,

$$\sqrt{55+\sqrt{76+\sqrt{11+\sqrt{180+\sqrt{256}}}}}$$

$$= \sqrt{55+\sqrt{76+\sqrt{11+\sqrt{180+16}}}}$$

$$= \sqrt{55+\sqrt{76+\sqrt{11+14}}}$$

$$= \sqrt{55+\sqrt{76+5}}$$

$$= \sqrt{55+9} = \sqrt{64} = 8$$

42. (D) A.T.Q,

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

$$\Rightarrow x^2 + \frac{2x}{3} + 1 = x^2 + \frac{1}{9} + \frac{2x}{3} + p^2$$

$$\therefore p^2 + \frac{1}{9} = 1$$

$$\Rightarrow p^2 = \frac{8}{9}$$

$$\Rightarrow p = \pm \frac{2\sqrt{2}}{3}$$

43. (A) A.T.Q,

$$\frac{4x-3y}{3x+4y} = \frac{6}{7}$$

$\Rightarrow 28x - 21y = 18x + 24y$
$\Rightarrow 10x = 45y$

$$\Rightarrow \frac{x}{y} = \frac{9}{2}$$

Now,

$$\left(\frac{\sqrt{x}+y}{\sqrt{x}-y}\right)^2 = \left(\frac{3+2}{3-2}\right)^2 = 25$$

44. (D) A.T.Q,

$a^2 + b^2 + c^2 + ab + bc + ca$

$$= \frac{1}{2}[(a+b)^2 + (b+c)^2 + (c+a)^2]$$

$$= \frac{1}{2}[(15)^2 + (11)^2 + (14)^2] = 271$$

45. (A) A.T.Q,

$x \sin\theta - \cos\theta = 1$

put $\theta = 90°$

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

Now,

$x^2 - (1 + x^2)\cos\theta = (1)^2 - (1 + 1)(0) = 1$

46. (D) A.T.Q,

$$\cos\frac{\pi x}{4} = x^2 - 4x + 4$$

through option (D)

$\cos 90° = x^2 - 4x + 4$
$\Rightarrow 0 = (2)^2 - 4(2) + 4$
$\Rightarrow 0 = 4 - 8 + 4$
$\therefore$ Required value of $x = 2$

47. (C) A.T.Q,

$$\cot\theta = \frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta}$$

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

Now, Adding 1 on both sides, we get

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

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

$$\Rightarrow \operatorname{cosec}^2\theta = \frac{2}{(\cos\theta + \sin\theta)^2}$$

$$\Rightarrow \frac{1}{\sin\theta} = \frac{\sqrt{2}}{(\cos\theta + \sin\theta)}$$

$\Rightarrow \sin\theta + \cos\theta$

$= \pm\sqrt{2}\sin\theta$

48. (D) A.T.Q,

$\cos 24° + \cos 5° + \cos 175° + \cos 204° + \cos 300°$

$\Rightarrow \cos 24° + \cos 5° + \cos(180° - 5°) + \cos(180° + 24°) + \cos(360° - 60°)$
$= \cos 24° + \cos 5° - \cos 5° - \cos 24° + \cos 60° = \frac{1}{2}$

49. (C) A.T.Q,

$\cos 15° = \cos(45° - 30°)$

$\Rightarrow \cos(45° - 30°)$
$= \cos 45° \cos 30° + \sin 45° \sin 30°$

$$\Rightarrow \cos(45° - 30°) = \frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}} \times \frac{1}{2}$$

$$\Rightarrow \cos 15° = \frac{\sqrt{3}+1}{2\sqrt{2}}$$

and,

$$\cos 15° = \frac{\sqrt{3}+1}{2\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{6}+\sqrt{2}}{4}$$

50. (C) A.T.Q,

$\cot\theta + \cos\theta = p$ ..... (i)

and,

$\cot\theta - \cos\theta = q$ ..... (ii)

Now,

$p^2 = \cot^2\theta + \cos^2\theta + 2\cot\theta\cos\theta$ ..... (iii)

and,

$q^2 = \cot^2\theta + \cos^2\theta - 2\cot\theta\cos\theta$ ..... (iv)

Solving equation (iii) and (iv), we get

$p^2 - q^2 = 4\cot\theta\cos\theta$

$\Rightarrow p^2 - q^2 = 4\sqrt{\cot^2\theta\cos^2\theta}$

$\Rightarrow p^2 - q^2 = 4\sqrt{\cot^2\theta(1-\sin^2\theta)}$

$\Rightarrow p^2 - q^2 = 4\sqrt{\cot^2\theta - \cos^2\theta}$

$\Rightarrow p^2 - q^2 = 4\sqrt{(\cot\theta - \cos\theta)(\cot\theta + \cos\theta)}$

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

51. (B) A.T.Q,

$\theta = 30°$

$\frac{1}{2}\sqrt{1+\cos\theta} - \frac{1}{2}\sqrt{1-\cos\theta}$

$= \frac{1}{2}\sqrt{1+\cos 30°} - \frac{1}{2}\sqrt{1-\cos 30°}$

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

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

$= \frac{1}{2\sqrt{2}}\left[\sqrt{2+\sqrt{3}} - \sqrt{2-\sqrt{3}}\right]$

$= \frac{1}{4}\left[\sqrt{4+2\sqrt{3}} - \sqrt{4-2\sqrt{3}}\right]$

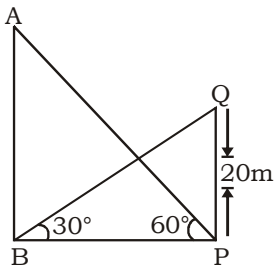
$= \frac{1}{4}\left[\sqrt{\left(1+\sqrt{3}\right)^2} - \sqrt{\left(\sqrt{3}-1\right)^2}\right]$

$= \frac{1}{4}[1 + \sqrt{3} - \sqrt{3} + 1] = \frac{1}{2}$

and, $\cos 60° = \frac{1}{2}$

$\therefore \frac{1}{2}\sqrt{1+\cos\theta} - \frac{1}{2}\sqrt{1-\cos\theta} = \cos 2\theta$

52. (B) A.T.Q,



In BPQ,

$\frac{PQ}{PB} = \tan 30°$

$\Rightarrow BP = 20\sqrt{3}$ m

Now, In ΔABP

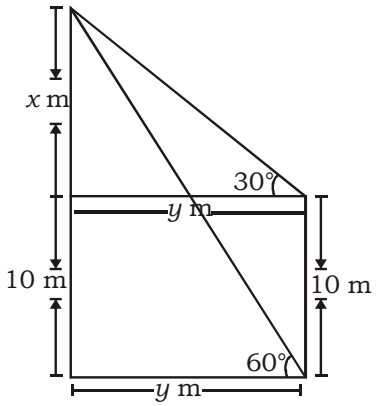
$\frac{AB}{BP} = \tan 60°$

$\Rightarrow AB = 20\sqrt{3} \times \sqrt{3}$

$\Rightarrow AB = 60$ m

$\therefore$ Height of the tower = 60 m

53. (D) A.T.Q,



$\frac{x}{y} = \tan 30°$

$\Rightarrow y = \sqrt{3}\,x$ ..... (i)

and,

$\frac{10+x}{y} = \tan 60°$

$\Rightarrow y = \frac{10+x}{\sqrt{3}}$ ..... (ii)

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

$\sqrt{3}\,x = \frac{10+x}{\sqrt{3}}$

$\Rightarrow 3x = 10 + x$

$\Rightarrow x = 5$

$\therefore$ Height of the tower = 10 + 5 = 15 m

54. (A) A.T.Q,

Initial	Final
20	21
20	21
20	21
8000	9261
×32 ↓	×32 ↓
256000	296352

∴ Total population on Ist January 2008 = 296352

55. (B) Let the original fraction = $\frac{x}{y}$

A.T.Q,

$$\frac{\frac{x\times125}{100}}{\frac{y\times96}{100}} = \frac{5}{3}$$

$\Rightarrow 25x = 32y$

$\Rightarrow \frac{x}{y} = \frac{32}{25}$

56. (C) A.T.Q,
Students failed in English = (100 – 65) = 35%
Students failed in Mathmatics = (100 – 75) = 25%
Total number of students passed in both the subjects = 100 – [35 + 25 – 15] = 55%
∴ Total number of students appeared in the examination = $\frac{3300}{55}\times100$ = 6000

57. (D) A.T.Q,

	C. P	S. P
First article	4 × 37	3 ×37
Second article	25 × 3	37 ×3 → 111

Now,

First article	148	111
second article	75	111

223 units = 1784

∴ 148 units $\frac{1784}{223}\times 148 = 1184$

∴ Cost price of first article = ₹1184

58. (A) Let C.P of 1 cm cloth = 1 unit
A.T.Q,
112 CP = 100
96 SP = 100
Now,
672 CP = 600
672 SP = 700
And, selling cash payment

$= \frac{700\times95}{100}$ = 665 units

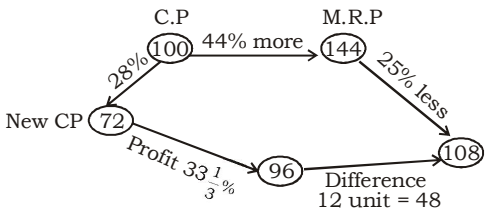
∴ Required profit %

$= \frac{65}{600}\times100$ = 10.8%

59. (C) Let the cost price of radio = ₹x
A.T.Q,
$750 - x = x - 530$
$\Rightarrow 2x = 1280$
$\Rightarrow x = 640$
∴ Cost price of radio = ₹640
∴ Required profit

$= \frac{960-640}{640}\times100$ = 50%

60. (A)



A.T.Q,
∴ Cost price of the article

$= \frac{48}{12}\times100$ = ₹400

61. (B) A.T.Q,

Required selling price = $\frac{500\times100\times120}{80\times100}$

= ₹750

62. (C) A.T.Q,

Cost price of 45 toffees = $\frac{100\times100}{96}$

$= \frac{625}{6}$ paise

Selling price at 8% profit

$= \frac{625}{6}\times 108$ = 112.50 paise

∴ Required number of toffees

$= \frac{45}{112.50}\times100$ = 40

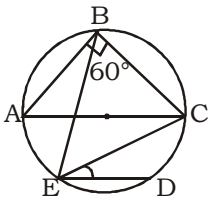
63. (B) A.T.Q,

Price	Apples
3	10 ×4
3	8 ×5 × 2
12	40
30	80

Selling price of 120 apples = 24 × 2 = ₹48

$\therefore$ Profit percentage = $\frac{6}{42}\times 100 = 14.28\%$

64. (D) A.T.Q,



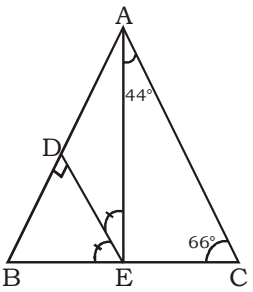
$\angle ABC = 90°$ (angle in segment)

$\angle ABE = 90° - 60° = 30°$

and, $\angle ABE = \angle ACE = 30°$

$\therefore \angle CED = \angle ACE = 30°$ (alternate interior angles)

65. (C) A.T.Q,



$\angle AEB = 66° + 44° = 110°$

and, $\angle BED = 55°$

$\therefore \angle ABC = 180° - 90° - 55° = 35°$

66. (B) A.T.Q,

H = 12 × 2 = 24 cm

We know that

$\frac{P+B-H}{2}$ = r (In radius)

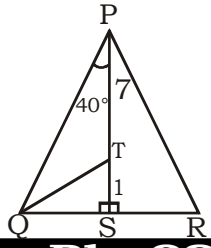
$\Rightarrow$ P + B – 24 = 6 × 2

$\Rightarrow$ P + B = 36 cm

$\therefore$ Required perimeter = P + B + H

= 36 + 24 = 60 cm

67. (C) A.T.Q,



In $\angle PQS = 180° - 90° - 40° = 50°$

and, $\frac{\tan\angle PRQ}{\tan\angle SQT} = \frac{PS}{SR}\times\frac{QS}{ST} = 8$

$\Rightarrow \frac{8}{SR}\times\frac{QS}{1} = 8$

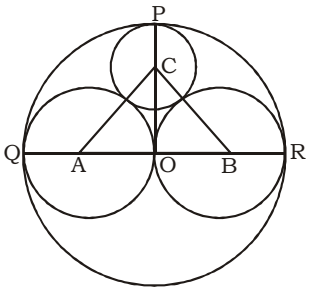
$\Rightarrow$ QS = SR

Hence, it an isosceles triangle

$\Rightarrow$ PQ = PR

$\therefore \angle PRQ = 50°$

68. (B) A.T.Q,



Let the radius of fourth circle = r

In ΔCOB

$OC^2 = BC^2 - OB^2$

$\Rightarrow (OP - PC)^2 = (2 + r)^2 - (2)^2$

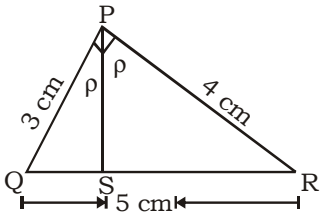
$\Rightarrow r^2 + 16 - 8r = 4 + r^2 + 4r - 4$

$\Rightarrow 12r = 16$

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

$\therefore$ Radius of the fourth circle = $\frac{4}{3}$cm

69. (D) A.T.Q,



In ΔPQS

$\frac{QS}{\sin\theta} = \frac{PS}{\sin Q}$

$\Rightarrow PS = \frac{\sin Q}{\sin\theta}\cdot QS$ ..... (i)

and, $PS = \frac{\sin R}{\sin\theta}\cdot RS$ ..... (ii)

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

$\frac{\sin Q}{\sin R} = \frac{RS}{QS}$ ..... (iii)

Now,

$\angle Q + \angle R = 90°$

$\sin R = \sin (90° - Q)$

$\Rightarrow \sin R = \cos Q$ ..... (iv)

From equation (iii) and (iv), we get

$\frac{RS}{QS} = \tan Q$

Now,

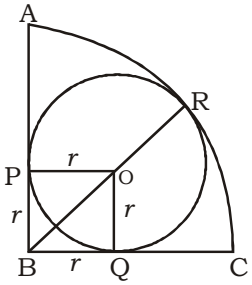
$\frac{RS}{QS} = \frac{PR}{PQ} = \frac{4}{3}$

$\Rightarrow \frac{RS}{QS} + 1 = \frac{4}{3} + 1$

$\Rightarrow \frac{QR}{QS} = \frac{7}{3}$

$\Rightarrow QS = \frac{3}{7} \times 5 = 2.1$ cm

70. (D) A.T.Q,



Let the radius of inscribed circle = r cm

ΔPOB and ΔQOB are isosceles right angled triangle

$\therefore OB^2 = r^2 + r^2$

$\Rightarrow OB = \sqrt{2}\, r \Rightarrow BR = 2$ cm

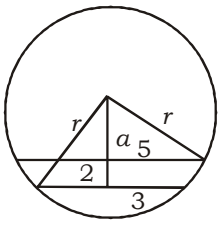
$\Rightarrow (OB + OR) = 2$

$\Rightarrow \sqrt{2}\, r + r = 2$

$\Rightarrow r = \frac{2}{\sqrt{2}+1}$

$\Rightarrow r = 2\left(\sqrt{2}-1\right)$ cm.

71. (B)



$\Rightarrow r^2 = 5^2 + a^2$

and $r^2 = 3^2 + (a + 2)^2$

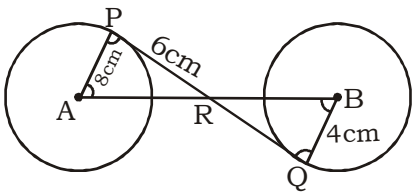
$\therefore 5^2 + a^2 = 3^2 + (a + 2)^2$

So, a = 3

$\Rightarrow r = \sqrt{5^2 + 3^2} = \sqrt{34}$

$\Rightarrow$ diameter $= 2\sqrt{34}$

72. (D) A.T.Q,



$\Delta PAR \sim \Delta QBR$

$\therefore \frac{AP}{BQ} = \frac{PR}{QR}$

$\Rightarrow \frac{8}{4} = \frac{6}{QR}$

$\Rightarrow QR = 3$ cm

In right angle triangle PAR

$AR^2 = 8^2 + 6^2 = 100$

$\Rightarrow AR = 10$ cm

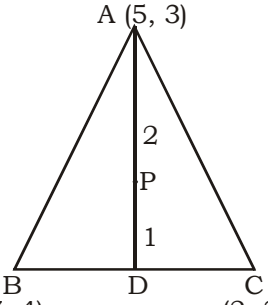
Now, In right angle $\angle BQR$

$BR^2 = 3^2 + 4^2 = 25$

$\Rightarrow BR = 5$ cm

Hence, length of AB = 10 + 5 = 15 cm

73. (C) A.T.Q,



$\therefore$ Coordinates of point D

$\left(\frac{7+2}{2}, \frac{4+3}{2}\right) = \left(\frac{9}{2}, \frac{7}{2}\right)$

Point P divides AD in 2 : 1

$\therefore$ Coordinates of point P

$= \left[\frac{2\times\frac{9}{2}+1\times5}{2+1}, \frac{2\times\frac{7}{2}+1\times3}{2+1}\right] = \left(\frac{14}{3}, \frac{10}{3}\right)$

74. (A) A.T.Q,

Total area of floor and roof

$= 2[12 \times 8] = 192$ m^2

Total area of four walls $= 5 \times 192 = 960$ m^2

Now, $2h(12 + 8) = 960$

$\Rightarrow h = \frac{960}{2\times20}$

$\Rightarrow h = 24$ m

$\therefore$ Volume of the go down

$= 12 \times 8 \times 24 = 2304$ m^3

75. (C) A.T.Q,

Length of the diagonal of cube = $42\sqrt{3}$ cm

$\therefore$ Side of cube = $\frac{42\sqrt{3}}{\sqrt{3}}$ = 42 cm

And, Radius of the sphere = $\frac{42}{2}$ = 21 cm

Surface area of sphere = $4 \times \frac{22}{7} \times 21 \times 21$

= 5544 cm^2

76. (D) A.T.Q,

Length of paralleopiped = 3 units

Breath of paralleopiped = 8 units

Height of paralleopiped = 9 units

Now,

Volume of cube (a^3) = 3 × 8 × 9

$\Rightarrow a^3 = 216$

$\Rightarrow a$ = 6 units

$\therefore$ Required ratio

$= \frac{2(3\times8+8\times9+9\times3)}{6\times6\times6} = \frac{246}{216} = \frac{41}{36}$

77. (C) Let rise in water level in = x

A.T.Q,

$\therefore l \times b \times h = 630$

$\Rightarrow h = \frac{630\times100\times100}{225\times175\times1000}$

$\Rightarrow$ h = .16 m

$\therefore$ Required rise in water level = 16 cm

78. (D) A.T.Q,

Distance travel in one round

$= \frac{1500}{60}\times9$ = 225 m

$\therefore 2(7x + 8x) = 225$

$\Rightarrow x = \frac{225}{30}$ = 7.5

$\therefore$ length of field = 7.5 × 7 = 52.5 m

Breath of field = 7.5 × 8 = 60 m

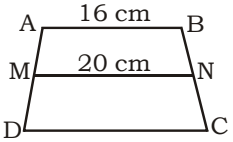
$\therefore$ Area of the field = 52.5 × 60 = 3150 m^2

79. (A) A.T.Q,

Required number of cubes

$= 4(l + b + h - 6) = 4(4 + 6 + 8 - 6] = 48$

80. (C) A.T.Q,



$MN = \frac{AB+CD}{2}$

$\Rightarrow 20 = \frac{16+CD}{2}$

$\Rightarrow$ CD = 40 – 16 = 24 cm

81. (C) Let the width of path = x m

A.T.Q,

$(36 - 2x)(30 - 2x) = (36 \times 30) - 920$

$\Rightarrow 1080 - 60x - 72x + 4x^2 = 1080 - 920$

$\Rightarrow 4x^2 - 132x + 920 = 0$

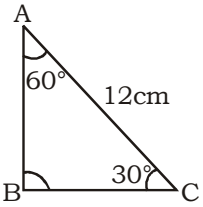
$\Rightarrow x^2 - 33x + 130 = 0$

$\Rightarrow (x - 10) + (x - 23) = 0$

$\Rightarrow x = 10$ and $x = 23$

$\therefore$ Width of the path = 10 m

82. (B) A.T.Q,



In ΔABC

$\frac{BC}{AC} = \cos 30°$

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

and, $\frac{AB}{BC} = \tan 30°$

$\Rightarrow$ AB = 6 cm

$\therefore$ Area of triangle

$= \frac{1}{2}\times6\times6\sqrt{3} = 18\sqrt{3}$ cm^2

83. (D) A.T.Q,

Distance covered in 45 sec

$= \frac{36\times45}{60} = 27$ m

Now,

$\pi r - 2r = 27$

$\Rightarrow r(\pi - 2) = 27$

$\Rightarrow r = \frac{27}{8}\times7$

$\Rightarrow$ r = 23.625 m

$\therefore$ Radius of the circular path = 23.625 m

84. (D) A.T.Q,

$4\% = \frac{4}{100} = \frac{1}{25}$

Principal	1000
First year	40
second year	40 + 1.6
Third year	40 + 1.6 + 1.6 + 0.064

Difference = 1.6 + 1.6 + 1.6 + 0.064

$\therefore$ 4.864 units = ₹14.592

$\therefore$ Required sum = $\frac{14.592}{4.864}\times1000$

= ₹3000

85. (C) A.T.Q,

Amount after 1 year on ₹3200 deposited on Ist January = $P\left(1+\frac{R/2}{100}\right)^{2T}$

$= 3200\left(1+\frac{15/2}{100}\right)^{2} = 3200\left(\frac{43}{40}\right)^{2}$

Amount after 1/2 year ₹3200 deposited

On Ist July = $3200\left(1+\frac{3}{40}\right)^{1}$

$= 3200\left(\frac{43}{40}\right)^{1}$

Total amount after 1 year

$= 3200\left(\frac{43}{40}\right)^{2} + 3200\left(\frac{43}{40}\right)$

$= 3200 \times \frac{43}{40} \times \frac{83}{40} =$ ₹7138

86. (D) A.T.Q,

Rate = $\frac{25\times100}{1000} = 2.5\%$

Total population after 3 years

$= 64000\left(1-\frac{5}{200}\right)^{3}$

$= 64000 \times \frac{39}{40}\times\frac{39}{40}\times\frac{39}{40} = 59319$

87. (A) A.T.Q,

Simple interest for 2 year

$= \frac{3600}{3}\times2 = 2400$

$\therefore$ Difference between compound interest and simple interest for 2 years

= 2550 – 2400 = ₹150

and,

SI for 1 year = ₹1200

$\therefore$ Rate % = $\frac{150}{1200}\times100 = \frac{25}{2}\%$

Now, $\frac{25}{2}\%$ of sum = ₹1200

$\therefore$ Required sum = $\frac{1200}{25}\times2\times100$

= ₹9600

88. (B) ATQ,

$\frac{8}{2}(6+7d) = \frac{2\times5}{2}(6+4d)$

$\Rightarrow 24 + 28d = 30 + 20d$

$\Rightarrow d = \frac{30-24}{28-20} = \frac{6}{8} = \frac{3}{4}$

Hence,

Required difference = 3/4

89. (D) Let the speed of second train = x m/s

Speed of first train = $\frac{210}{35}$ = 6 m/s

A.T.Q,

$\frac{2\times210}{x+6} = 15$

$\Rightarrow 420 = 15x + 90$

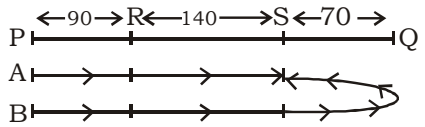
$\Rightarrow 15x = 330$

$\Rightarrow x$ = 22 m/sec

Required speed = $22 \times \frac{18}{5}$

= 79.2 km/h

90. (C)



Let the distance PQ = 300 km,

Distance PR = $\frac{300\times30}{100}$ = 90 km,

Distance SQ = $300 \times \frac{70}{300}$ = 70 km

So, RS = 300 – 160 = 140 km

First time Car A and B meets at R and second time they meet at S.

So, the ratio of speed

$\frac{S_A}{S_B} = \frac{140}{140+70+70}$

$\Rightarrow S_A : S_B = 1 : 2$

So, speed of both the Cars are x and $2x$.

A.T.Q,

$\frac{90}{x}-\frac{90}{2x}=1 \Rightarrow \frac{90\times1}{2x} = 1$

$\Rightarrow x$ = 45 km/h

Now, the speed of second Car (S_B)

= 2 × 45 = 90 km/h

time taken by Car B to cover PQ

$= \frac{300}{90} = 3\frac{1}{3}$ hour

91. (A) Let the speed of boat be x km/h and speed of the stream by y km/h
A.T.Q,
$$\frac{54}{x+y} + \frac{72}{x-y} = 9 \text{ ..... (i)}$$
And,
$$\frac{90}{x+y} + \frac{84}{x-y} = 12 \text{ ..... (ii)}$$
On solving equation (i) and (ii) we get,
$x + y = 18$ and $x - y = 12$
So,
$$x = \frac{18+12}{2} = 15 \text{ km/h}$$
$$y = \frac{18-2}{2} = 3 \text{ km/h}$$

92. (D) Let the speed of the train = x km/h
A.T.Q,
$$\frac{75}{x} - \frac{75}{x+5} = \frac{10}{60}$$
$$\Rightarrow \frac{75\times5}{x(x+5)} = \frac{1}{6}$$
$\Rightarrow x(x + 5) = 2250$
$\Rightarrow x^2 + 5x - 2250 = 0$
$\Rightarrow x = 45$
So, the original speed of train = 45 km/h

93. (C) Consider $(47^5 + 58^5 + 29^5 + 53^5)$
$= (47^5 + 29^5) + (58^5 + 53^5)$
We have, $(x^h + y^h)$ is always divided by $(x + y)$ if h is an odd numbers.
So, $(47^5 + 29^5)$ is divided by 76 and $(58^5 + 53^5)$ is divided by 111.
That's why, it will be divisible by 37.
$\therefore$ Remainder = 0

94. (B) Required average = 86 – 16 × 3 = 38

95. (B) Let original no. of cows = x
According to the question,
$$x \times \frac{94}{100} \times \frac{90}{100} = 1692$$
$\Rightarrow x = 2000$

96. (C) Total number of males in Haryana, Punjab and Himachal
$$= 2160000 \times \left(\frac{12}{100}\times\frac{3}{8} + \frac{20}{100}\times\frac{3}{4} + \frac{15}{100}\times\frac{3}{5}\right)$$
$$= 2160000 \times \frac{1140}{4000} = 615600$$
Required percentage
$$= \frac{615600}{2160000}\times100 = 28.5\%$$

97. (B) Required number
$$= \left(2160000\times\frac{25}{100}\times\frac{3}{8}\right) + \left(2160000\times\frac{20}{100}\times\frac{1}{4}\right)$$
$= 202500 + 108000 = 310500$

98. (A) Required ratio
$$= \frac{2160000\times\frac{11}{100}\times\frac{3}{7}}{2160000\times\frac{8}{100}\times\frac{2}{3}} = \frac{11\times3\times3}{7\times8\times2} = \frac{99}{112}$$

99. (C) Required number = $2160000 \times \frac{12}{100}\times\frac{3}{8}$
$= 97{,}200$

100. (D) Required ratio
$$= \frac{2160000\times\frac{9}{100}\times\frac{100}{110}}{2160000\times\frac{20}{100}\times\frac{100}{121}} = \frac{9\times121}{20\times110} = 99:200$$

SSC TIER II (MATHS) MOCK TEST - 42 (ANSWER KEY)

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