SSC CHSL - CHT1 : 180233 GRAND TEST HINTS AND SOLUTIONS

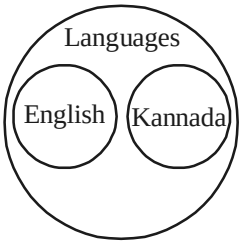
ANSWER KEY

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

1. (3) We pay rent for accommodation. Similarly, we pay fare for journey.
2. (1) $(1)^2 = 1$; $(3)^2 = 9 \Rightarrow 19$
   Similarly, $(2)^2 = 4$; $(1)^2 = 1 \Rightarrow 41$
3. (1) A E Z → F P Y
   +5, +11, −1
   Similarly,
   B G X → G R W
   +5, +11, −1
4. (4) Nephron is the basic structural and functional unit of the kidney. Similarly, neron is the basic structural and functional unit of the Central Nervous System.
5. (3) Kidnap is different from other three words.
6. (4) Major, Colonel and Brigadier are different ranks in the Indian Army. Admiral is the topmost rank in the Indian Navy.
7. (2) $S \xrightarrow{-3} P$
   $N \xrightarrow{-2} L$
   $Z \xrightarrow{-3} W$
   $T \xrightarrow{-3} Q$
8. (1) Except Life Insurance Corporation, all other are insurance companies for general insurance, i.e., for vehicles, property etc.
9. (1) $D \xrightarrow{+4} H \xrightarrow{+4} L \xrightarrow{+4} \boxed{P} \xrightarrow{+4} T$
   $A \xrightarrow{+4} E \xrightarrow{+4} I \xrightarrow{+4} \boxed{M} \xrightarrow{+4} Q$
10. (4) 21 + 7 = 28
    28 + 5 = 33
    33 + 3 = $\boxed{36}$
    36 + 1 = 37
    37 – 1 = 36
    Therefore, the number 35 is wrong in the series.
11. (1) 5 + 8 = 13
    13 + 16 = 29
    29 + 32 = 61
    61 + 64 = $\boxed{125}$
    125 + 128 = 253.
    Therefore, the number 120 is wrong in the series.
12. (2) First Column $1 + 8 + 27 = 36 \Rightarrow 36 - 1^2 = 35$
    Second Column $216 + 125 + 64 = 405$
    $\Rightarrow 405 - 2^2 = 404$
    Third Column $343 + 512 + ? = 1575 + 3^2$
    $\Rightarrow 855 + ? = 1584$
    $\Rightarrow ? = 1584 - 855 = 729$.
13. (1) $a \nabla b \nabla c \Rightarrow a < b < c$
    Option (1), $a \Delta b \phi c \Rightarrow a > b \leq c$ or, $a < b \leq c$
    Option (2), $a \phi b + c \Rightarrow a \leq b = c$
    Option (3), $a \circ b + c \Rightarrow a > b = c$
    Option (4), $a \circ b \times c \Rightarrow a > b \geq c$
14. (4) 5 – 4 = 1; 4 – 3 = 1
    1 + 1 = 2
    6 – 0 = 6; 5 – 1 = 4
    6 + 4 = 10
    6 – 2 = 4; 7 – 2 = 5
    4 + 5 = $\boxed{9}$
15. (3) Option (1), $8 - 7 + 3 \times 5 = 35 \Rightarrow 7 + 8 - 3 \times 5 = 35$
    $\Rightarrow 7 + 8 - 15 \neq 35$
    Option (2), $7 \times 8 + 6 - 9 = 25 \Rightarrow 8 \times 7 - 6 + 9 = 25$
    $\Rightarrow 56 - 6 + 9 \neq 25$

Option (3), $6+8\times2-7=0 \Rightarrow 6-7\times2+8=0$
$\Rightarrow 6-14+8=0$
Option (4), $8\times2+7-6=9 \Rightarrow 7\times2-8+6=9$
$\Rightarrow 14-14\neq9$

16. (4) English is different from Kannada. But both are included in the class languages.



17. (3) C is the father of B.
A is the wife of C.
B, E and F are sons of A and C.
D is a girl.
Male members $\Rightarrow$ A, B, E and F.

18. (3) There is no 'S' letter in the given word. Therefore, the word CONSCIENCE cannot be formed.
I N [C O N V E N I] E N [C] E
$\Rightarrow$ CONVINCE
I N [C O N V E N] I [E] N C E
$\Rightarrow$ CONVENE
I N [C O N V E] N [I] E N [C E]
$\Rightarrow$ CONCEIVE

19. (1) First Premise is Particular Affirmative (I-type).
Second Premise is Universal Affirmative (A-type).
All doctors are social workers.

Some social workers are politicians.
A + I $\Rightarrow$ No Conclusion.

20. (3) [a] c [d] b / d [a] c b / c d a [b] / a [c] d b / [d] a

21. (1)

F	L	A	T	T	E	R
↓	↓	↓	↓	↓	↓	↓
7	2	3	8	8	5	9

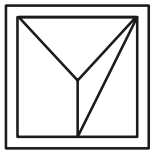
M	O	T	H	E	R
↓	↓	↓	↓	↓	↓
4	6	8	1	5	9

Therefore,

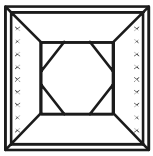
M	A	M	M	O	T	H
↓	↓	↓	↓	↓	↓	↓
4	3	4	4	6	8	1

22. (4)

23. (4)



24. (2)

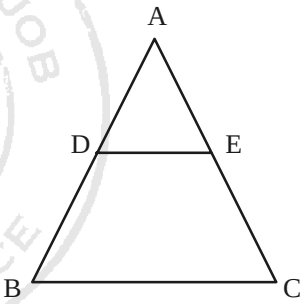


25. (1) B $\Rightarrow$ 01, 13, 20, 32, 44
E $\Rightarrow$ 56, 68, 75, 87, 99
A $\Rightarrow$ 03, 10, 22, 34, 41
K $\Rightarrow$ 57, 69, 76, 88, 95

Option	B	E	A	K
(1)	44	75	22	88
(2)	44	88	10	75
(3)	20	10	87	57
(4)	32	76	75	22

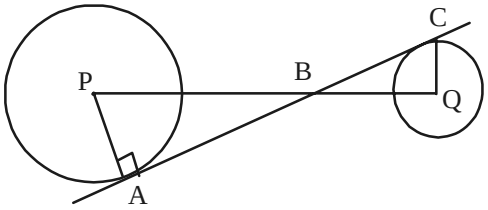
51. (1) $\because$ 30% $\cong$ Rs.30
$\therefore$ 100% $\cong$ Rs.100
$\therefore$ New S.P. = 100 – 30 = 70.

52. (4)



$\angle BAC = 40°,\ \angle ABC = 65°$
$\therefore \angle ACB = 180° - 40° = 75°$
DE || BC
$\therefore \angle AED = \angle ACB = 75°$
$\therefore \angle CED = 180° - 75° = 105°$

53. (4)



In ΔAPB and ΔBCQ
$\angle PAB = \angle BCQ = 90°$
$\angle PBA = \angle QBC$
By AA – similarity,
$\Delta APB \sim \Delta BQC$

$\therefore \frac{AB}{BC} = \frac{AP}{QC} \Rightarrow \frac{8}{BC} = \frac{6}{3} \Rightarrow BC = \frac{8\times3}{6} = 4$ cm

$\therefore PQ = \sqrt{AC^2 + (r_1 + r_2)^2} = \sqrt{(8+4)^2 + (6+3)^2}$

$= \sqrt{12^2 + 9^2} = \sqrt{144+81} = \sqrt{225} = 15$ cm.

54. (3) Single equivalent discount

$= \left(10 + 20 - \frac{10 \times 20}{100}\right)\% = (30 - 2)\% = 28\%$

$\therefore$ C.P. of article = 100 – 28 = ₹ 72

Actual cost price of article = $\frac{72 \times 110}{100}$ = ₹ 79.2.

$\therefore$ For a profit of 15%, required S.P.

= $\frac{79.2 \times 115}{100}$ = ₹ 91.08.

55. (3) $4a - \frac{4}{a} = -3$

On dividing by 4,

$\Rightarrow a - \frac{1}{a} = \frac{-3}{4}$

$\therefore a^3 - \frac{1}{a^3} = \left(a - \frac{1}{a}\right)^3 + 3a \times \frac{1}{a}\left(a - \frac{1}{a}\right)$

$= \left(\frac{-3}{4}\right)^3 + 3 \times \frac{-3}{4} = -\frac{27}{64} - \frac{9}{4} = \frac{-27-144}{64} = \frac{-171}{64}$

$\therefore a^3 - \frac{1}{a^3} + 3 = \frac{-171}{64} + 3 = \frac{-171+192}{64} = \frac{21}{64}$

56. (3) $x\sin^3\theta + y\cos^3\theta = \sin\theta.\cos\theta$

$\Rightarrow (x\sin\theta).\sin^2\theta + (y\cos\theta)\cos^2\theta = \sin\theta.\cos\theta$

$\Rightarrow x\sin\theta.\sin^2\theta + x\sin\theta.\cos^2\theta = \sin\theta.\cos\theta$

$\Rightarrow x\sin\theta(\sin^2\theta + \cos^2\theta) = \sin\theta.\cos\theta$

$\Rightarrow x = \cos\theta$

$\therefore x\sin\theta = y\cos\theta$

$\Rightarrow \cos\theta.\sin\theta = y\cos\theta$

$\Rightarrow y = \sin\theta$

$\therefore x^2 + y^2 = \cos^2\theta + \sin^2\theta = 1$

57. (3) Angle traced by hour hand in an hour = 30°

$\therefore$ Angle traced in $2\frac{1}{4}$ i.e. $\frac{9}{4}$ hours $= \frac{9}{4} \times 30° = \frac{135°}{2}$

Angle traced by minute hand in 60 minutes = 360°

$\therefore$ Angle traced in 15 minutes = $\frac{360}{60} \times 15 = 90°$

\ Required angle = $90° - \frac{135°}{2} = \frac{45°}{2} = 22\frac{1}{2}°$

58. (4) $x^4 + \frac{1}{x^4} = 23$

$\left(x^2 + \frac{1}{x^2}\right)^2 - 2 = 23 \Rightarrow \left(x^2 + \frac{1}{x^2}\right)^2 = 23 + 2 = 25$

$\therefore x^2 + \frac{1}{x^2} = 5$

$\therefore \left(x - \frac{1}{x}\right)^2 = x^2 + \frac{1}{x^2} - 2 = 5 - 2 = 3.$

59. (1) $1 + \cos^2\theta = 3\sin\theta.\cos\theta$

Dividing both sides by $\sin^2\theta$,

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

$\Rightarrow \text{cosec}^2\theta + \cot^2\theta = 3\cot\theta$

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

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

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

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

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

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

60. (3) Let the numbers be 2x and 3x respectively.

According to the question, $\frac{2x+8}{3x+8} = \frac{3}{4}$

$\Rightarrow 9x + 24 = 8x + 32$

$\Rightarrow 9x - 8x = 32 - 24 = 8$

$\Rightarrow x = 8$

$\therefore$ Sum of numbers = 2x + 3x = 5x = 5 × 8 = 40.

61. (2) Points (a, b) and [(a + 3), (b + k)] will satisfy the equation.

x – 3y + 7 = 0

$\therefore$ a – 3b + 7 = 0 ...(i)

and a + 3 – 3 (b + k) + 7 = 0

$\Rightarrow$ a + 3 – 3b – 3k + 7 = 0

$\Rightarrow$ a – 3b + 7 + 3 – 3k = 0

$\Rightarrow$ 3 – 3k = 0 $\Rightarrow$ 3k = 3

$\Rightarrow k = \frac{3}{3} = 1$ [$\because$ a = –3, b + 70]

62. (4) $\frac{\frac{2}{3}\pi r_1^3}{\frac{2}{3}\pi r_2^3} = \frac{6.4}{21.6} \Rightarrow \frac{\pi r_1^3}{\pi r_2^3} = \frac{6.4}{21.6} = \left(\frac{4}{6}\right)^3 = \left(\frac{2}{3}\right)^3$

$\Rightarrow \frac{r_1}{r_2} = \frac{2}{3}$

63. (1) $x^2 + y^2 + z^2 = 2(x + z - 1)$

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

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

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

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

$[\because a^2 + b^2 + c^2 = 0 \Rightarrow a = 0, b = 0, c = 0]$

$\therefore x - 1 = 0 \Rightarrow x = 1$

$y = 0$

$z - 1 = 0 \Rightarrow z = 1$

$\therefore x^3 + y^3 + z^3 = 1 + 0 + 1 = 2$

64. (2) $\dfrac{\sec\theta + \tan\theta}{\sec\theta - \tan\theta} = 2\dfrac{51}{79} = \dfrac{158+51}{79} = \dfrac{209}{79}$

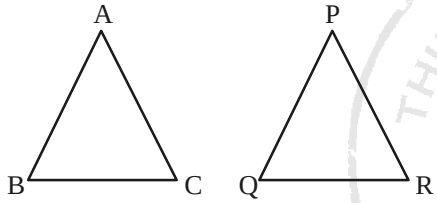
By componendo and divdendo,

$$\frac{\sec\theta + \tan\theta + \sec\theta - \tan\theta}{\sec\theta + \tan\theta - \sec\theta + \tan\theta} = \frac{209 + 79}{209 - 79}$$

$$\Rightarrow \frac{2\sec\theta}{2\tan\theta} = \frac{288}{130} \Rightarrow \frac{\sec\theta}{\tan\theta} = \frac{144}{65}$$

$$\therefore \sin\theta = \frac{\tan\theta}{\sec\theta} = \frac{65}{144}$$

65. (1)



The ratio of the areas of two similar triangles is equal to the ratio of squares of any two corresponding sides.

$$\therefore \frac{\text{Area of } \Delta PQR}{\text{Area of } \Delta ABC} = \frac{PR^2}{AC^2}$$

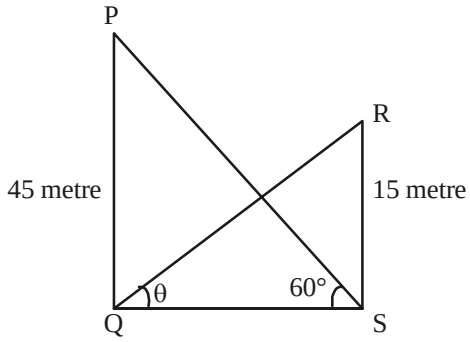
$$\Rightarrow \frac{PR^2}{AC^2} = \frac{256}{441} = \frac{12^2}{AC^2} = \frac{256}{441}$$

Taking square roots of both sides, $\dfrac{12}{AC} = \dfrac{16}{21}$

$$\Rightarrow 16 \times AC = 12 \times 21$$

$$\Rightarrow AC = \frac{12 \times 21}{16} = \frac{63}{4} = 15.75 \text{ cm}$$

66. (2)



PQ = Tower A = 45 metre

RS = Tower B = 15 metre

QS = x metre (let)

$\angle PSQ = 60°$; $\angle RQS = \theta$

From ΔPQS, $\tan\theta 60° = \dfrac{PQ}{QS}$

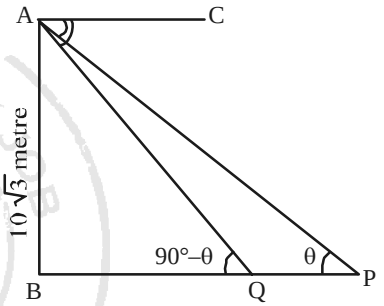
$$\Rightarrow \sqrt{3} = \frac{45}{x} \Rightarrow \sqrt{3}x = 45 \Rightarrow x = \frac{45}{\sqrt{3}} = 15\sqrt{3} \text{ metre}$$

From ΔRSQ, $\tan\theta = \dfrac{RS}{QS} = \dfrac{15}{15\sqrt{3}}$

$$\Rightarrow \tan\theta = \frac{1}{\sqrt{3}} \Rightarrow \tan\theta = \tan 30° \Rightarrow \theta = 30°$$

$$\therefore \sin\theta = \sin 30° = \frac{1}{2}$$

67. (3)



AB = Building = $10\sqrt{3}$ metre

PQ = 20 metre

BQ = x metre (let)

If $\angle APB = \theta$ then $\angle AQB = 90° - \theta$

From ΔABP,

$$\tan\theta = \frac{AB}{BP} = \frac{10\sqrt{3}}{x + 20} \quad \text{...(i)}$$

From ΔABQ, $\tan(90° - \theta) = \dfrac{AB}{BQ}$

$$\Rightarrow \cot\theta = \frac{10\sqrt{3}}{x} \quad \text{...(ii)}$$

By multiplying both equations,

$$\tan\theta.\cot\theta = \frac{10\sqrt{3}}{x+20} \times \frac{10\sqrt{3}}{x}$$

$$\Rightarrow x^2 + 20x = 10 \times 10 \times 3 \Rightarrow x^2 + 20x - 300 = 0$$

$$\Rightarrow x^2 + 30x - 10x - 300 = 0$$

$$\Rightarrow x(x+30) - 10(x+30) = 0 \Rightarrow (x-10)(x+30) = 0$$

$\Rightarrow x = 10, \; x \neq -30$

$\therefore$ BP = 10 + 20 = 30 metre.

68. (1) $2-\cos^2\theta = 3\sin\theta.\cos\theta$

Dividing by $\cos^2\theta$

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

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

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

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

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

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

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

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

$$\Rightarrow \tan\theta=\frac{1}{2} \text{ or } 1.$$

69. (3) Required mass of lead

$$=8000\times\frac{60}{100}\times\left(1-\frac{3}{400}\right)$$

$$=8000\times\frac{60}{100}\times\frac{397}{400}=4764 \text{ kg.}$$

70. (3) Let the C.P. of article be Rs.100 and the marked price be ₹ x.

Case I

$$\frac{x\times 90}{100}=120\Rightarrow x=\frac{120\times 100}{90}=₹\ \frac{400}{3}$$

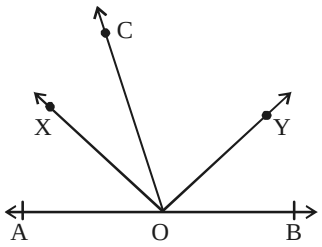
Case II

$$\text{S.P.} = \frac{x\times 80}{100}=₹\ \frac{4x}{5}=₹\left(\frac{4}{5}\times\frac{400}{3}\right)=₹\ \frac{320}{3}$$

$$\therefore \text{ Profit} = ₹\left(\frac{320}{3}-100\right)=₹\left(\frac{320-300}{3}\right)=₹\ \frac{20}{3}$$

$$\therefore \text{ Profit percent} = \frac{20}{3}\%=6\frac{2}{3}\%$$

71. (1)



OY is the bisector of $\angle$ AOC.

$\therefore \angle AOC = 2\angle COX$

OX is the bisector of $\angle$ BOC,

$\therefore \angle BOC = 2\angle COY$

$\therefore \angle AOC+\angle BOC = 2\angle COY+2\angle COX = 180°$

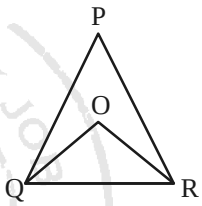
$\Rightarrow 2(\angle COX+\angle YOC)=180°$

$\Rightarrow \angle XOY = 90°$

$\therefore \angle AOX+\angle XOY+\angle BOY = 180°$

$\therefore \angle BOY = 180°-90°-20° = 70°$

72. (4)



$\angle QPR = 50°$

$\therefore \angle PQR+\angle PRQ = 180°-50° = 130°$

$$\therefore \frac{1}{2}\angle PQR+\frac{1}{2}\angle PRQ = 65°$$

The point of intersection of internal bisectors of angles is in-centre.

$$\therefore \angle OQR=\frac{1}{2}\angle PQR;\ \angle ORQ=\frac{1}{2}\angle PRQ$$

In ΔOQR, $\angle OQR + \angle QOR + \angle ORQ = 180°$

$\Rightarrow \angle QOR = 180°-65° = 115°$

73. (2) According to the question,

$\because$ Market tax $\cong$ Rs. 165 crores

$\therefore 33\% \cong$ Rs. 165 crores

$$\therefore 100-33=67\% \cong \frac{165\times 67}{33} = \text{Rs. 335 crores}$$

74. (1) $\because 100\% \cong$ Rs. 733 crores

$$\therefore 35+10=45\% \cong \frac{733}{100}\times 45 = \text{Rs. 329.85 crores}$$

75. (1) $\because 100\% \cong 360°$

$$\therefore 1\% \cong \frac{360°}{100}\Rightarrow 35\% = \frac{360°}{100}\times 35 = 126°$$