

**STATE TALENT SEARCH EXAMINATION-2017  
SCHOLASTIC APTITUDE TEST (SAT)\_ HINTS & SOLUTIONS**

1. Sol. (4)

2. Sol. (4)

3. Sol. (2)

4. Sol. (2)

5. Sol. (3)

6. Sol. (4)

7. Sol. (2)

$$g = \frac{Gm}{R^2}$$

$$\text{So } g_A > g_B$$

$$R_A < R_B$$

8. Sol. (4)

9. Sol. (1)

10. Sol. (4)

11. Sol. (4)

12. Sol. (1)

13. Sol. (2)

14. Sol. (1)

15. Sol. (1)

$$u = 15\text{cm}$$

$$f = -60$$

$$\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

$$-\frac{1}{15} + \frac{1}{v} = \frac{-1}{60} \Rightarrow v = +20\text{cm}$$

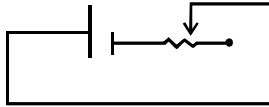
$$\text{Power} = \frac{1}{f} = 1.33\text{D}$$

16. Sol. (3)

17. Sol. (4)

18. Sol. (2)

19. Sol. (3)



20. Sol. (4)

21. Sol. (3)

22. Sol. (3)

23. Sol. (3)

24. Sol. (2)

25. Sol. (2)

26. Sol. (1)

Air is an example of Homogeneous mixtures and others are heterogeneous mixtures.

27. Sol. (3)

Dioxygen

O<sub>2</sub>

2 : 3

Ozone

O<sub>3</sub>

28. Sol. (1)

Mole = 2.5

$$2.5 = 2.5 = \frac{\text{Given Molecules}}{6.02 \times 10^{23}}$$

$$\text{Given Molecules} = 2.5 \times 6.02 \times 10^{23}$$

$$15.55 \times 10^{23}$$

29. Sol. (4)

Cl = 17

K, L

2, 8

L = 8

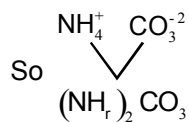
30. Sol. (3)

Sodium -24 is used for study of blood circulation.

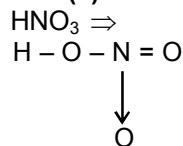
31. Sol. (2)

Ammonium = NH<sub>4</sub><sup>+</sup>

Carbonate = CO<sub>3</sub><sup>-2</sup>



32. Sol. (1)



33. Sol. (2) Formula of soda Ash =  $\text{Na}_2\text{CO}_3$

34. Sol. (3) Example of physical change = Melting of Ice

36. Sol. (1) Differential extraction is used to separate two immiscible liquids.

37. Sol. (1)  $\text{BF}_3$  has incomplete octet, so it will be considered as lewis acid.

38. Sol. (3) In aqua regia the ratio of  $\text{HNO}_3$  &  $\text{HCl}$  will be 1 : 3

39. Sol. (2) Decay of tooth enamel starts when pH is below 5.5

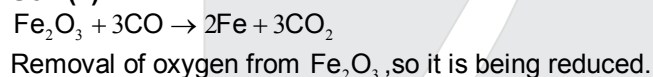
40. Sol. (1)

$$\begin{aligned} [\text{H}^+] &= 10^{-7} \\ \text{So pH} &= -\log [\text{H}^+] = -\log (10^{-7}) = 7 \log 10 \\ \text{pH} &= 7 \end{aligned}$$

41. Sol. (2)

Buna - S is polymer of butadiene & styrene.

42. Sol. (4)



43. Sol. (2)

Ionic compounds are insoluble in non- polar solvents.

44. Sol. (2)

Role of Mo in this reaction is as catalyst promoter.

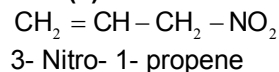
45. Sol. (4)

Fluorine is highest electronegative element in periodic table.

46. Sol. (3)

Fe shows variable valency

47. Sol. (2)



48. Sol. (3)



49. Sol. (2)

Mass of A = 7  
Mass of C = 39

$$\text{So Mass of B} = \frac{7 + 39}{2} = \frac{46}{2} = 23$$

50. Sol. (3)

The position of calcium in periodic table is second group and fourth period.

51. Sol. (2)

52. Sol. (1)

53. Sol. (4)

54. Sol. (3)

55. Sol. (3)

56. Sol. (2)

57. Sol. (1)

58. Sol. (4)

59. Sol. (3)

60. Sol. (2)

61. Sol. (4)

62. Sol. (3)

63. Sol. (3)

64. Sol. (2)

65. Sol. (3)

66. Sol. (3)

67. Sol. (3)

68. Sol. (3)

69. Sol. (1)

70. Sol. (4)

71. Sol. (2)

$$68 \times 9 \times 11 \times 9 \times 111 = 68 \times 81 \times 1111 \times 11 = 67313268$$

72. Sol. (1)

$$\left( \frac{1+2\sqrt{3}}{2+\sqrt{3}} \right) \left( \frac{2-\sqrt{3}}{2-\sqrt{3}} \right)$$

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

$$= -4+3\sqrt{3} = 29+3\sqrt{3}$$

$$2a = -4, b = 3$$

$$a = -2, b = 3$$

$$\therefore (a+b)^2 = (1)^2 = 1$$





**77. Sol. (2)**

$$\frac{x_2 + x_3}{2} = 0$$

$$\frac{y_1 + y_2}{2} = 2$$

$$\frac{x_1 + x_2}{2} = 1$$

$$\frac{y_2 + y_3}{2} = -1$$

$$\frac{x_3 + x_1}{2} = 2$$

$$\frac{y_3 + y_1}{2} = -1$$

$$\Rightarrow x_1 + x_2 + x_3 = 3 \text{ and}$$

$$\Rightarrow y_1 + y_2 + y_3 = 0$$

$\therefore$  centroid =

$$\frac{x_1 + x_2 + x_3}{3} = \frac{3}{3} = 1$$

$$\frac{y_1 + y_2 + y_3}{3} = \frac{0}{3} = 0$$

**78. Sol. (2)**

Sum at least 9

$$P(S \geq 9) = P(S = 9) + P(S = 10) + P(S = 11) + P(S = 12)$$

$$= \frac{4}{36} + \frac{3}{36} + \frac{2}{36} + \frac{1}{36}$$

$$= \frac{10}{36} = \frac{5}{18}$$

**79. Sol. (3)**

$$2(lb + bh + hl)$$

$$4l + 4b + 4h = 20$$

$$4(l + b + h) = 20$$

$$l + b + h = 5$$

$$l + b + h = 20$$

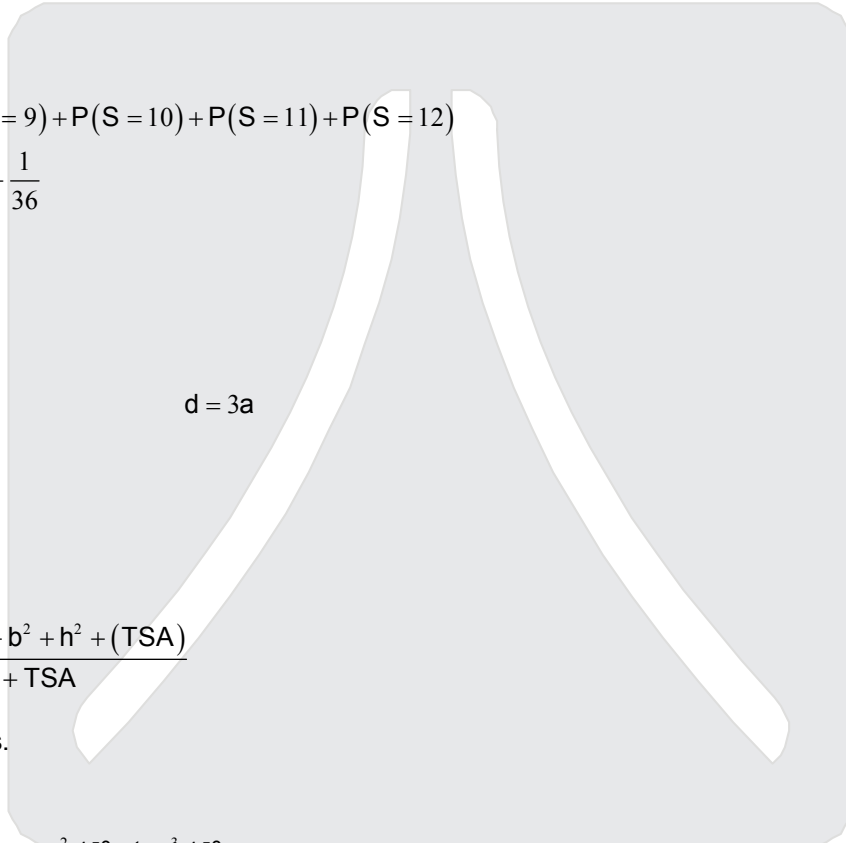
$$l^2 + b^2 + h^2 = 9$$

$$2(lb + bh + hl)$$

$$\frac{(l + b + h)^2 = l^2 + b^2 + h^2 + (TSA)}{25 = 9 + TSA}$$

$$25 = 9 + TSA$$

$$25 - 9 = 16 \text{ Ans.}$$



**80. Sol. (3)**

$$\sec 2x = \sin 30^\circ + \cos^2 45^\circ + \tan^3 45^\circ$$

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

$$\sec 2x = \frac{1}{2} + \frac{1}{2} + 1 = 2.$$

$$\cos 2x = \frac{1}{2} = \cos 60^\circ, \cos 120^\circ$$

$$2x = 60^\circ$$

$$x = 30^\circ$$

$$3x = 90^\circ$$

$$\sin 3x = \sin 90^\circ = 1$$

$$\operatorname{cosec} 3x = 1$$

**81. Sol. (2)**

$$\operatorname{cosec}\theta + \cot\theta = x$$

$$\operatorname{cosec}\theta - \cot\theta = \frac{1}{x}$$

$$- \quad + \quad -$$

$$2\cot\theta = x - \frac{1}{x}$$

$$\cot\theta = \frac{x^2 - 1}{2x}$$

$$\tan\theta = \frac{2x}{x^2 - 1} \Rightarrow \cos\theta = \frac{x^2 - 1}{x^2 + 1}$$

**82. Sol. (4)**

A.P.  $3, 6 + \sqrt{2}, 9 + 2\sqrt{2}, 12 + 3\sqrt{3}, \dots, (75 + 24\sqrt{2})$

$$a = 3$$

$$d = 6 + \sqrt{2} - 3 = 3 + \sqrt{2}$$

$$9 + 2\sqrt{2} - 6\sqrt{2} = 3 + \sqrt{2}$$

$$a' = 75 + (124\sqrt{2})$$

$$d' = -(3 + \sqrt{2})$$

$$T_5 = a' + 4d' = (75 + 24\sqrt{2}) + 4\{-3 - \sqrt{2}\} = 63 + 20\sqrt{2}$$

**83. Sol. (4)**

$$2x^2 + px - 150 \Rightarrow$$

$$+2(-5)^2 + p(-5) - 15 = 0$$

$$50 - 15 = 5p$$

$$35 = 5p = P =$$

$$7(x^2 + x) + k = 0$$

$$7x^2 + 7x + k = 0$$

$$D = 0 \quad 7^2 - 4(7)(k) = 0$$

$$49 = 28k$$

$$k = \frac{49}{4 \times 7} = \frac{7}{4}$$

**84. Sol. (1)**

$$4x^2 - x - 4 = 0$$

$$\alpha, \beta \quad \alpha + \beta = -\left(-\frac{1}{4}\right) = \frac{1}{4}$$

$$\alpha\beta = \frac{-4}{4} = -1$$

$$\frac{1}{\alpha}, \frac{1}{\beta} \quad s = \frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta} = \frac{\frac{1}{4}}{-1} = -\frac{1}{4}$$

$$p = \left(\frac{1}{\alpha}\right)\left(\frac{1}{\beta}\right) = \left(\frac{1}{-1}\right) = -1$$

$$x^2 - Sx + P = 0$$

$$x^2 - \left(-\frac{1}{4}\right)x + (-1) = 0$$

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

**85. Sol. (2)**

$$2\pi r - 2r = 15$$

$$2r(\pi - 1) = 15$$

$$2r\left(\frac{22}{7} - 1\right) = 15$$

$$2r\left(\frac{22-7}{7}\right) = 15$$

$$2r\left(\frac{15}{7}\right) = 15$$

$$2r = \frac{15 \times 7}{15}$$

$$2r = 7$$

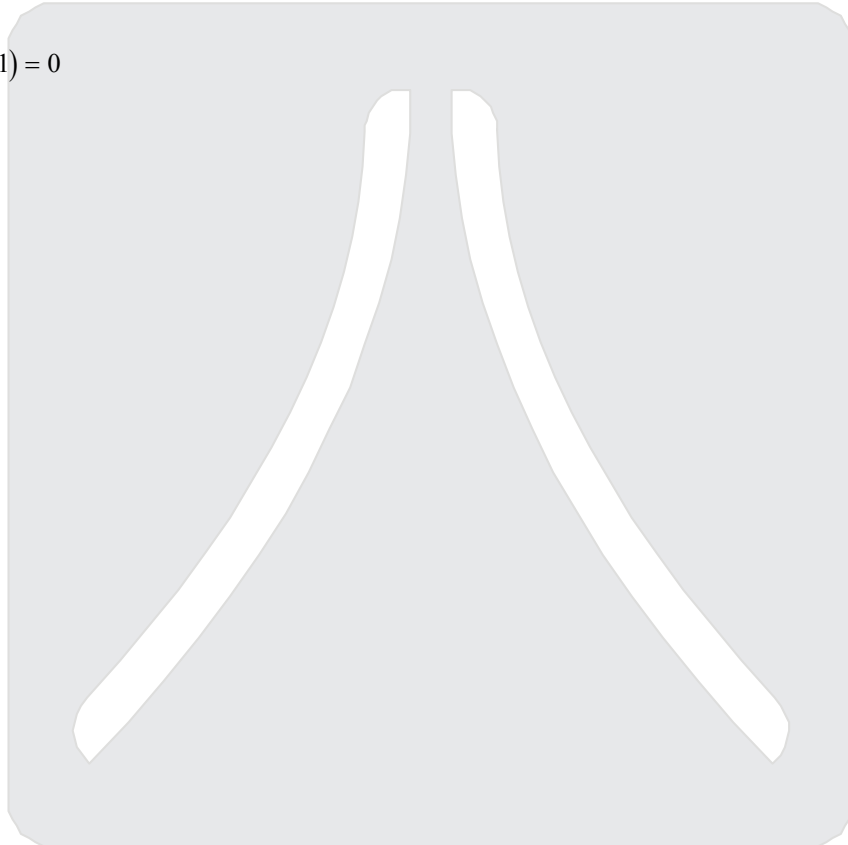
$$r = \frac{7}{2}$$

$$A = \pi r^2$$

$$= \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2}$$

$$= \frac{11}{2} \times 7$$

$$= \frac{77}{2} = 38.5 \text{ cm}$$





**86. Sol. (3)**

$$\frac{BP}{BA} = \frac{1}{\sqrt{2}}$$

$$\text{ar}(\triangle ABC) = 18\text{cm}^2$$

$$\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle BPQ)} = \frac{(\sqrt{2}k)^2}{k^2} = \frac{2}{1} = \frac{2}{1}$$

$$\frac{18}{\text{ar}(\triangle BPQ)} = \frac{2}{1} \Rightarrow \frac{18}{2} = \text{ar}(\triangle BPQ) = 9$$

$$\therefore \text{ar}(PQCA) = 18 - 9 = 9$$

**87. Sol. (1)**

$$\frac{x_1 + x_2 + \dots + x_5}{5} = 18 \quad \Rightarrow$$

$$\frac{x_1 + x_2 + x_3 + x_4}{4} = 16$$

$$(64) + x_5 = 90$$

$$x_5 = 90 - 64$$

$$= 26 \text{ Ans.}$$

**88. Sol. (4)**

$$S_n = (n-2) \times 180$$

$$= (6-2) \times 180^\circ$$

$$= 4 \times 180^\circ$$

$$S_1 = 720^\circ$$

5 numbers are in A.P

$$a - 2d + a - d + a + a + d + a + 2d = 560$$

$$5a = 560^\circ$$

$$a = 112^\circ$$

Smallest angle =

$$a - 2d = 112^\circ - 2(20^\circ) = 112 - 40 = 72^\circ$$

**89. Sol. (4)**

$$\frac{16 + 16 + x}{2} = 18$$

$$32 + x = 36$$

$$x = 4$$

8, 11, 12, 16, 20, 20, 20, 25

$$20 + 27 + 60 + 25$$

$$= 132$$

$$\therefore \text{mean} = \frac{132}{8} = 16.5$$

90. Sol. (1)

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

$$\frac{1}{x} + \frac{1}{2y} = 8$$

Solving these equation we will find answer

$$x = \frac{1}{6}, y = \frac{1}{4}$$



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