

NATIONAL TALENT SEARCH EXAMINATION-2018-19, RAIPUR
SCHOLASTIC APTITUDE TEST (SAT) HINTS & SOLUTIONS

1. (C)

Sol. Energy consumed = $\frac{\text{No. of appliance} \times \text{Power} \times \text{time}}{1000}$

$$= \frac{4 \times 500 \times 10}{1000}$$

$$= 20 \text{ KWh}$$

2. (D)

Sol. $R = -20 \text{ cm}$

$$f = -10 \text{ cm}$$

$$h_o = 5 \text{ cm}$$

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

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

$$\frac{1}{v} = -\frac{1}{10} + \frac{1}{15}$$

$$v = -30 \text{ cm}$$

$$m = \frac{-v}{u}$$

$$= -\left(\frac{-30}{-15}\right) = -2$$

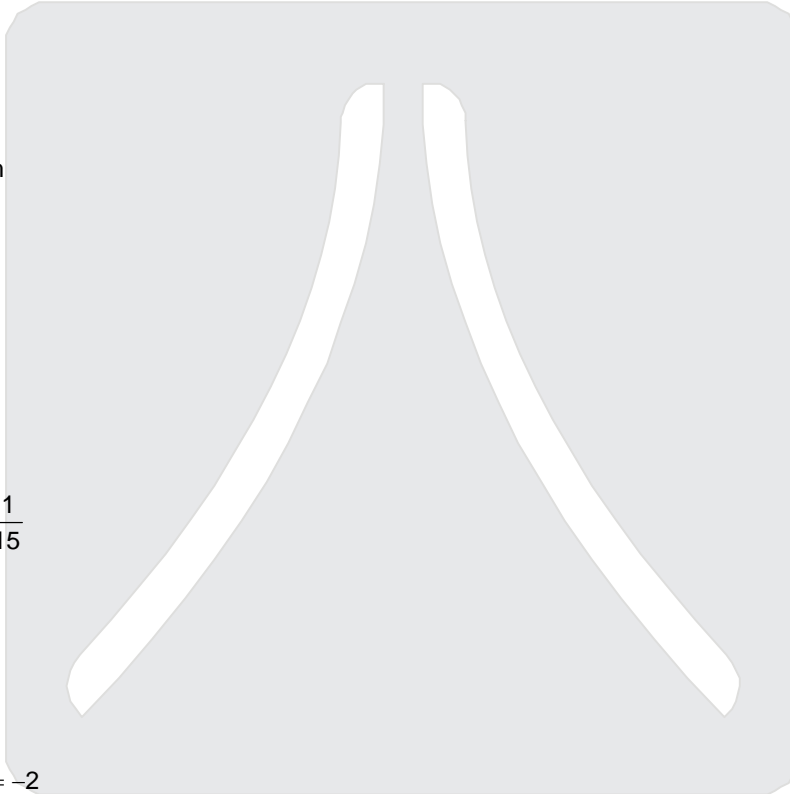
$$h_i = -10 \text{ cm}$$

Real Inverted, 10 cm

3. (A)

Sol. All resistance between A and B are in parallel.

$$R_{eq} = \frac{R}{n} = \frac{2}{4} = 5\Omega$$



4. (B)

Sol. $T = \frac{2\pi R}{v}$

$$24 \times 60 \times 60 = 2 \times \frac{22}{7} \times \frac{42250}{v}$$

$$v = 3.07 \text{ km/s}$$

5. (D)

6. (C)

7. (A)

Sol. Weight = Buoyant force

$$D_{\text{obj}} \times V_{\text{obj}} = V_{\text{dipp}} \times D_{\text{liq}}$$

$$(1) x \times v = \frac{8}{9} v \times d_1$$

$$\frac{9}{8} x = d_1$$

$$d_1 = 1.125$$

$$(2) x \times v = \frac{9}{11} v \times d_2$$

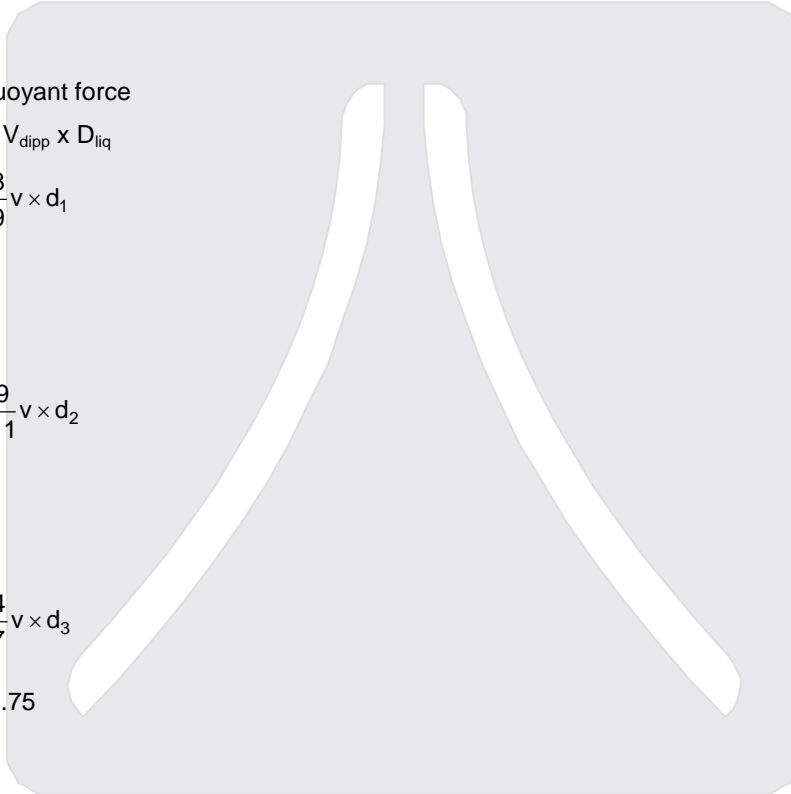
$$\frac{H}{9} x = d_2$$

$$d_2 = 1.222$$

$$(3) x \times v = \frac{4}{7} v \times d_3$$

$$d_3 = \frac{7x}{4} = 1.75$$

$$d_1 < d_2 < d_3$$



8. (B)

Sol. According to Fleming's left hand rule. Both pointing outside the plane of paper perpendicularly.

9. (A)

Sol. $V_E = \sqrt{\frac{2GM}{R}}$

Mass = density x vol.

$$= d \times \frac{4}{3} \pi R^3$$

$$\therefore V_E \propto R$$

10. (C)

11. (B)

12. (D)

13. (D)

Sol. By increasing pressure boiling point increases.

14. (B)

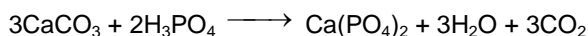
Sol. Sugar is a compound of C, H and O. i.e. $C_{11}H_{22}O_{11}$

15. (C)

Sol. Main constituent of natural gas is methane (CH_4) that is also a green house gas.

16. (C)

Sol. Balanced reaction is –



So value of x & y are 3, 2

17. (D)

Sol. Less P^H means more acidic.

So correct order of acidic strength is $Y > X > Z$

18. (A)

Sol.
$$\text{Mole} = \frac{\text{Mass of sample in gm}}{\text{Atomic Mass}}$$

So Mass of sample = 3.2 gm.

19. (C)

Sol. In the given reaction

Iron metal is getting oxidized, water is getting reduced and water is acting as oxidizing agent

20. (B)

Sol. Valency of x = 2

Valency of y = 1

So compound will be XY_2

21. (D)

Sol. Chemical formula of both milk of lime and lime water is same. That is $Ca(OH)_2$

22. (A)

Sol. In a period atomic size decreases and in a group atomic size increases

23. (B)

Sol. Ethanol [CH_3-CH_2-OH] and dimethyl ether [CH_3-O-CH_3] are isomers.

24. (A)

Sol. Ethyne has triple bond so structural formula is – $H-C \equiv C-H$

25. (C)



Sol. Al_2O_3 is an amphoteric oxide so it reacts with both acids and alkalis.

26. (D)

Sol. Maximum electrons can be filled in K shell is 2 and maximum electrons can be filled in L shell is 8, so total electrons are 10.

27. (A)

28. (B)

29. (A)

30. (B)

31. (C)

32. (D)

33. (A)

34. (C)

35. (A)

36. (B)

37. (A)

38. (D)

39. (B)

40. (D)

41. (A)

Sol. $P(x) = q(x) \times g(x) + r(x)$

$$P(x) = (2x^2 - 3x + 1)(x + 2) + 5$$

$$P(x) = 2x^3 + x^2 - 5x + 7$$

42. (D)

Sol. $Kx - 5y - 2 = 0$

$$6x + 2y - 7 = 0$$

No solution

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

$$\frac{k}{6} = -\frac{5}{2} \neq \frac{-2}{-7}$$

$$K = -15$$

43. (A)

Sol. $x^2 + ax + 3 = 0$

One root is 1, let other root is α product of roots $1 \cdot \alpha = 3$

$$\alpha = 3$$

44. (C)

Sol. $l = a + (n - 1)d$

$$332 = 17 + (n - 1)9$$

$$\frac{332 - 17}{9} = n - 1$$

$$n - 1 = 35$$

$$n = 36$$

45. M = Number of men

D = Number of days

H = Number of Hours

$$M_1 D_1 H_1 = M_2 D_2 H_2$$

$$9 \times 25 \times 6 = 15 \times D_2 \times 9$$

$$D_2 = 10 \text{ days.}$$

46. (A)

Sol. P(0, 2) A(3, K) B(K, J)

$$PA^2 = PB^2$$

$$(3 - 0)^2 + (K - 2)^2 = (K - 0)^2 + (5 - 2)^2$$

$$9 + K^2 + 4 - 4K = K^2 + 9$$

$$\Rightarrow 4K = 4$$

$$K = 1$$

47. (B)

Sol. Equation cess is calculated on total income tax.

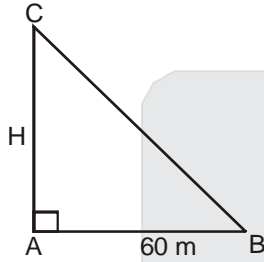
48. (A)

Sol. $\frac{2 \tan 30^\circ}{1 + \tan^2 30^\circ}$

$$\Rightarrow \frac{2 \times \frac{1}{\sqrt{3}}}{1 + \frac{1}{3}}$$

$$\Rightarrow \frac{\sqrt{3}}{2} \text{ That is equal to } \sin 60^\circ$$

49. (A)



Sol. AB = Base

AC = height

$$\tan 30^\circ = \frac{h}{60}$$

$$h = 20\sqrt{3} \text{ meter}$$

50. (D)

Sol. Here $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

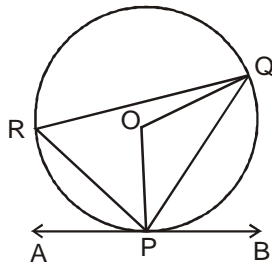
$$\frac{AB}{3} = \frac{4}{2} = \frac{AC}{2.5}$$

$$AB = 6 \text{ cm}$$

$$AC = 5 \text{ cm}$$

So Perimeter of $\triangle ABC$ is 15 cm.

51. (A)

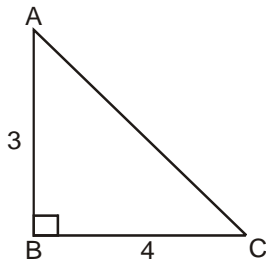


Sol.

Here $\angle QPB = \angle PRQ = 50^\circ$ (Angle in Alternate segment)

So $\angle POQ = 100^\circ$

52. (D)



Sol.

In case of right angle triangle hypotenuse is diameter of the circumcircle

$$AC = \sqrt{4^2 + 3^2} = 5$$

$$\text{Radius} = \frac{AC}{2} = \frac{5}{2} = 2.5$$

53. (B)

Sol. Negative of P is

~P: x is not integer or y is not integer.

54. (C)

Sol. Maximum length = $\sqrt{l^2 + b^2 + h^2}$
 $= \sqrt{10^2 + 10^2 + 5^2} = \sqrt{225} = 15 \text{ cm}$

55. (C)

Sol. $V = \frac{1}{3} \pi r^2 h$
 $\frac{1}{3} \pi \times 4^2 \times 3$
 $= 16\pi$

56. (C)

Sol. Most repeated value of series is mode.

So $x = 43$

57. (D)

Sol. $AB = \sqrt{AC^2 + BC^2} = \sqrt{8^2 + 6^2} = 10$

Shaded area = $\frac{1}{2}(\pi r^2) - \frac{1}{2} \times AC \times BC$

$$= \frac{1}{2} \times 3.14 \times 5^2 - \frac{1}{2} \times 8 \times 6$$

$$= 39.25 - 24$$

$$= 15.25$$

58. (B)

Sol. $7x - 2y = 5$

$$2y = 7x - 5$$

$$y = \frac{7}{2}x - \frac{5}{2}$$

Compare $y = mx + c$

Slope $m = \frac{7}{2}$

59. (C)

Sol. Total interest obtain

$$= \frac{100 \times 60 \times 6}{100 \times 12} + \frac{100 \times 59 \times 6}{100 \times 12} + \frac{100 \times 58 \times 6}{100 \times 12}$$

$$+ \dots + \frac{100 \times 1 \times 6}{100 \times 12}$$

$$= \frac{6}{12} [60 + 59 + \dots + 1]$$

$$= \frac{1}{2} \left[\frac{60 \times 61}{2} \right]$$

$$= 915 \text{ Rs}$$

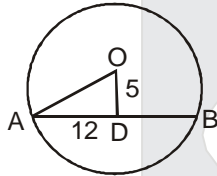
$$\text{Total Amount} = P + I$$

$$= 100 \times 60 + 915$$

$$= 6000 + 915$$

$$= 6915 \text{ Rs.}$$

60. (C)



Sol.

$$OA^2 = AD^2 + OD^2$$

$$OA^2 = 144 + 25$$

$$OA = 13$$

$$\text{Diameter} = 2 \times 13 = 26$$

61. (A)

62. (B)

63. (D)

64. (C)

65. (C)

66. (D)

67. (D)

68. (C)

69. (C)

- 70. (A)
- 71. (D)
- 72. (A)
- 73. (B)
- 74. (B)
- 75. (C)
- 76. (B)
- 77. (A)
- 78. (C)
- 79. (A)
- 80. (D)
- 81. (D)
- 82. (C)
- 83. (D)
- 84. (B)
- 85. (D)
- 86. (D)
- 87. (A)
- 88. (A)
- 89. (B)
- 90. (B)
- 91. (A)
- 92. (A)
- 93. (A)
- 94. (D)
- 95. (C)
- 96. (D)
- 97. (D)
- 98. (B)
- 99. (C)
- 100. (C)

