CHANDIGARH NTSE STAGE-1 2019-20
(SCHOLASTIC APTITUDE TEST - SAT)

ANSWER KEYS

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

*** None of the option is correct**

HINTS & SOLUTION

BIOLOGY

41. C.

Sol: Apomixis is the asexual formation of seed from the maternal tissues of ovule, avoiding the process of fertilization.

42. D

Sol: Because intercalary meristem is present at nodes & internodes.

43. C

Sol: Because pteridophytes and gymnosperms have xylem and phloem but absent in bryophytes and thallophytes.

44. D

Sol: Pepsin helps in the digestion of proteins

45. C

Sol: Because colour blindness is a recessive X-linked disease.

46. C

Sol: Because 'B' tube has 5% salt solution and no change noticed as the solution in cylinder is isotonic with respect to B.

47. C

Sol: Because mitochondria and chloroplasts contain DNA and ribosomes (protein synthesizing machinery)

48. C

Sol: Haptopropism is the movement in which plant moves or grow in response to touch or contact stimuli.

49. B

Sol: Because chemical signals are released from the axonal end of the neuron.

50. D

Sol: Because these organs have common organization and different functions.

51. A

Sol: Due to biomagnification the non-biodegradable pollutants retained in the body tissues.

52. B

Sol: Because unisexual flowers are those in which sexes are separate

53. B

Sol: Because of anaerobic respiration in muscles.

54. A

Sol: Urine formation occurs in kidney which enters into ureters and then into urinary bladder and comes out through urethra.

MATHEMATICS

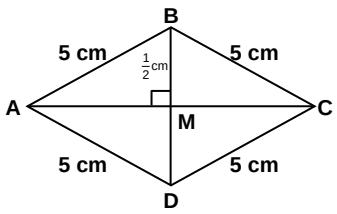
55. D

Sol: BD = 1 cm

$BM = \frac{1}{2} CM$

$AM = \sqrt{5^2 - \left(\frac{1}{2}\right)^2}$

$= \frac{\sqrt{99}}{2} = \frac{3\sqrt{11}}{2}$



$AC = 2\ AM = 3\ \sqrt{11}$

Area of Rhombus $= \frac{1}{2}(AC)(BD) = \frac{1}{2}\left(3\sqrt{11}\right).1 = \frac{3(3.32)}{2} = \frac{9.92}{2} = 4.96\ cm^2$

56. **C (Rs. should be omitted from options)**

Sol: 12 oranges sales price= 1Rs

1 orange sales price= $\frac{1}{12}$Rs

S. P of one orange = $\frac{1}{12}$Rs

Loss = 20%

Cp =

If SP is 80 Rs. then CP =100 Rs.

If SP is Rs. 1 then CP = $\frac{100}{80}$ Rs.

If SP is Rs. 1/12 then CP = $\frac{5}{48}$Rs.

For 20% gain S.P of one orange = $\frac{5}{48} \times \frac{120}{100} = \frac{1}{8}$Rs.

In Rs.1, He should sell 8 oranges

57.

Sol: **(Given Options are incorrect)**

$T_n = S_n - S_{n-1}$

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

$T_n = 3n + 1$

$T_{25} = 25\ (3) + 1 = 76$

58. **A**

Sol: Total days 366

n (E)= 2

n (S)= 7

SM, MT, TW, WTh, ThF, F S, S S

$P(E) = \frac{n(E)}{n(S)} = \frac{2}{7}$

59. **B**

Sol: A + B = 90°

$$\frac{\tan A \tan(90^0 - A) + \tan A \cot(90^0 - A)}{\sin A \sec(90^0 - A)} - \frac{\sin^2(90^0 - A}{\cos^2 A}$$

$$\Rightarrow \frac{\tan A \cot A + \tan A \tan A}{\sin A.\cos ecA} - \frac{\cos^2 A}{\cos^2 A}$$

$\Rightarrow 1 + \tan^2 A - 1$

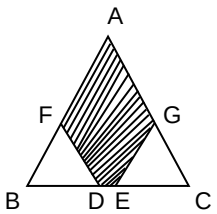
$= \tan^2 A = \tan^2 (90^0 - B) = \cot^2 B$

60. **B**

Sol: Area of unshaded portion = $2\left(\frac{\sqrt{3}}{4}x^2\right)$

Area of $\Delta ABC = \frac{\sqrt{3}}{4}(3x)^2$

$$\frac{\text{Area of Shaded portion}}{\text{area of } \Delta ABC} = \frac{\frac{\sqrt{3}}{4}(9x^2 - 2x^2)}{\frac{\sqrt{3}}{4}(9x^2)} = \frac{7}{9}$$

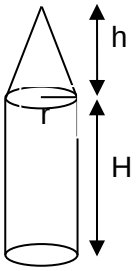


$AF = AG = 2x$

$BF = BD = FD = EC = CG = EG = DE = x$

61. **B**

Sol:



Volume of solid = 3 volume of cone

$\pi r^2 H + \frac{1}{3}\pi^2 h = 3\left(\frac{1}{3}\pi r^2 h\right)$

$H = \frac{2h}{3}$

62. **B**

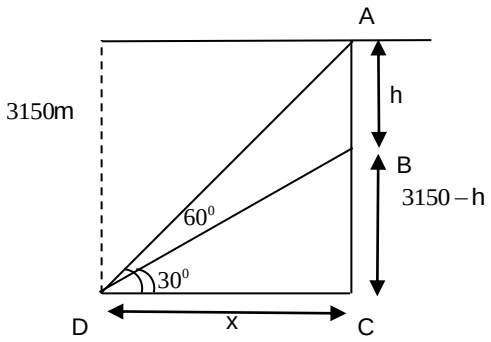
Sol: $\frac{3150}{x} = \tan 60^0 = \sqrt{3}$ **……..1**

$\frac{3150-h}{x} = \tan 30^0 = \frac{1}{\sqrt{3}}$ **……..2**

$\Rightarrow \frac{3150}{3150-h} = 3 \Rightarrow 3150 = 9450\text{-}3h$

$3h = 6300$

$H = 2100$ m



63. **D**

Sol: $SI = \frac{P \times 8 \times 2}{100}$

$CI = P\left(1+\frac{8}{100}\right)^2 - P$

$= \left(\frac{27}{25}\frac{27}{25} - 1\right)P$

CI – SI = 6.40 Rs.

$P\left(\frac{729-625}{625}\right) - P\left(\frac{4}{25}\right) = \frac{32}{5}$

$P\left(\frac{104-100}{625}\right) = \frac{32}{5}P$

$\Rightarrow P \times \frac{4}{625} = \frac{32}{5}$

P = 1000 Rs.

64. **B**

Sol: a, b, c, d, e are in continuous proportion

$\frac{a}{b} = \frac{b}{c} = \frac{c}{d} = \frac{d}{e} = x$ (say)

$d = ex$

$c = dx = ex^2$

$b = cx = ex^3$

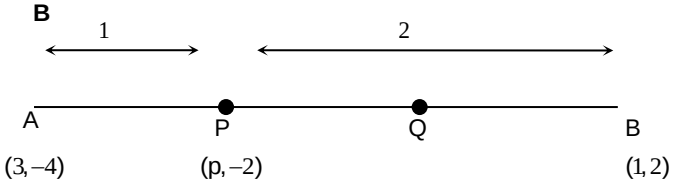
$a = bx = ex^4$

$\Rightarrow \frac{a}{e} = x^4$

$\frac{a^4}{b^4} = x^4$

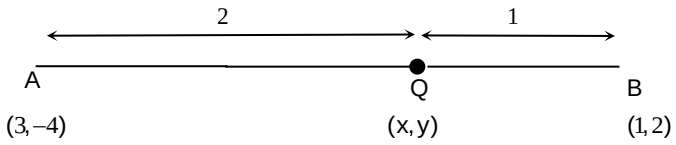
65. **B**

Sol:



$\frac{1(1)+2(3)}{3} = p \Rightarrow p = \frac{7}{3}$

$\frac{1(2)+2(-4)}{3} = -2$



$Q\left(\frac{5}{3}, q\right)$

Then q = 0

x = $\frac{2(1)+1(3)}{3} = \frac{5}{3}$

y = $\frac{2(2)+1(-4)}{3} = 0$

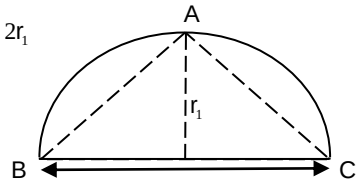
p = $\frac{7}{3}, q = 0$

66. **B**

Sol: For maximum area of Δ ABC = $\frac{1}{2}(2r_1).r_1$

$r_1 = \frac{r}{16}$

maximum area of $\Delta ABC = \frac{r^2}{256}$



67. **D**

Sol: x + y + z = 0 $\quad x \neq 0, y \neq 0, z \neq 0$

$\frac{x^2}{yz} + \frac{y^2}{xz} + \frac{z^2}{xy} = \frac{x^3+y^3+z^3}{xyz}$

of x + y + z = 0 then $x^3 + y^3 + z^3 = 3xyz$

$\Rightarrow \frac{x^3+y^3+z^3}{xyz} = 3$

68. **D**

Sol: $x^2 + y^2 + z^2 = r^2$

x = r cos a cos b

y = r cos a sin b

$\Rightarrow r^2 \cos^2 a \cos^2 b + r^2 \cos^2 a \sin^2 b + z^2 = r^2$

$r^2\cos^2 a(\cos^2 b + \sin^2 b) + z^2 = r^2$

$r^2 \cos a + z^2 = r^2$

$z^2 = r^2(1 - \cos^2 a)$

$z^2 = r^2 \sin^2 a$

$\Rightarrow$ z = r sin a

69. **A**

Sol: α and β are roots of equation $3x^2 - 5x + 3 = 0$

$\alpha + \beta = \frac{5}{3}$

$\alpha\beta = 1$

Equation of roots whose roots are □²□ and □□□ is

$x^2 - Sx + P = 0$

$S = \alpha^2\beta + \alpha\beta^2 = \alpha\beta(\alpha+\beta) = \frac{5}{3}$

$P = \alpha^2\beta \cdot \alpha\beta^2 = (\alpha\beta)^3 = 1^3 = 1$

equation

$x^2 - \frac{5}{3}x + 1 = 0$

$3x^2 - 5x + 3 = 0$

70. **B**

Sol: $\ell + b + h = 19$ $\quad (\ell + b + h)^2 = 361$

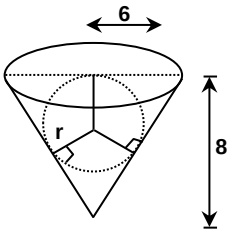
$\sqrt{\ell^2 + b^2 + h^2} = 5\sqrt{5}$ $\quad \ell^2 + b^2 + h^2 + 2(\ell b + bh + \ell h) = 361$

$\Rightarrow \ell^2 + b^2 + h^2 = 125$ $\quad 125 + 2(\ell b + bh + \ell h) = 361$

$\Rightarrow 2(\ell b + bh + \ell h) = 236\ cm^2$

71. **C**

Sol: r is inradius of circle whose sides 12, 10, 10



$r = \frac{\Delta}{s} = \frac{48}{16} = 3$

$2s = 32$

$s = 16$

$\Delta = \sqrt{16.4.6.6}$

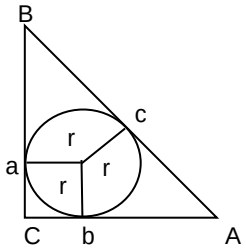
Water over flowed = $6.8 = 48\ cm^3$

= volume of sphere = $\frac{4}{3}\pi^3 = \frac{4}{3}\pi(3)^3 = 36\pi\ cm^3$

$= \frac{\text{water over flowed}}{\text{water filled in conical vessel}} = \frac{3}{8}$

72. **C**

Sol: $r = \frac{\Delta}{s} = \frac{\frac{1}{2}ab}{\frac{1}{2}(a+b+c)}$



$= \frac{ab}{(a+b+c)}$

$= \frac{ab(a+b-c)}{(a+b+c)(a+b-c)}$

$= \frac{ab(a+b-c)}{((a+b)^2 - c^2)}$

$= \frac{a+b-c}{2}$

$\therefore a^2 + b^2 = c^2$

73. B

Sol: AD = $\frac{3\sqrt{5}}{2}$

CE = $2\sqrt{5}$

In Δ BDA

$BD^2 + BA^2 = AD^2$

$\frac{BC^2}{4} + BA^2 = \frac{45}{4}$

$BC^2 + 4BA^2 = 45$ ….1

In ΔCBE

$(BC)^2 + (BE)^2 = (CE)^2$

$BC^2 + \frac{AB^2}{4} = 20$

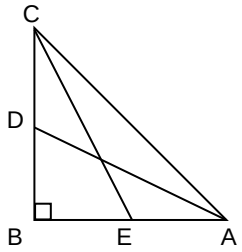
$4BC^2 + AB^2 = 80$ ….2

Solving eq. No. 1 & 2

$AB^2 = \frac{20}{3}, BC^2 = \frac{55}{3}$

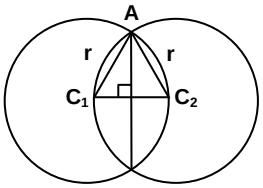
$AB^2 + BC^2 + AC^2$

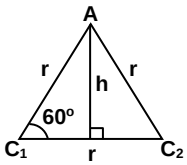
AC = 5



74. B

Sol:





$\frac{h}{r} = \sin 60^o$

$h = \frac{\sqrt{3}}{2}r$

Length of common chord = $2h = \sqrt{3}r$

$\frac{\text{Length of common chord}}{\text{radius of circle}} = \frac{\sqrt{3}r}{r} = \frac{\sqrt{3}}{1}$

CHEMISTRY

75. C

Sol: As gold has maximum malleability

76. C

Sol: When carbon dioxide is passed through lime water which is a diluted solution of $Ca(OH)_2$, it turns milky due to the formation of calcium carbonate which is $CaCO_3$

77. B

Sol: B is the correct answer = Na > Mg > Al > Si > Cl. Along the period, metallic character decreases, all elements belong to period-3. This question is directly from class tenth NCERT exampler problems.

78. C

Sol: The correct ans is C because gases can be liquified at low temperatures and high pressure. Non ideal gases are only liquefiable.

84. C

Sol: Bismuth alone does not exist with allotropy. Whereas all the elements in 15^{th} group of periodic table show allotropy due to its variable oxidation state. Bismuth due to its inert pair effect does not exist variable oxidation state.

85. D

Sol: Tea contains tannic acid, which becomes bitterer as the tea is steeped. Depending on the type, tea a pH ranging from 4.0 to

6.0. Ginger tea and green tea are lowest in acidity.

86. D

Sol: Due to maximum electronegativity.

PHYSICS

87. A

Sol: $\sqrt{\frac{2h}{g}} = T \therefore \sqrt{\frac{2\Delta h}{g}} = \frac{T}{3}$

$\Delta h = h/9$

$\therefore$ height $\frac{8h}{9}$ from ground.

88. C

Sol: $K = \frac{p^2}{2m}$

$\frac{p_1^2}{p_2^2} = \frac{m_1 k_1}{m_2 k_2} = \frac{16}{1}$

89. B

Sol: Power = $\frac{dm}{dt} gh$

= 75 kw

90. B

Sol: $\Delta p = F\Delta t$ = area of graph = 0

91. D

Sol: $R = \rho\frac{L}{A} = \frac{\rho L^2}{\text{volume}}$

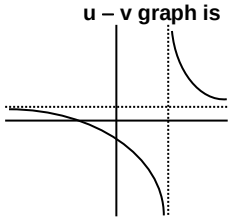
$L \to 2L$, $R \to 4R$

Increase is 300%

92. C

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

u – v graph is



93. **C**

Sol: $B_{coil} = \frac{\mu_0 NI}{2R}$

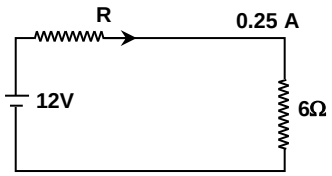
$$\frac{B_1}{B_2} = \frac{\frac{1}{d_1}}{\frac{1}{d_2}} = \frac{d_2}{d_1} = 2:1$$

94. **A**

Sol: $\lambda_{glass} = \frac{\lambda_{vaccum}}{\mu_{glass}} = \frac{5460\,A^o}{1.5} = 3640\,A^o$

95. **A**

Sol: Equivalent circuit is



12 V = 0.25 (6 + R)

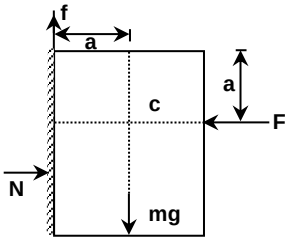
(R = 42 Ω)

96. **D**

Sol: Slope of graph = velocity

97. **D**

Sol: N does not pass through centre and produce torque.

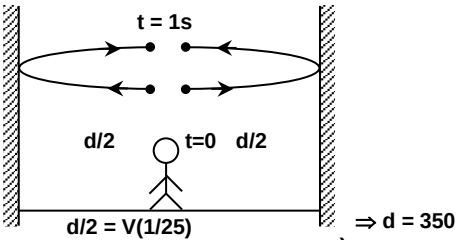


98. **A**

Sol: Thermal radiations transfer energy from hot to cold body in vacuum.

99. **B**

Sol: $d = v \Delta t = 350$ m



100. **B**

Sol: $T = 2\pi\sqrt{\frac{L}{g}}$

As water leaks out centre of mass falls initially and finally again returns to centre. L increases first and then decreases T. Increases first and then decreases.