

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

FIITJEE CHANDIGARH 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: Haptotropism 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

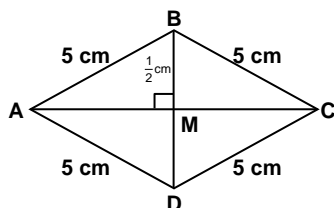
$$BM = \frac{1}{2} \text{ CM}$$

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

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

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

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



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

Sol: 12 oranges sales price= 1Rs

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

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

Loss = 20%

Cp =

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

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

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

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

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, FS, SS

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

59. **B**

Sol: $A + B = 90^\circ$

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

$$\Rightarrow \frac{\tan A \cot A + \tan A \tan A}{\sin A \operatorname{cosec} A} - \frac{\cos^2 A}{\cos^2 A}$$

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

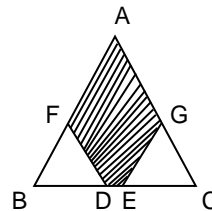
$$= \tan^2 A = \tan^2(90^\circ - B) = \cot^2 B$$

60. **B**

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

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

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



$$AF = AG = 2x$$

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

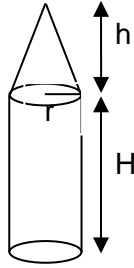
61. B

Sol:

Volume of solid = 3 volume of cone

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

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



62. B

Sol:

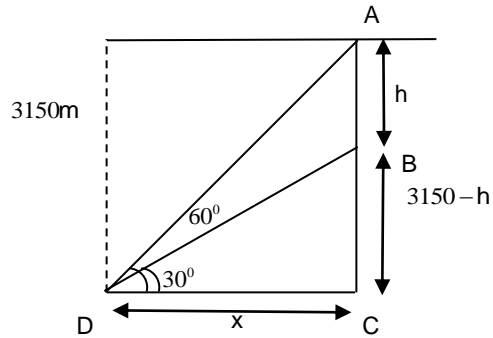
$$\frac{3150}{x} = \tan 60^\circ = \sqrt{3} \dots\dots 1$$

$$\frac{3150-h}{x} = \tan 30^\circ = \frac{1}{\sqrt{3}} \dots\dots 2$$

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

$$3h = 6300$$

$$H = 2100 \text{ m}$$



63. D

Sol:

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

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

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

$$CI - SI = 6.40 \text{ Rs.}$$

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

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

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

$$P = 1000 \text{ Rs.}$$

64. B

Sol:

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

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

$$d = ex$$

$$c = dx = ex^2$$

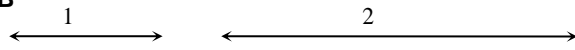
$$b = cx = ex^3$$

$$a = bx = ex^4$$

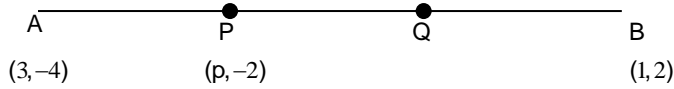
$$\Rightarrow \frac{a}{e} = x^4$$

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

65. **B**

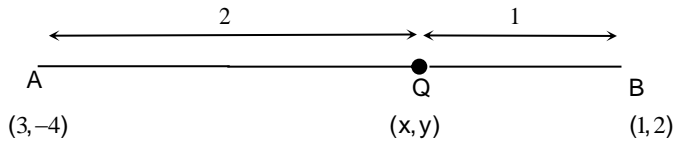


Sol:



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

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



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

Then $q = 0$

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

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

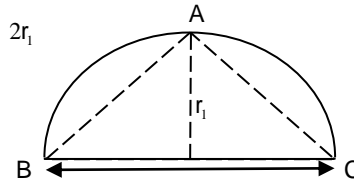
$$p = \frac{7}{3}, q = 0$$

66. **B**

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

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

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



67. **D**

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

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

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:

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

$$x = r \cos a \cos b$$

$$y = r \cos a \sin b$$

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

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

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

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

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

$$\Rightarrow z = r \sin a$$

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 α^2 and β^2 is

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

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

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

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

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

70. B

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

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

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

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

71. C

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

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

$$2s = 32$$

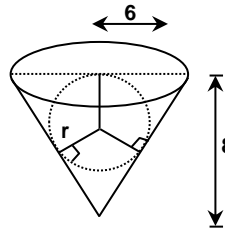
$$s = 16$$

$$\Delta = \sqrt{16 \cdot 4 \cdot 6 \cdot 6}$$

$$\text{Water over flowed} = 6.8 = 48 \text{ cm}^3$$

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

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



72. C

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

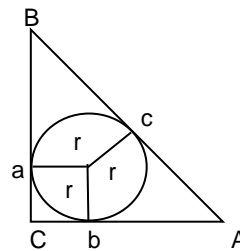
$$= \frac{ab}{(a+b+c)}$$

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

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

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

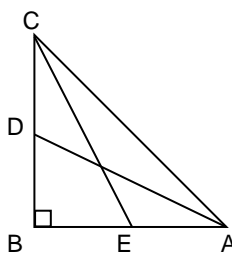
$$\therefore a^2 + b^2 = c^2$$



73. B

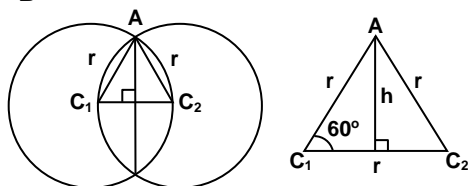
$$\text{Sol: } AD = \frac{3\sqrt{5}}{2}$$

$$\begin{aligned} CE &= 2\sqrt{5} \\ \text{In } \triangle BDA \\ BD^2 + BA^2 &= AD^2 \\ \frac{BC^2}{4} + BA^2 &= \frac{45}{4} \\ BC^2 + 4BA^2 &= 45 \dots 1 \\ \text{In } \triangle CBE \\ (BC)^2 + (BE)^2 &= (CE)^2 \\ BC^2 + \frac{AB^2}{4} &= 20 \\ 4BC^2 + AB^2 &= 80 \dots 2 \\ \text{Solving eq. No. 1 \& 2} \\ AB^2 &= \frac{20}{3}, BC^2 = \frac{55}{3} \\ AB^2 + BC^2 + AC^2 & \\ AC &= 5 \end{aligned}$$



74. B

Sol:



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

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

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

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

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 = $\text{Na} > \text{Mg} > \text{Al} > \text{Si} > \text{Cl}$. Along the period, metallic character decreases, all elements belong to period-3. This question is directly from class tenth NCERT exemplar 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 15th 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 = $\frac{dm}{dt} gh$

$$= 75 \text{ kw}$$

90. B

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

91. D

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

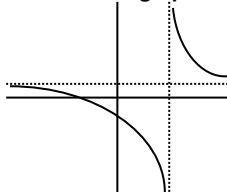
$$L \rightarrow 2L, R \rightarrow 4R$$

Increase is 300%

92. C

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

u - v graph is



93. C

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

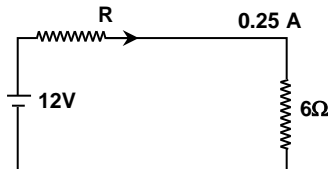
$$\frac{B_1}{B_2} = \frac{\frac{1}{d_1}}{\frac{1}{d_2}} = \frac{d_2}{d_1} = 2 : 1$$

94. A

Sol: $\lambda_{\text{glass}} = \frac{\lambda_{\text{vacuum}}}{\mu_{\text{glass}}} = \frac{5460 \text{ \AA}}{1.5} = 3640 \text{ \AA}$

95. A

Sol: Equivalent circuit is
 $12 \text{ V} = 0.25 (6 + R)$
 $(R = 42 \Omega)$

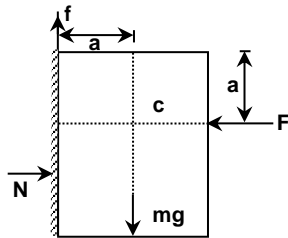


96. D

Sol: Slope of graph = velocity

97. D

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

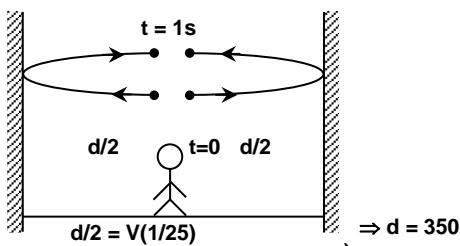


98. A

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

99. B

Sol: $d = v \Delta t = 350 \text{ m}$



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.