

# FIITJEE

## NATIONAL TALENT SEARCH EXAMINATION, 2017-18

### SAT ANSWER KEY

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

### SAT SOLUTIONS

- (4)  
Theory :- Light bonds due to difference in R.I. of air layers.
- (2)  
General Knowledge
- (3)  
Theory:- Universal law of gravitation

4. (1)  

$$P = \frac{F}{A} = \frac{50}{0.5 \times 10^{-6}} \text{ N/m}^2 = 100 \times 10^6 \text{ N/m}^2$$
5. (2)  
 Theory:- Property of human eye
6. (1)  
 Theory
7. (3)  
 Theory
8. (4)  
 Theory:- Field lines originate from north pole and end on south pole outside magnet
9. (4)  
 Theory:- Phenomenon is reflection
10. (1)  
 Theory:- Electromagnetic Induction
11. (3)  
 $Q = it = 0.4 \times 3 \times 60 = 72\text{C}$
12. (2)  
 Theory:- Image formation by concave mirror
13. (1)  
 Theory:- Circuit diagram for Ohm's Law
14. (3)  
 Ionisation energy decreases down the group and increases across the period. Hence K
15. (4)  
 $K^+ = 19 - 1 = 18$   
 $Cl^- = 17 + 1 = 18$   
 $Ca^{2+} = 20 - 2 = 18$   
 Hence Only K
16. (3)  
 $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$
17. (2)  

$$\underset{\text{Blue}}{CuSO_4 \cdot 5H_2O} \rightarrow \underset{\text{white anhydrous } CuSO_4}{CuSO_4}$$
18. (4)  
 Ant sting contains methanoic acid also called formic acid.
19. (1)  
 $Na_2CO_3$  is formed from NaOH and  $H_2CO_3$  i.e. strong base and weak acid.  
 Hence  $Na_2CO_3$ .
20. (2)  
 HCl. Rest all are ionic
21. (1)  
 Copper lies below H in reactivity series.
22. (2)  
 $CH_3COOH$  and  $C_2H_5COOH$   
 a difference of  $-CH_2$
23. (2)  
 $CH_3 - CH = CH_2$

24. (1)  
Stainless steel is a mixture of Iron, Nickel, Chromium and Carbon.
25. (1)  
Nonmetals form acidic oxides.  
Hence atomic No. 7
26. (2)  
 $C_nH_{2n+1}$  is alkyl
27. (4)  
 $CO_2$  and water ( $CO_2$  is reduced to  $C_6H_{12}O_6$  and  $H_2O$  is oxidized to oxygen)
28. (4)  
Testis (Is male reproductive organ while others are female)
29. (1)  
50 decibel (in day time, 40 decibel at night in silent zone)
30. (2)  
114 ( $N_2O$  remains in the atmosphere for 114 years)
31. (3)  
Two (Deoxygenated blood enters the heart and then lungs, oxygenated blood enters the heart and pumped to other parts of the body (Pulmonary circulation and then systemic circulation))
32. (4)  
Seismonastic movement (Nastic movement, nondirectional movement towards direction of touch)
33. (2)  
Regeneration is not truly a reproductive process, rather it's a process of renewal, restoration and growth in organisms.
34. (2)  
23 pairs of chromosomes (22 pairs of autosome and one pair of allosome)
35. (1)  
Darwin explained natural selection, Lamarck explained inheritance of acquired characters and Mendel is known for pioneering work in inheritance.
36. (4)  
1, 2 and 3 belongs to Thallophyta and 4 belongs to Bryophyta
37. (2)  
Raphide crystals are sharp needle like crystals of calcium oxalate that dart and cause discomfort to throat, activates inflammatory reaction by production of histamines.
38. (3)  
Area A is for perception of touch, pain etc.  
Area B is for perception of sound  
Area C is occipital lobe of for brain for visual perception  
Area D is for thinking, Intelligence etc.
39. (2)  
Estrogen is secreted by ovary
40. (4)  
1, 2 and 3 are pteridophytes and 4 is bryophyte
41. (2)
42. (4)
43. (2)
44. (3)
45. (1)
46. (4)

47. (3)  
48. (2)  
49. (1)  
**\*50. (4) (Correction in question - League of nation)**  
51. (2)  
52. (3)  
53. (4)  
54. (4)  
55. (3)  
56. (4)  
57. (1)  
58. (3)  
59. (2)  
60. (2)  
61. (1)  
62. (3)  
63. (3)  
64. (3)  
65. (1)  
66. (4)  
67. (1)  
68. (2)  
69. (2)  
70. (4)  
71. (1)  
72. (3)  
73. (1)  
74. (3)  
75. (2)  
76. (1)  
77. (3)  
78. (2)  
79. (2)  
80. (4)  
81. (3)

$$11, 15, 19, \dots 299$$

$$299 = 11 + (n-1)4$$

$$\therefore n = 73$$

82. (1)

$$x^2 + 2\sqrt{x} - 6 = 0$$

$$\Rightarrow x^2 + 3\sqrt{2}x - \sqrt{2}x - 6 = 0$$

$$\Rightarrow (x - \sqrt{2})(x + 3\sqrt{2}) = 0$$

$$x = \sqrt{2}, -3\sqrt{2}$$

83. (1)

$$50 \rightarrow 10,000/-$$

$$100 \rightarrow 20,000/-$$

84. (3)

Speed  $\times$  km/hr distance = y km

Speed = (x + 15)

$$\frac{y}{x+15} = \frac{y}{x} - 2$$

$$\Rightarrow xy = (x+15)(y-2x)$$

$$\Rightarrow xy = xy + 15y - 2x^2 - 30x$$

$$\Rightarrow 15y = 2x^2 + 30x$$

Speed = (x - 15) km/hr

$$\frac{y}{x-5} = \frac{y}{x} + 1$$

$$xy = (x-5)(y+x)$$

$$\Rightarrow xy = xy + x^2 - 5y - 5x$$

$$\Rightarrow 5y = x^2 - 5x$$

$$\Rightarrow 15y = 3x^2 - 15x$$

$$\therefore 3x^2 - 15x = 2x^2 + 30x$$

$$\Rightarrow x^2 - 45x = 0$$

$$x = 0, x = 45$$

$$\therefore y = \frac{(45)^2}{5} - 45 = 405 - 45 = 360 \text{ km}$$

85. (1)

$$(\sqrt[3]{3} + \sqrt[3]{2})(\sqrt[3]{9} + \sqrt[3]{4} - \sqrt[3]{6})$$

$$= \sqrt[3]{27} + \sqrt[3]{12} - \sqrt[3]{18} + \sqrt[3]{18} + \sqrt[3]{8} - \sqrt[3]{12}$$

$$= 3 + 2 = 5$$

86. (1)

$$x + 12 = 160 \times \frac{1}{x}$$

$$\Rightarrow x^2 + 12x = 160$$

$$\Rightarrow x^2 + 12x - 160 = 0$$

$$\Rightarrow x^2 + 20x - 8x - 160 = 0$$

$$\Rightarrow x(x+20) - 8(x+20) = 0$$

$$X = 8, x = -20$$

$$X = 8$$

$$\therefore \text{Number} = 8 + 12 = 20$$

87. (1)

n(S) = 50

E = {2, 3, 5, 7, 11, 13, 17, 19, 23, 2, 31, 37, 41, 43, 47}

n(E) = 15

$$\therefore P(E) = \frac{15}{50} = \frac{3}{10}$$

88. (3)  
 $52 = (4)3 + 2(4)2 - 4\alpha - 12$   
 $\Rightarrow 52 = 64 + 32 - 4\alpha - 12$   
 $\Rightarrow 4\alpha = 84 - 52$   
 $\Rightarrow \alpha = \frac{32}{4} = 8$

89. (2)  
 $D_x = \begin{vmatrix} 7 & m \\ 5 & 8 \end{vmatrix} = 56 - 5m$   
 $x = \frac{D_x}{D}$   
 $\Rightarrow 9 = \frac{56 - 5m}{4}$   
 $\Rightarrow 36 = 56 - 5m$   
 $\therefore \frac{20}{5} = 4$

90. (4)

0 - 10	30
10 - 20	42
20 - 30	50
30 - 40	80 → Modal class
40 - 50	50
50 - 60	40

$l = 30$   
 $n = 10$   
 $f_1 = 80$   
 $f_0 = 50$   
 $f_2 = 50$

$$\therefore \text{Mode} = l + \left( \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$$

$$= 30 + \left( \frac{80 - 50}{160 - 50 - 50} \right) \times 10$$

$$= 30 + \frac{30}{60} \times 10 = 35$$

91. (2)

$$\frac{\cos^2 30^\circ + \cos 30^\circ \cdot \sin 30^\circ + \sin^2 30^\circ}{\cos^3 30^\circ - \sin^3 30^\circ}$$

$$= \frac{(1 + \sin 30^\circ \cdot \cos 30^\circ)}{(1 + \sin 30^\circ \cos 30^\circ)}$$

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

$$= \sqrt{3} + 1$$

92. (1)

$$\tan \theta = -1$$

$$\frac{\sec \theta + \operatorname{cosec} \theta}{\cos \theta - \sec \theta} = \frac{\operatorname{cosec} \theta (\tan \theta + 1)}{\cos \theta (1 - \tan \theta)} = 0$$

93. (3)

Equation of PQ

$$y = \frac{1}{2}x + 3$$

$$y - \frac{x}{2} = 3$$

$$\frac{y}{3} + \frac{x}{(-6)} = 1$$

Intercept on x is -6.

94. (1)

$$\frac{\frac{4}{3}\pi r^3}{4\pi r^2} = \frac{\sqrt{7}}{3}$$

95. (4)

$$N \times \pi \times 1.1 \times 1.1 \times 0.2 = \pi \times 3.3 \times 3.3 \times 40$$

$$N = 1800$$

96. (4)

$$\frac{[PMD]}{[RND]} = \frac{1}{4} = \left(\frac{1}{2}\right)^2$$

$$\frac{PM}{RN} = \frac{1}{2}, \frac{[PQS]}{[RQS]} = \frac{\frac{1}{2} \times QS \times PM}{\frac{1}{2} \times QS \times RN} = \frac{1}{2}$$

97. (1)

$$S = 15 + \frac{x}{2}$$

$$80 = \sqrt{\left(15 + \frac{x}{2}\right)\left(\frac{x}{2} + 5\right)\left(15 - \frac{x}{2}\right)\left(\frac{x}{2} - 5\right)}$$

$$x = 2\sqrt{65}$$

98. (3)

$$\text{Let } \angle BAC = \angle BCA = y$$

$$\text{Then } \angle OAB = \angle ABO = 2y$$

$$4y = x$$

$$x/y = 4$$

99. (3)

$$\triangle OCD \sim \triangle OAB$$

$$\frac{[OCD]}{[OAB]} = \frac{40^2}{16^2} = \frac{25}{4}$$

100. (3)

$$\frac{1}{2}[PQCB] = [PSB]$$

$$\frac{1}{2} \times 8 \times 12 = [PSB]$$

$$[PSB] = 48$$