FIITJEE

NTSE STAGE – 1 (2017)

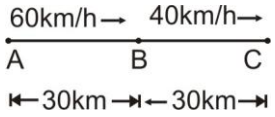
ANSWERS KEYS (SAT)

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

HINT & SOLUTIONS (SAT)

PHYSICS

1. (C)

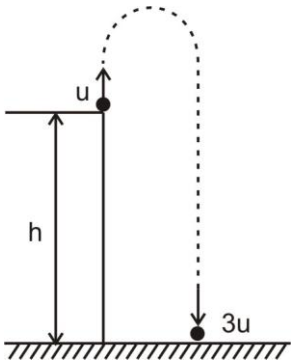


$T = t_{AB} + t_{AC}$

$= \frac{30}{60} + \frac{30}{40} = \frac{1}{2} + \frac{3}{4} = \frac{5}{4}h$

$= 75$ min

2. (D)



$(-3u)^2 = (u)^2 + 2(-g)(-h)$

$\Rightarrow 9u^2 = u^2 + 2gh$

$\Rightarrow 8u^2 = 2gh$

$\Rightarrow \left[h = \frac{4u^2}{g}\right]$

3. (B)

Let $v_2 = 2v_1$

$\therefore \quad \frac{k_1}{p_1} = \frac{1/2 m_1 v_1^2}{mv_1} = \frac{v_1}{2}$

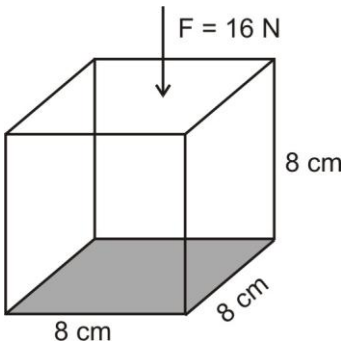
Now, $\frac{k_2}{p_2} = \frac{1/2\, mv_2^2}{mv_2} = \frac{v_2}{2} = \frac{2v_1}{2} = 2\left(\frac{v_1}{2}\right) = 2\left(\frac{k_1}{p_1}\right)$

4. **(C)**

$\because \quad V = \nu\lambda$

$$\lambda = \frac{3\times10^8}{10^9} = 0.3\text{m} = 30\text{cm}$$

5. **(B)**



$$P = \frac{F}{A} = \frac{16}{8\times8\times10^{-4}} = 0.25\times10^4\text{Pa}$$

$\therefore \quad [P = 2500\text{Pa}]$

6. **(D)**

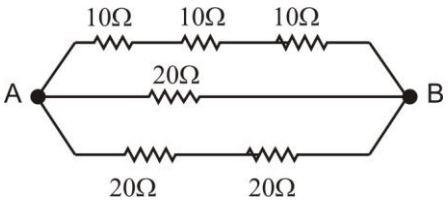
$W = Fs\cos\theta$

when $\theta = 0^o, \Rightarrow \cos0^o = 1(\text{maximum})$

$\therefore$ W = Fs is maximum

$\therefore$ F → s → is correct

7. **(A)**



$R_{AB} = ?$

$$\frac{1}{R_{AB}} = \frac{1}{30} + \frac{1}{20} + \frac{1}{40}$$

$$\frac{1}{R_{AB}} = \frac{4+6+3}{120} = \frac{13}{120}$$

$$R_{AB} = \frac{120}{13} = 9.23\Omega$$

8. (B)

$R_1 = \frac{\rho L}{4A}$ ….. (1)

$R_2 = \frac{\rho \times 2L}{A}$ …….(2)

$\frac{R_1}{R_2} = \frac{\rho L}{4A} \times \frac{A}{\rho \times 2L}$

$\frac{R_1}{R_2} = \frac{1}{8} = 1:8$

9. (A)

On increasing the length of the conductor by stretching, the new resistance is given by -

$R' = (n)^2 R$ Where n is no. of times of stretching

$R' = (3)^2 R \; [n = 3]$

$R' = 9R$

10. (A)

Our solar system lies in "Milky way" Galaxy

11. (B)

"Presbyopia" Occurs in old age. 'Presbyopia' is natural part of the ageing process. It happens due to hardening of the lens of eye to focus light behind rather than on the retina when looking at closer objects.

12. (C)

by lens makers' formula

$\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$; where n is refractive index of lens.

In case – 1

$\frac{1}{f_1} = (n-1)\left(\frac{1}{R} - \left(-\frac{1}{R}\right)\right)$

$f_1 = \frac{R}{2(n-1)}$

In Case – 2

$\frac{1}{f_2} = (n-1)\left(\frac{1}{R} - \frac{1}{\infty}\right)$

$f_2 = \frac{R}{(n-1)}$

$\therefore \quad f_2 = 2f_1 = 2f$

13. (C)

$p_1 = p_2$

$\sqrt{2m_1K_1} = \sqrt{2m_2K_2}$

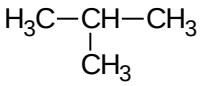
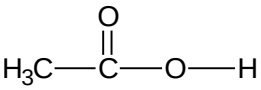
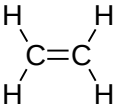
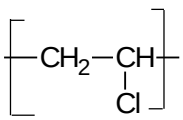
$m_1K_1 = m_2K_2$

if $m_1 > m_2$

so, $\frac{m_1}{m_2} = \frac{K_2}{K_1}$ so, if $m_1 > m$ then –

$K_2 > K_1$

CHEMISTRY

14. Electron is discovered by J.J. Thomson
15. Gypsum is $CaSO_4.2H_2O$
16. The process in which the red hot cast iron is cooled immediately in cold water is known as quenching
17. $Na^+ \Rightarrow 1s^2_2\ 2s^2\ 2p^6_8$
18. SO_2
    $x + (-2) \times 2 = 0$
    $x = 4$
19. 
    2-methylpropane
20. Stainless steel contains Fe, Ni, Cr
21. Number of proton = 1
    Number of electron = 11
    Number of Neutron = 12
22. General electronic configuration of III group is $ns^2\ np^1$
23. $Zn(s) + H_2SO_4(aq) \longrightarrow ZnSO_4(aq) + H_2 \uparrow$
24. 
    Carboxylic acid
25. 
    Double covalent bond
26. 
    Poly vinyl chloride (PVC)

MATHEMATICS

81. $\frac{\cos^2\theta+\tan^2\theta-1}{\sin^2\theta}$

$\Rightarrow \cot^2\theta+\sec^2\theta-\operatorname{cosec}^2\theta$

$\Rightarrow \sec^2\theta-1$

$\Rightarrow \tan^2\theta$

82. $\frac{\cos^2 20^\circ+\cos^2 70^\circ}{\sin^2 59^\circ+\sin^2 31^\circ}$

$\Rightarrow \frac{\cos^2 20^\circ+\sin^2 20^\circ}{\cos^2 31+\sin^2 31}$

$\Rightarrow 1$

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

$\frac{2}{3}=\frac{m}{-7}$

$m=-\frac{14}{3}$

84. $x^3-4x^2-7x+10$

$\Rightarrow (x-1)(x^2-3x-10)$

$\Rightarrow (x-1)(x-5)(x+2)$

$x=1,5,-2$

85. $\frac{x+1}{x^2-1}-\frac{x-x^2+2}{x(x^2-1)}$

$\Rightarrow \frac{x^2+x-x+x^2-2}{x(x^2-1)}$

$\Rightarrow \frac{2x^2-2}{x(x^2-1)}$

$\Rightarrow \frac{2}{x}$

86. $MB=\sqrt{5^2-3^2}$

$MB=4$ cm

AB = 8 cm

87. $2\pi(R+r)h=1320$

$2\pi(8+r)14=1320$

$2\times\frac{22}{7}\times 14(8+r)=1320$

$(8+r)=15$

r = 7

Diameter = 14

88. $\tan\theta=\frac{h}{4}$

$\theta=45^\circ$

89. $\sin\theta(\operatorname{cosec}\theta-\sin\theta)$

$\Rightarrow 1-\sin^2\theta$

$=\cos^2\theta$

90. HT, TH

$P(E)=\frac{1}{2}$

91. Only one way to have same birthday

$\therefore P(E) = \frac{364}{365}$

92. Sunita = y Vineeta = x

(y - 5) = 3(x - 5) (y + 10) = 2(x + 10)

3x – y – 10 = 0 2x – y + 10 = 0

x = 20, y = 50

93. 10, 12, 14 98

98 = 10 + (n – 1)2

88 = 2n – 2

n = 45

94. $A^C \cap B^C$

95. $N = \frac{\frac{4}{3}\pi(8)^3}{\frac{4}{3}\pi(1)^3} = \frac{5}{2}$

96. $\left[\frac{\cos 41}{\cos 41} + \frac{\cos 41}{\cos 41}\right]^2$

$2^2 = 4$

97. C

98. B

99. $S = \frac{20}{2}[16 + (20-1)(-5)]$

$= 10[16 - 95]$

=0 × -79 = -790

100. Distance covered

$= 21 \times 60 \times 2\pi \frac{1.6}{2}$

$= 21 \times 60 \times \frac{22}{7} \times 1.6$

= 6336 m

= 6.336 km

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NTSE STAGE – 1 (2017)

ANSWERS KEYS (MAT)

1.	**D**	**2.**	**C**	**3.**	**B**	**4.**	**D**	**5.**	**B**	**6.**	**C**	**7.**	**A**
8.	**C**	**9.**	**D**	**10.**	**A**	**11.**	**B**	**12.**	**D**	**13.**	**C**	**14.**	**B**
15.	**A**	**16.**	**B**	**17.**	**D**	**18.**	**C**	**19.**	**D**	**20.**	**A**	**21.**	**B**
22.	**A**	**23.**	**B**	**24.**	**D**	**25.**	**B**	**26.**	**C**	**27.**	**A**	**28.**	**B**
29.	**D**	**30.**	**C**	**31.**	**C**	**32.**	**A**	**33.**	**C**	**34.**	**C**	**35.**	**A**
36.	**D**	**37.**	**B**	**38.**	**C**	**39.**	**A**	**40.**	**C**	**41.**	**A**	**42.**	**D**
43.	**A**	**44.**	**C**	**45.**	**B**	**46.**	**D**	**47.**	**A**	**48.**	**D**	**49.**	**C**
50.	**B**												

HINT & SOLUTIONS (MAT)

1. $1^3, 2^2, 3^3, 4^2, 5^3, 6^2, 7^3$
   = 125

2. Common difference 3, 5, 7, 9, 11
   28 + 11 = 39

3. 10, 18, 28, 40, 54, ?, 88
   8 10 12 14 16
   54 + 16 = 70

4. x3, x3, x3,....
   108x3 = 324

5. $1^2, 3^2, 5^2, 7^2, 9^2, 11^2$
   Square of odd numbers is 81

6. Raw material – Clay

7. 1st comes in 2nd- water

8. lack of second results in the first – sanitation

9. Thermometer shows temperature

10. An oven is an appliance to keep food items hot
    Similarly, a refrigerator keeps food-items cold

11. First is made up of second – steel

12. 1st revolves around 2nd – earth

13. 1st + 135º clockwise direction – North East

14. +1, +1, +1, ...
    OFNFTJT

15. +1, -1, +1, -1...
UQBHOHOF

16. +1, +1, +1....
FAMOUS

17. A – 4, C – 5, E – 9, P – 7, T = 7
Ans 455978

18. In the given code
A = 2, B = 4, C = 6, ...2 = 52
So, ACT = 2 + 6 + 40 = 48 and
BAT = 4 + 2 + 40 = 46
Ans – 46

19. All except throat are sense organs – Throat

20. Brother of mother – Uncle
Uncle's son – Cousin

21. Grand son

22. Let Akash's age today = x years
Then, Akash's age after 1 year = (x + 1) years
Therefore x + 1 = 2(x - 12)
$\Rightarrow x+1=2x-24$ = 25

23. Lets son's ager be x
Then father's age is 3x
Five years ago, father's age = 3x – 5
And son's age = x – 5
So, 3x – 5 = 4(x - 5)
$\Rightarrow 3x-5=4x-20$ = 15

24. Given that seventh day of a month is three days earlier than Friday
$\Rightarrow$ Seventh day is Tuesday
$\Rightarrow$ 14^{th} is Tuesday
$\Rightarrow$ 19^{th} is Sunday

25. 26^{th} Jan – Saturday
Day in between 26^{th} Jan to 14^{th} Feb $\Rightarrow$ 19
So off day = 5
Therefore Saturday + 5 = Thursday

26. (Rank from bottom) + (Rank from top) – 1
26 + 7 – 1 = 32

27. Position from right = 14
Total = 40
So $\Rightarrow$ 40 – 14 + 1 = 27

28. South-West

29. 10 meters

30. By observation – C

31. 8 + 6 + 2 + 4 = 20

32. $9 \times 3 = 27$

33. $7 + 5 + 1 + 1 + 3 + 4 = 21$

34. By observation – Six

35. By observation – A (4, 6, 8)

36. By observation – 2

37. By observation – 4

38. $13 + 19 = 32$
$4 \times 8 = 32$
So C – 20

39. x1, x2, x3, x4, x5. X6
$480 \times 6 = 2880$

40. $1 + 2 = 3$
$2 + 3 = 5$
$3 + 5 = 8$
$5 + 8 = 13$

41. $5 \times (6 + 7) = 63$
Ans (A) – 1

42. A + F = K
1 + 6
+5 + 5
Ans D – K

43. By observation (A)

44. By observation (C)

45. By observation (B)

46. By observation (D)

47. By observation (A)

48. By observation (D)

49. By observation (C)

50. By observation (B)