

KARNATAKA NTSE-S TAGE 1(2017)

ANSWER KEYS SOLUTIONS

PHYSICS

1. $\vec{A} \times (\vec{B} \times \vec{C}) \neq \vec{A} \times \vec{B} \times \vec{C}$

Magnitude doubles & direction becomes opposite.

(2)

2. Area under v - t graph \propto change in displacement of the particle

3. (3)

$$m \quad 4m$$

$$p \quad 4p$$

$$mv_1 \quad 4mv_2$$

$$v_1 \quad 4v_2$$

$$K_1 \quad 4K_2$$

$$K_1 = \frac{1}{2}mv_1^2$$

$$K_2 = \frac{1}{2}4m(4v_2)^2$$

$$= \frac{1}{2}m(4v_2)^2$$

$$= 8mv_2^2$$

$$= 16 \times \frac{1}{2}mv_2^2$$

$$= 4 \times \frac{1}{2}mv_2^2$$

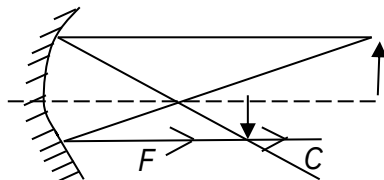
$$K_1 : K_2 = 4 : 1$$

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(2)

4. (2)



Real inverted diminished

5. (2)

(A) \neq correct (R) \neq correct \neq angle of incidence \neq critical angle for TIR

$$6. F = G = \frac{m}{R^2} = \frac{6.67 \times 10^{-11} \times 16}{42} = 3.34 \times 10^{-11} N$$

(2)

7. (1)

8. (1)

8

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9. (A) correct
 (B) correct
 (1)

Pressure proportional to density at constant temp

10. $E = mc^2$

$110 \times 10^6 \times 3 \times 10^8^2$

9×10^{10}

(4)

11. According to Stefan's law

Radiation power $\propto T^4$

On increasing the temperature by two times radiation power will increase 16 times.

(3)

12. In a half positive wave of input AC single upper diode will conduct and in next negative wave lower diode will conduct & it is called full wave rectifier.

(2)

13. Reg $\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}$

$\frac{1}{6} \times \frac{1}{3}$
 $\frac{1}{2}$

(4)

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ANSWERS & SOLUTIONS

CHEMISTRY

14. (3)

Fact

15. (1)

16. Reason: Across the period size decreases, down the group size increases.

17. (4)

Reason: Methane and Propane do not exhibit isomerism

18. (2)

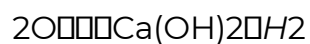
19. Reason: Indicator will have less wavelength in basic medium ($R > Q > P$)

(4)

Reason: Method of preparation of silicon.

(2)

Reason: $\text{Ca} \square \square \text{H}$

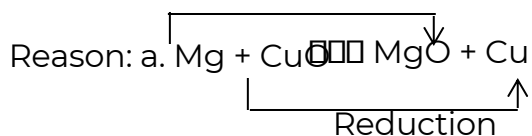


(base)

□

Shows pink colour in phenolphthalein

20.(3)



b. Oxygen is displaced.

21. (2)

Reason: Chemical 'A' cannot be alcohol it can't turn blue litmus to red. Chemical 'B' is an acid.

22. (1)

Reason: $\text{Pb}(\text{NO}_3)_2 \square \square \text{KNO}_3 \square \square \text{Pb} \square \square \text{KNO}_3(\text{aq})$ (yellow ppt).

23. (4)

Reason: $\text{C} \square \square \square \text{CO}(\text{neutral})$ 2

$\text{C} \square \square \square \text{CO}_2(\text{acidic})$

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24.(2)

Reason: X is most electropositive
Y is most electronegative
So, type of bond formed is ionic.

25. (3)

Reason: Methan has negative M.Pt & B.Pt.
Ethanoic acid has positive M.Pt & B.Pt.

26.(4)

(Fact)

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ANSWER KEY

BIOLOGY

27 (3)

. (4)

28 (2)

. (3)

29 (1)

. (3)

30 (3)

. (2)

31 (1)

. (1)

32 (2)

. (4)

33 (3)

. (1)

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39

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ANSWER KEY

SST

41 3 42 4

. 3 . 1

43 4 44 4

. 2 . 4

45 1 46 2

. 2 . 4

47 1 48 1

. 2 . 3

49 3 50 1

. 4 . 1

51 2 52 3

. 1 . 4

53 2 54 1

. 2 . 1

55 3 56 3

. 3 . 1

57 4 58 2

. 2 . 3

59 4 60 4

. 4 . 2

61 62

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63 64

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65 66

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67 68

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69 70

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71 72

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ANSWER KEYS SOLUTIONS

MATHS

81. $r_2^2 = 386 \text{ cm}^2$ $r_2 = 21 \text{ cm}$

$r_1^2 = 962.5 \text{ cm}^2$ $r_1 = 17.5$

$r_2 - r_1 = 3.5 \text{ cm}$

(3)

82. $Vol = \pi r^2 h = V^1$

$V_2 = \pi (1.2r)^2 (1.2h) = \pi r^2 h (1.2)^3$

$= (1.2)^3 V^1$

% Increase in volume $= \frac{V_2 - V_1}{V_1} \times 100 = \frac{(1.2)^3 - 1}{1} \times 100$

$= 72.8\%$

(4)

83. $x^2 + px + q = 0$ has a root '-4'.

$(-4)^2 + p(-4) + q = 0 \Rightarrow 16 - 4p + q = 0$

And $x^2 + 3x + m$ has equal roots $(3)^2 - 4m = 0$

$m = \frac{9}{4}$

84. St I: $\sqrt{5} \sqrt{24} = \sqrt{x} \sqrt{y}$

$\Rightarrow 5 \sqrt{24} = x \sqrt{y} \Rightarrow 2 \sqrt{x} \sqrt{y} = 5 \sqrt{24}$ (wrong)

St II: $\sqrt{5} \sqrt{24} = \sqrt{3} \sqrt{2}$

$\therefore 5 \sqrt{24} = \sqrt{3} \sqrt{2} \Rightarrow 3 \times 2 \times 2 \sqrt{6}$

$= 5 \sqrt{24}$ (True)

(2)

85. $S = \cos^2 5^\circ + \cos^2 10^\circ + \cos^2 15^\circ + \dots + \cos^2 85^\circ + \cos^2 90^\circ$

$S = \cos^2 90^\circ + \cos^2 85^\circ + \dots + \cos^2 5^\circ$

(1)

$2S = (\cos^2 5^\circ + \cos^2 85^\circ) + (\cos^2 10^\circ + \cos^2 80^\circ) + \dots + (\cos^2 85^\circ + \cos^2 5^\circ)$

$S = \frac{17}{2} \times \frac{1}{2}$

(3)

86. $(x+a)$ is a factor of the polynomial $(x^2 + px + q)$ & $(x^2 + mx + n)$

$(a)^2 + p(a) + q = 0$ & $(a)^2 + m(a) + n = 0$

$q = a^2 - pa - m$

$\frac{q - n}{p - m} = a$

(1)

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87. Let LCM x & HCF = y

$$x = 14y \text{ \& } x + y = 600 \implies y = 40$$

\square Let numbers be a & b $\square 560$
 $\square ab = xy = 560 \square 40$

$$a \square 80, b \square \frac{560 \cdot 40}{80} \square 280$$

(3)

88. $P \square Q \square P \square Q \square P \square Q \square P \square Q$
 (4)

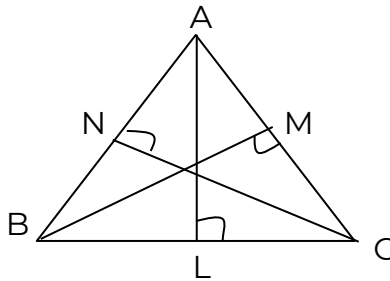
89. $AN \square BL \square CM$

$$\frac{AN}{CL} \square \frac{OA}{OC}$$

$$\frac{BL}{AM} \square \frac{OB}{OA}$$

$$\frac{CM}{BN} \square \frac{OC}{OB}$$

$$\frac{AN \square BL \square CM}{AM \square BN \square CL} \square L$$



(1)

90. FATE: $\boxed{EFT} - 3!$
 $\boxed{EAF} - 3!$

$$FAET - 1$$

$$\square 3! + 3! + 1 = 13$$

(2)

91. 12 points of which 4 collinear.

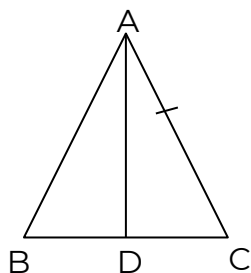
$$\square \text{ total no of lines} = \binom{12}{2} - \binom{4}{2} = 66 - 6 = 60$$

$$\text{total no of triangles} = \binom{12}{3} - \binom{4}{3} = 220 - 4 = 216$$

(4)

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92.



$$AC^2 = AD^2 + DC^2$$

$$BC^2 = AD^2 + 2$$

$$(BD + DC)^2 = AD^2 + DC^2$$

$$AD^2 = BD^2 + 2BD + DC$$

(1)

93. $\frac{\text{No. of black balls}}{\text{total balls}} = \frac{2}{5} \frac{\text{No. of white balls}}{\text{total balls}}$

$$\square \text{Black} = \frac{2}{5} \square \text{White}$$

(2)

94. By alternate segment theorem $\square AMP = \square MBA$

$\square \square$ PMB is isosceles by secant properly $PM^2 = PA \cdot PB$ also $\square PMB$ (\square PMB is isosceles)

$$\square MB^2 = PA \cdot PB$$

Both A & B are true

(4)

(i) a, b, c in GP $\square (b)^2 = Ca = b^2 = ac$

95. (ii) a, b, c in AP $\square 2b = a + c$ $\sqrt{\quad}$

$$\text{(iii) a, b, c in HP} \square \frac{2}{b} = \frac{1}{a} + \frac{1}{c} \square a + c = \frac{2ac}{b}$$

\square (3) i - d, ii - a, iii - b

96. A has smaller standard deviation \square A is more consistent than B only I

$$\& \% = \frac{SD}{Mean} \square 100$$

'B' is more efficient

(2)

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97. $\tan 60^\circ = \frac{H}{b} = \frac{H}{36\sqrt{3}}$

$\tan 30^\circ = \frac{H}{a} = \frac{H}{\sqrt{3}}$

$H^2 = a^2 \cdot 36 = \frac{a^2}{3}$

$H = \frac{a\sqrt{3}}{3}$

(3)

98. Equating slopes $\frac{1-b}{1} = \frac{1}{1-a}$

$1 - a - b + ab = 1$

$ab = a + b \Rightarrow \frac{a+b}{ab} = 1$

(2)

99. $I_1 = 11I, \text{Exp} = 9m$

$I_2 = 7I, \text{Exp} = 5m$

$\frac{11}{9m} = \frac{400}{7} = \frac{5m}{4} = \frac{4m}{1} = m$

$\frac{2}{400} = \frac{200}{1} = \frac{I_2 = 18I}{3} = 600.$

(1)

100. $y = a + a^2 + a^3 + \dots$

sum of infinite GP = $\frac{\text{first term}}{1 - \text{common ratio}}$

$= \frac{a}{1-a} = y$

$a = y(1-a) \quad (a \neq 1)$

$(1-y)a = y$

$a = \frac{y}{1-y}$

(1)