KARNATAKA NTSE-STAGE1(2017)
ANSWER KEY & SOLUTIONS
PHYSICS

1. $\vec{A}$ (2) 2.A

   Magnitude doubles & direction becomes opposite.
   (2)

2. Area under v - t graph change in displacement of the practical
   (3)

3. m $4m$

   p

   mv_1 $4mv_2$

   v_1 $4v_2$

   K_1 K_2

   $K_1 \dfrac{1}{2} mv_1^2$ $K_2 \dfrac{1}{2} 4mv_2^2$

   $\dfrac{1}{2} m (4v_2)^2$ $\dfrac{1}{2} 4mv_2^2$
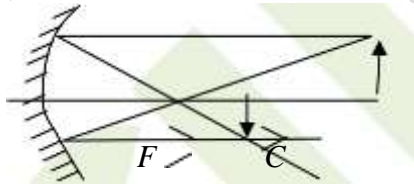
   $16 \dfrac{1}{2} mv_2^2$ $4 \dfrac{1}{2} mv_2^2$

   $K_1 : K_2$ 4:1
   (2)

4. **(2)**

   Real inverted diminished

5. **(2)**
   (A) correct
   (R) correct
   angle of incidence critical angle for TIR

6. $F G \dfrac{m_1 m_2}{R^2 4^2}$ $\dfrac{6.67 \times 10^{-11} \times 2 \times 16}{}$ $13 \, 34 \times 10^{-11} \, N$
   (2)

7. **(1)**

8. **(1)**

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9. (A) correct

(B) correct   Pressure proportional to density at constant temp

(1)

10. Emc^2

$1 \times 10^6 \times \left(3 \times 10^8\right)^2$

9×10^{10} J

(4)

11. According to Stefen's law

Radiation power $\propto T^4$

On increasing the temperature by two time radiation power will increase by $2^4 = 16$

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. $Req = \dfrac{1}{\dfrac{1}{3} + \dfrac{1}{3} + \dfrac{1}{3}} = \dfrac{1}{\dfrac{1}{6} + \dfrac{1}{3}} = 2$

(4)

14. (3)
Fact

15. (1)
Reason: Across the period size decreases, down the group size increases.

16. (4)
Reason: Methane and Propane do not exhibit isomerism

17. (2)
Reason: Indicator will have less wavelength in basic medium (R > Q > P)

18. (4)
Reason: Method of preparation of silicon.

19. (2)
Reason: Ca $+$ 2H$_2$O $\rightarrow$ Ca(OH)$_2$ $+$ H_2
$\qquad\qquad\qquad\qquad$ (base)

Shows pink colour in phenolphthalein

20. (3)

Reason: a. Mg + CuO $\rightarrow$ MgO + Cu

$\qquad\qquad\qquad$ Reduction

$\qquad$ 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: Pb(NO$_3$)$_2$ $+$ 2KI $\rightarrow$ PbI$_2$ $+$ 2KNO$_3$ (aq) (yellow ppt).

23. (4)
Reason: $C + \frac{1}{2}O_2 \rightarrow CO$(neutral) $C + O_2$

$\qquad\qquad$ CO_2 (acidic)

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)

28. (4)

29. (2)

30. (3)

31. (1)

32. (3)

33. (3)

34. (2)

35. (1)

36. (1)

37. (2)

38. (4)

39. (3)

40. (1)

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ANSWER KEY
SST

41.	3	**42.**	4
43.	3	**44.**	1
45.	4	**46.**	4
47.	2	**48.**	4
49.	1	**50.**	2
51.	2	**52.**	4
53.	1	**54.**	1
55.	2	**56.**	3
57.	3	**58.**	1
59.	4	**60.**	1
61.	2	**62.**	3
63.	1	**64.**	4
65.	2	**66.**	1
67.	2	**68.**	1
69.	3	**70.**	3
71.	3	**72.**	1
73.	4	**74.**	2
75.	2	**76.**	3
77.	4	**78.**	4
79.	4	**80.**	2

81. $\pi r^2 = 1386 cm^2$ $r = 21cm$

$\pi r_1^2 = 962.5 cm^2$ $r_1 = 17.5$

$r_2 - r_1 = 3.5cm$

(3)

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

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

$V_2 = (1.2)^3 V_1$

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

$= 72.8\%$

(4)

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

$(4)^2 - P(4) + 4 = 0 \Rightarrow P = 3$

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

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

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

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

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

$\because \sqrt{5 + \sqrt{24}} = \sqrt{3} + \sqrt{2} + 2\sqrt{6}$

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

(2)

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

$S = \cos^2 90 + \cos^2 85 + ... + \cos^2 5$

$(\because \cos 90 = 0)$

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

$S = \dfrac{17}{2} = \dfrac{81}{2}$

(3)

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

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

$q - aP = n - am$

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

(1)

87. Let LCM x & HCF = y

x = 14y & x + y = 600

$$y \quad 40$$

$$x \quad 560$$

Let numbers be a &

b ab = xy = 560 $\times$ 40

$a \quad 80, b \quad \dfrac{560 \times 40}{80_2} \quad 280$

(3)

88. $_{P \ Q} \qquad _{P \ Q} \qquad _{P \ Q}$

(4)

89. $AN \quad BL \quad CM$

$\dfrac{AN}{CL} \quad \dfrac{OA}{OC}$

$\dfrac{BL}{AM} \quad \dfrac{OB}{OA}$

$\dfrac{CM}{BN} \quad \dfrac{OC}{OB}$

$\dfrac{AN}{AM} \cdot \dfrac{BL}{BN} \cdot \dfrac{CM}{CL} \quad L$

(1)
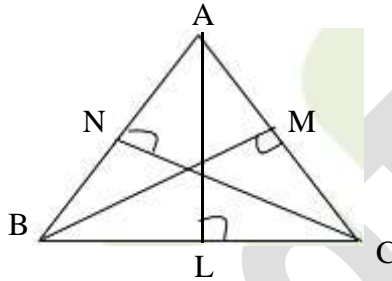
90. FATE: A $\boxed{EFT}$ — 3! $\qquad$ FAET — 1

E $\boxed{AFT}$ — 3! $\qquad$ 3!+3!+1=13

(2)

91. 12 points of which 4 collinear.

total no of lines = $^{12}C_2 \quad ^4C_2 \quad 1 \quad 61$

total no of triangles = $^{12}C_3 \quad ^4C_3 \quad 216$

(4)

92.
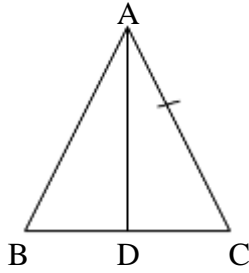
$AC^2 = AD^2 + DC^2$

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

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

$AD^2 + BD^2 + 2BD \cdot DC$

(1)

93. $\dfrac{No.\ of\ black\ balls}{total\ balls} = \dfrac{2}{5} = \dfrac{No.\ of\ while\ balls}{total\ balls}$

$Black = \left(\dfrac{2}{5}\right) \times 60 = 12$

(2)

94. By alternate segment theorem ∠AMP = ∠MBA

PMB is isosceles by secant properly $PM^2 = PA.PB$ also $PM = MB$ (∵ PMB is isosceles)

$MB^2 = PA.PB$

Both A & B are true

(4)

95. (i) a, b, c in GP $(b)^2 = Ca = bac$

(ii) a, b, c in AP 26 = a + c

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

(3) i – d, ii – a, iii – b

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

& % = $\dfrac{SD}{Mean} \times 100$

'B' is more efficient

(2)

97. $\tan 60 \quad \dfrac{H}{b} \quad H36 \quad \sqrt{}$

$\tan 30 \quad \dfrac{H}{a} \quad H^a \quad \sqrt{3}$

$H^2 \quad \sqrt{}36 \quad \dfrac{a}{\sqrt{3}} \quad a$

$H \quad ab$

(3)

98. Equating slopes $\dfrac{1 \quad b}{1 \quad 1a} \quad 1$

$1 - a - b + ab = 1$

$ab = a + b \quad a \quad b \quad 1$

$\quad\quad\quad\quad ab$

(2)

99. $I_1 \quad 11l \,, \; Exp_1 \quad 9m$

$I_2 \, 7l \,, \; Exp_2 \quad 5m$

$11l \quad 9m \quad 400 \quad 7l \quad 5m \quad 4l \quad 4m \quad l \quad m$

$2l \quad 400 \quad l \quad 200 I_1 \quad I_2 \quad 18l \quad 3,600.$

(1)

100. $y \quad a \quad a^2 \quad a^3 \quad \dots \quad a \quad 1$

$\quad\quad\quad\quad\quad\quad\quad\quad\quad first\ term$

sum of infinite G.P $\quad \dfrac{1}{common\ ratio}$

$\quad\quad\quad\quad \dfrac{a \quad y}{1a}$

$a \quad y \quad y^a \quad (a \quad 1)$

$(1 \quad y) a \quad y$

$a \quad \dfrac{y}{1 \quad y}$

(1)