NTSE STAGE-II (2013)

CLASS-X [LANGUAGE]

ANSWERKEY

ENGLISH

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

HINDI

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

NTSE STAGE-II (2013)

CLASS-X [SAT]

HINTS & SOLUTIONS

ANSWER KEY

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

CHEMISTRY

15. Liquid A gives a more cooling sensation than liquid B means liquid A is early vaporised than liquid B. Thus, liquid A has less B P and lower latent heat of vaporisation than that of liquid B.

16.

A	B	C
↓	↓	↓
Soluble in water	Insoluble in water	soluble in water and also sublimable

First of all 'C' can be separated from the mixture by sublimation. Thereafter, the mixture of 'A' and 'B' can be put in water, filtered to separate B and recover A by crystallisation.

17. $2H_2 + O_2 \rightarrow 2H_2O$
4gm 32gm 36gm
2gm 16gm 18gm
2 + 16 = 18 gm

18. No. of electrons in L shell = 7
No. of protons = 9
Electronic configuration = 2,7
By acquiring one e^- in L shell
gets $8e^-$ in the last shell.

19. This reaction takes place in presence of oxygen. Hence, it is a combustion reaction and in this reaction there is a addition of two elements so it is combination reaction.

20. $CaCO_3 + \text{mineral acid} \longrightarrow \underset{(X)}{CO_2}\uparrow \xrightarrow[(Y)]{Ca(OH)_2} \underset{(X)}{CaCO_3}$

$Ca(OH)_2 + Cl_2 \longrightarrow \underset{(Z)\text{Bleaching powder}}{CaOCl_2}$
(Y)

21. [A] $\underset{\text{weak acid}}{CH_3-COOH} + \underset{\text{weak base}}{NH_4OH} \rightarrow \underset{\text{salt}}{CH_3-COONH_4} + H_2O$

[B] $\underset{\text{metal oxide}}{Na_2O} + H_2O \longrightarrow \underset{\text{base}}{NaOH} + H_2\uparrow$

[C] $Mg + 2HCl \longrightarrow \underset{\text{salt}}{MgCl_2} + H_2\uparrow$
metal

[D] $\underset{\text{Metal oxide}}{Na_2O} + \underset{\text{Mineral acid}}{2HCl} \longrightarrow \underset{\text{Salt}}{2NaCl} + H_2O$

22. $2Al + 6HNO_3 \longrightarrow Al_2O_3 + 6NO_2 + 3H_2O$
|
Protective layer

23. $\underset{(X)}{Na} + H_2O \longrightarrow \underset{(Y)}{NaOH} + \underset{(Z)}{H_2} + \text{Energy}$

$NaOH_{(aq)} + HCl_{(aq)} \longrightarrow NaCl_{(aq)} + H_2O_{(\ell)}$
X = Na, Y = NaOH, Z = H_2

24. $\underset{\text{(Alcohol)}}{Y} \xrightarrow[\text{Acidification}]{\text{Alkaline } KMnO_4} \underset{\text{(Carboxylic acid)}}{X}$

$\underset{\text{(Alcohol)}}{Y} + \underset{\text{(Carboxylic acid)}}{X} \xrightarrow[H_2SO_4]{\text{Conc.}} \underset{\text{Sweet smelling substance}}{Z}$

Hence X = Ethanoic acid, Y = Ethanol,
Z = Ethylethanoate

$\underset{(Y)}{C_2H_5OH} \xrightarrow[KMnO_4]{\text{Alkaline}} \underset{(X)}{CH_3COOH}$

$\underset{(Y)}{C_2H_5OH} + \underset{(X)}{CH_3COOH} \xrightarrow[H_2SO_4]{\text{Conc.}} \underset{(Z)}{CH_3COOC_2H_5}$

25. C_2H_2 is Ethyne and C_3H_6 is propene. Both of them are hydrocarbon. Hence they would undergo combustion to form CO_2 & H_2O.
Both C_2H_2 & C_3H_6 are unsaturated compounds. Hence they would undergo addition reaction.

26. $2X + 3H_2 \longrightarrow 2XH_3$
Element 'X' is placed on R.H.S. of periodic table. It is non-metal.
Element 'X' is combining with three monovalent H-atoms. Hence its valency is three. It has 5 valence electrons. It is a gas.

27. Element 'X' (Z = 12) is Mg and, Element 'Y' (Z = 17) is Cl.

$\underset{(X)}{Mg} + \underset{(Y)}{Cl_2} \longrightarrow \underset{(Z)}{MgCl_2}$

Molucular formula of Z is XY_2.
Compound 'Z' is ionic compound, hence it would conduct electricity in molten state.

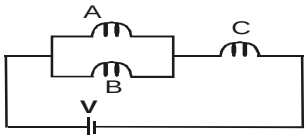
PHYSICS

28. If air bubble is in the path then sound wave will take more time to travel this distance.

30. In optical lens (for eye defects) concave lens is used. focal length must be much larger then 2.5 cm if its is equal or less than 2.5 cm then it mean that the power point is at approxmetly 2.5 cm, which is not possible.

31. Since F_g is perpendicular to displacement at each instant so
Work done = 0

32.



Resistance of each bulb is R.

$I = \frac{2V}{3R}$

$P_A = P_B = \left(\frac{V}{3R}\right)^2 R = \frac{V^2}{9R}$ .... (i)

$P_C = \frac{4V^2}{9R}$ .... (ii)

When bulb A is fused, then

Now, current, $I = \frac{V}{2R}$

So. $P_B = P_C = \frac{V^2}{4R}$ .... (iii)

So, B will be brighter and C will be dimmer

33. Since V_{AB} & resistance (2R) is same so 'i' will also be same

34. $KE = \frac{p^2}{2m}$

$\left|\vec{P}\right|$ is same so $KE \propto \frac{1}{m}$

35. x is decreasing with decresing speed

37. Average speed = $\frac{20}{20}$ = 1 m/s

maximum speed from graph is between time t = 10 sec. and t = 18 sec.

$$V_{max} = \frac{20-4}{18-10} = \frac{16}{8} = 2 \text{ m/s}$$

38. $g = \frac{GM}{R^2} = \frac{G\frac{4}{3}\pi R^3\rho}{R^2}$

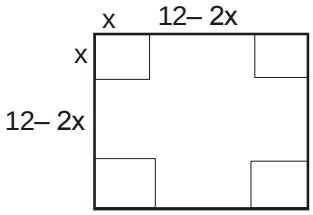
$= \frac{4}{3}\pi g\rho R$

$g \propto R$

39. Plastic is non magnetic substance and open ring does not form magnetic poles so due to induction only ring Q will experience retarding force

MATHEMATICS

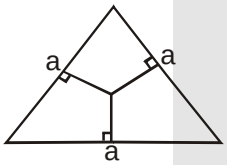
41.



$V = x(12 - 2x)^2$
This box has maximum volme when x = 2 cm which is 128 c.c.
So, volume130 cc is not possible.

42. For similarity of triangles we have SSS criteria. So S_1 in true.
But for polygon : two polygon to be similar if the corresponding sides are in same ratio then corresponding angle must be same. So S_2 is not correct.

43.



$a = 2\sqrt{3}$ cm

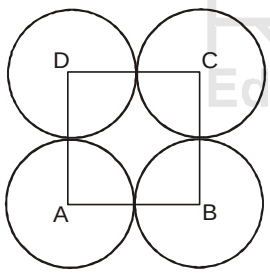
$\frac{1}{2}a(x + y + z) = \frac{\sqrt{3}}{4}a^2$

$x + y + z = \frac{\sqrt{3}}{2}a = \frac{\sqrt{3}}{2} \times 2\sqrt{3} = 3$ cm

44. $\sqrt[4]{6765201} = 51$

45. All odd square can be written in the form 8n+1
$1^2 = 1 = 8 \times 0 + 1$
$3^2 = 9 = 8 \times 1 + 1$
$5^2 = 25 = 8 \times 3 + 1$
$7^2 = 49 = 8 \times 6 + 1$

46.



Area of interior region $= a^2 - \pi\left(\frac{a}{2}\right)^2$

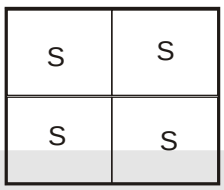
$= a^2 - \pi\frac{a^2}{4}$

$= a^2\left(\frac{4 - a}{4}\right)$

47. tan1° tan2° tan3° .....tan89°
= (tan1° tan89°) (tan2° tan88) ..... tan45°
= (tan1° tan1°) (tan2° cot2°) .....(1)
= (1) (1) ..... (1)
= 1

48. $ax^2 + bx + c = 0$ will have real roots when c = 0.

49.



If we cut square S from a piece of tin at that time the volume of open box is 0.
But the open box made from S is always be greater than 0.
So according to this 4th option is not possible.

50. Every parallelogram is a trapezium

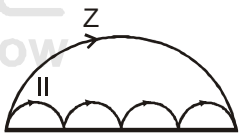
51. Triangle (By SSS criteria).

52. Let there are x human being and y dogs
$\therefore$ Total legs = 2x + 4y
one tenth of x human beings lost a leg.

$\therefore (2x + 4y) - \frac{x}{10} = 77$

$\frac{19x}{10} + 4y = 77$
when x = 10
4y = 77 – 19 = 58 (Which is not possible).
when x = 30
57 + 4y = 77
4y = 20
y = 5
$\therefore$ Number of dogs = 5

53. Let if we take n small simicircle of radii r
If we take n small simicircle of radii 2R = 2nr
If we take n small simicircle of radii R = nr



Part I = $\pi R = n\pi r$
Part II = $n(\pi r)$
so Part I & II always be equal.

54. From 1 to 50 number.
No. which are divisible by 4 = 25
No. which are divisible by 6 = 16
No. which are divisible by 12 = 8
No. which are divisible by 4 or 6 = 25 + 16 – 8
= 33
So, number which are not divisible by 4 or 6
= 100 – 33 = 67
So, requred probability = $\frac{67}{100} = 0.67$

Resonance
Educating for better tomorrow

55. $\sqrt{(a-b)^2} + \sqrt{(b-a)^2}$

= |a – b| + |b – a|

Let a > b	Let a < b
then	then
|a – b| + |b – a|	|a – b| + |b – a|
= a – b + a – b	= b – a + b – a
= 2a – 2b	= 2b – 2a
i.e. +ve	i.e. +ve

So answer is always +ve if $a \neq b$

56. $\frac{4}{3}\pi R^3 = \frac{4}{3}\pi (r_1^3 + r_2^3 + r_3^3 + ...r_n^3)$ ... (i)

$S_1 = 4\pi R^2$

$S_2 = 4\pi(r_1^2 + r_2^2 + r_3^2 + ... + r_n^2)$

From (i) , we get

$R^3 = r_1^3 + r_2^3 + r_3^3 + ... + r_n^3$

If all smaller sphere are of equal radius i.e. r

then, $\frac{4}{3}\pi R^3 = \frac{4}{3}\pi \times nr^3$

$R^3 = nr^3$

$\frac{S_1}{S_2} = \frac{R^2}{n \times r^2} = \frac{(nr^3)^{2/3}}{nr^2} = \frac{n^{2/3} \times r^2}{nr^2}$

$nS_1 = n^{2/3} S_2 \Rightarrow n^{1/3}S_1 = S_2 \quad \therefore S_2 > S_1$.

57. 23.10 1 00 1 000 1 0000 ..... is an irrational number as it is Non-terminating & non-repeating.

58. Out of the options, 14 cannot be made as it required 2, Rs. 5 coins & 4, Rs. 1 coin i.e. 5, 5, 1, 1, 1, 1.

59. Ascending order

1, 3, 4, 6, 7, 8, 8, 9, 12, 15

Median = $\frac{7+8}{2}$ = 7.5.

60. Average speed = 6 km/hr.

$6 = \frac{2 \times 4 \times x}{4 + x}$

24 + 6x = 8x

2x = 24

x = 12 km/hr.

Resonance
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