

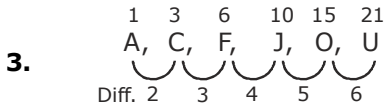
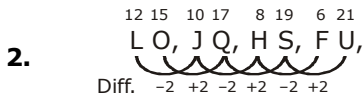
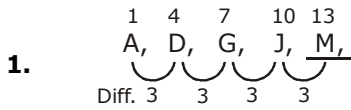
# MOTION

Nurturing potential through education

## NATIONAL TALENT SEARCH EXAMINATION(NTSE) 2017 STAGE-I

### MENTAL ABILITY TEST (MAT) - 210-A

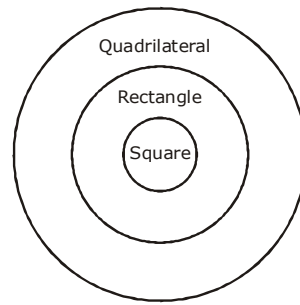
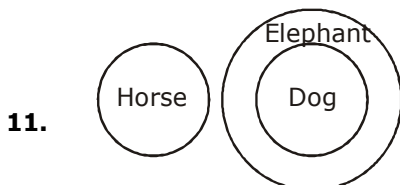
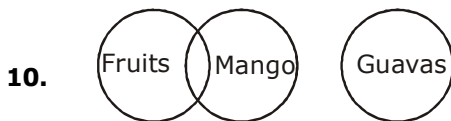
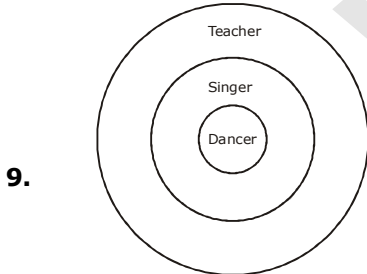
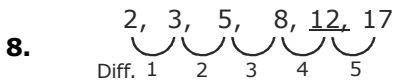
1. (2) 2. (1) 3. (4) 4. (2) 5. (1) 6. (2) 7. (4)  
8. (2) 9. (3) 10. (4) 11. (2) 12. (1) 13. (3) 14. (2)  
15. (1) 16. (4) 17. (4) 18. (1) 19. (4) 20. (4) 21. (2)  
22. (1) 23. (3) 24. (4) 25. (3) 26. (1) 27. (1) 28. (1)  
29. (2) 30. (2) 31. (3) 32. (4) 33. (1) 34. (4) 35. (3, 4)  
36. (3) 37. (3) 38.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



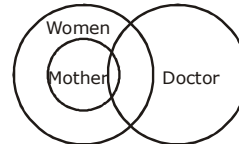
5.  $(11)^2, (12)^2, (13)^2, (14)^2, (15)^2, (16)^2$

6.  $5, 2 \times 5 = 10, 2 \times 10 = 20, \underline{2 \times 20 = 40}, 2 \times 40 = 80$

7.  $(2)^2, (2)^3, (3)^2, (3)^3, (4)^2, (4)^3, (5)^2, (5)^3$



12.



13.

14.  $3 + 6 + 10 + 12 = 31$

15. 8

16. MNOP are in continuous

17.  $(10)^3 = 1000$

$10000 \div 10 = 1000$

$2^3 \times 5^3 = 1000$

$2000 - 2 = 1098$

18. Pacific is ocean and others are continent

19. Nepal, Pakistan and Srilanka are neighbour of India.

20.  $1 \leftrightarrow 4$

$2 \leftrightarrow 5$

$3 \leftrightarrow 6$

21.  $1 \leftrightarrow 3$

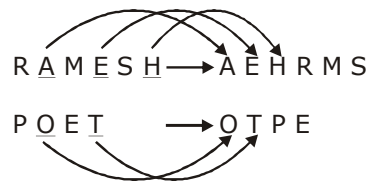
$4 \leftrightarrow 2$

$5 \leftrightarrow 6$

22.  $n = 4$

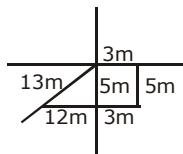
Zero side painted =  $(n - 2)^3 = 8$

23. 1 side painted =  $6(n - 2)^2 = 24$



24.

- 25.** 19 3 8 15 15 12 → 21 1 10 13 17 10  
 SCHOOL → U A J M Q J  
 16 18 9 14 3 9 16 12 5 → 18 16 11 12 5 7 18 10 7  
 PRINCIPLE → R P K L E G R J G
- 26.** H A T C B  
 6 2 8 3 0
- 27.** B H I C K  
 0 6 7 3 4
- 28.** (1)



- 29.** 13 km, North-East
- 30.** (2)
- 31.** (3), One ring is added after every 2 step.
- 32.** (4) The one arrow is kept fixed and other is rotated by  $90^\circ$  in each step.
- 33.** (1)
- 34.** (4) The dot is moved by 1 position then 2 positions Then 3 positions & then 4 positions.
- 35.** Either (3) & (4)
- 36.** (3) All other are symmetric
- 37.** (4) All other figures contain dots.
- 38.** (4) Every outer shape has 1 side more than innershape.

- 39.** (2)
- 40.** (2)
- 41.** (4)
- 42.** (2)
- 43.** (4)
- 44.** (1)
- 45.** (2)
- 46.** (2)
- 47.** (3) By making the cube and analysing.
- 48.** (2) No. divisible by 7 between 11 to 50  
 = 6(14, 21, 28, 35, 42, 49)  
 out of which only 2 no. (21, 42) are divisible by 3.  
 $\therefore$  Required no. = 6 - 2 = 4
- 49.** (2) 6 pentagons (as every cube make one pentagon)
- 50.** (4) 10 trinalges

# MOTION

Nurturing potential through education

## NATIONAL TALENT SEARCH EXAMINATION(NTSE) 2017 STAGE-I

### LANGUAGE COMPREHENSION TEST (LCT) - 211-B

#### HINDI

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

#### ENGLISH

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

## English

- 1.** (3)  
They looted us, took over what was ours.  
Sol. As inferred in the fourth line of the first paragraph.
- 2.** (2)  
Because we respect the freedom of others.  
Sol. As inferred in the seventh line of the first paragraph.
- 3.** (3) It is the freedom that we must protect and nurture and build on.  
Sol. As inferred in the second last line of the first paragraph.
- 4.** (4)  
His second vision for India is development.  
Sol. As inferred in the fourth line of the second paragraph.
- 5.** (1)  
We must be strong as military and economic powers.  
Sol. As inferred in the last line of the second paragraph.
- 6.** (2) Reads  
Sol. As it is showing regular routine action of the third person.
- 7.** (1) is knocking  
Sol. As the action is being done in the present.
- 8.** (3) has come  
Sol. "Just now" takes present perfect form.
- 9.** (2) was won  
Sol. Sentence in the passive voice of simple past tense.
- 10.** (1) is being recited  
Sol. Sentence in the passive voice of present continuous tense.
- 11.** (2) is sung  
Sol. Sentence in the passive voice of simple present tense.
- 12.** (3) will be given away  
Sol. Sentence in the passive voice of simple future tense.
- 13.** (4) What I was  
Sol. Question in the direct speech changes into affirmative sentence in the indirect speech.
- 14.** (2) that he had won  
Sol. Present perfect of the direct speech changes into past perfect in the Indirect speech.
- 15.** (3) She wanted  
Sol. Simple present tense in the direct speech changes into simple past tense in the indirect speech.
- 16.** (2) May  
Sol. As it shows the possibility.
- 17.** (3) Would  
Sol. As it is showing request.
- 18.** (1) needn't  
Sol. As it is showing an obligation. The negative form of must is need not/needn't.
- 19.** (3) is  
Sol. Words such as As well as, Along with, in addition to, takes its verb according to the first subject. Here the first subject is a single person "Jaiprakash".
- 20.** (2) is dead  
Sol. The poet and playwright is the same person.
- 21.** (4) are  
Sol. Conjunctions both .... And take its plural verb.
- 22.** (3) is  
Sol. The phrase "The number of" takes singular verb.
- 23.** (2) A little  
Sol. It is a common Idiom.  
The word "dangerous" shows that the uncountable noun knowledge is not sufficient.

- 24.** (3) Some  
Sol. Money is an uncountable noun.
- 25.** (4) Through  
Sol. As the window works as a passage for the snake.
- 26.** (1) of  
Sol. The word "sake" is always followed by preposition "of".
- 27.** (3) By  
Sol. By your watch has the idiomatic meaning of "according to".
- 28.** (3) that  
Sol. Conjunction so is always followed by the word "that".
- 29.** (2) eating  
Sol. The word eating shows the regular action.
- 30.** (2) While  
Sol. The word "while" is used when two actions go side by side.
- 31.** (1) isn't it  
Sol. Positive statement takes a negative tag.
- 32.** (3) Will he  
Sol. Negative statement takes a positive tag.
- 33.** (1) (a) (e) (c) (d)  
Sol. The best possible arrangement.
- 34.** (4) (a) (c) (e) (d)  
Sol. The best possible arrangement.
- 35.** (2) Sad  
Sol. The similar meaning of downcast is sad.
- 36.** (1) A person who finds it difficult to stop working.  
Sol. This is the appropriate meaning of workholic.
- 37.** (4) Latter  
Sol. The opposite meaning of former is latter.
- 38.** (1) Enemy  
Sol. The opposite meaning of Ally is Enemy.
- 39.** (3) Attracted by  
Sol. Taken with some one or something means to be interested in or attracted to them.
- 40.** (1) distribute  
Sol. Give away means to provide/offer something for free.
- 41.** (2) Robert Frost  
Sol. The poem "The Road not taken" is written by Robert Frost.
- 42.** (4) Leslie Norris  
Sol. The poem "A Tiger in The Zoo" is written by Leslie Norris.
- 43.** (3) Adverb  
Sol. As the word "in" qualifies the verb "came".
- 44.** (2) Adjective  
Sol. As the word "favoured" qualifies the noun "corner".
- 45.** (3) No other month of the year is as cold as December.  
Sol. The superlative degree will change into positive degree to make it negative.
- 46.** (1) inauguration  
Sol. The ceremony held on the day is inauguration.
- 47.** (2) Beehive  
Sol. The only correct spelling among the given options.
- 48.** (2) 18 year and above  
Sol. It is a law by the country.
- 49.** (1) in the act of doing something wrong.  
Sol. The idiomatic red-handed means being caught doing something wrong.
- 50.** (4) by any means possible  
Sol. The idioms by hook or by crook means doing whatever means possible, fair or unfair.

# MOTION

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## NATIONAL TALENT SEARCH EXAMINATION(NTSE) 2017 STAGE-I

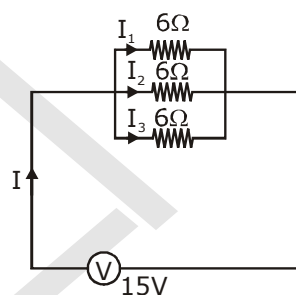
### SCHOLASTIC APTITUDE TEST (SAT) - 212-C

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

## SOLUTION

1. (2)  
 $a = -8\text{m/s}^2$   
 $t = 3\text{ s}$   
 $\therefore$  Initial velocity =  $8 \times 3 = 24\text{ m/s}$   
 $s = ut + \frac{1}{2} at^2$   
 $s = 24 \times 3 + \frac{1}{2} (-8) (3)^2$   
 $= 72 - 36$   
 $s = 36\text{m}$
2. (1)  
 $m_1 = 10\text{ gram} = 10 \times 10^{-3}\text{ kg}$   
 $u_1 = 100\text{ m/s}$   
 $m_2 = 1\text{kg}$   
 $u_2 = 0$   
 Using conservation of momentum  
 $10 \times 10^{-3} \times 100 = (10 \times 10^{-3} + 1) \times V$   
 $\frac{1}{1 + 10 \times 10^{-3}} = V$   
 $V = 1\text{ m/s}$
3. (3)  
 Buoyant force depends upon weight of the liquid displaced.  
 $B = \rho vg$   
 $\therefore B$  depends upon density of liquid.
4. (1)  
 1 unit of energy =  $3.6 \times 10^6\text{J}$   
 200 unit of energy =  $7.2 \times 10^8\text{J}$
5. (1) Velocity of sound is maximum in solids  
 Hence Glass
6. (1)  
 $W_E = 15 \times 9.8\text{ N}$   
 $W_m = \frac{W_E}{6} = \frac{15 \times 9.8}{6} = 24.5\text{ N}$
7. (4)  
 $W = \frac{1}{2}mv^2 - \frac{1}{2}mu^2$   
 $= \frac{1}{2} \times 2 \times \left(\frac{72 \times 5}{18}\right)^2 - \frac{1}{2} \times 2 \times \left(18 \times \frac{5}{18}\right)^2$   
 $= 400 - 25 = 375\text{J}$
8. (2)  
 For real inverted and magnified image, object's position should be between principal focus & centre of curvature.

9. (3)  
 Speed will be maximum in Rarer medim.  
 $\therefore n_3$  is rarer (As light bends away from Normal)
10. (3)  
 Tyndall effect is an example of scattering.
11. (3)  
 $\vec{F} = q(\vec{v} \times \vec{B})$   
 For  $e^-$  direction of force will be opposite  
 So, using right hand thumb rule  
 Force will be out of the page on the  $e^-$
12. (1)  
 $R_{eq} = \frac{1}{\frac{1}{6} + \frac{1}{6} + \frac{1}{6}}$   
 $R_{eq} = 2\Omega$   
 $I = \frac{V}{R_{eq}} = \frac{15}{2} = 7.5\text{A}$



- $\therefore$  The current will be divided equally into 3 parts  
 $\therefore I_1 = I_2 = I_3 = \frac{I}{3} = 2.5\text{A}$
13. (2)  
 $10^6\text{ K}$
14. (3)  
 Mass % of a solution =  $\frac{\text{solute}}{\text{solute} + \text{solvent}} \times 100$   
 $= \frac{30}{(30 + 220)} \times 100 = \frac{30}{250} \times 100 = 12\%$
15. (1)  
 Gel (Dispersed phase - Liquid & Dispersing medium - Solid)
16. (2)  
 Fractional distillation (Minimum difference between B.P <  $25^\circ\text{C}$ )



17. (4)  
Electronic configuration of Mg = 2, 8, 2  
No. of valence electrons in Mg = 2
18. (3)  
Given mass of O<sub>2</sub> = 4gm  
No. of moles =  $\frac{\text{Given mass}}{\text{Molecular mass}} = \frac{4}{32} = \frac{1}{8}$   
1 oxygen molecule = 2 atoms  
No. of atoms in 4gm of oxygen  
Molecules = 2 × mole × N<sub>A</sub>  
 $= 2 \times \frac{1}{8} \times 6.022 \times 10^{23} = 1.5055 \times 10^{23}$  atoms
19. (4)  
 $\text{Al}^{3+} = \begin{matrix} 27 \\ 13 \end{matrix} \text{Al} \longrightarrow \begin{matrix} 27 \\ 13 \end{matrix} \text{Al}^{3+} + 3e^{-}$   
 $\text{F}^{-} = \begin{matrix} 19 \\ 9 \end{matrix} \text{F} + e^{-} \longrightarrow \begin{matrix} 19 \\ 9 \end{matrix} \text{F}^{-}$   
Electron same (Al<sup>3+</sup> & F<sup>-</sup>)
20. (4)  
pH of Base > 7
21. (3)  
Ag is less reactive at high temperature
22. (2)  
Gold and platinum dissolve in Aqua-Regia.  
Aqua-Regia = HCl + HNO<sub>3</sub>  
3 : 1
23. (3)  
K is most reactive according to reactivity series
24. (3)  
 $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow[\text{H}_2\text{SO}_4]{\text{Conc.}} \text{CH}_2 = \text{CH}_2 + \text{H}_2\text{O}$   
Ethanol Ethene
25. (1)  
Electronic configuration of sodium(Na) = 2, 8, 1  
Potassium(K) also same electronic configuration = 2, 8, 8, 1
26. (3)  
Ethanol + Methanol → Denaturated alcohol
27. (4) Mitochondria
28. (3) Bryophyta
29. (4) Sclerenchyma
30. (4) Cytokinin
31. (3) Callus
32. (1) Plant conservation
33. (1) Ultraviolet radiation
34. (3) Lysosome
35. (4) Stratified squamous epithelium
36. (3) Ascaris (It comes under Aschelminthes)  
rest are in platyhelminthes
37. (4) Echidna
38. (2) 120/80 mm Hg
39. (1) Spinal cord. (CNS = Brain + Spinal cord)
40. (4) Dinosaur  
*Raja saurus* is a genus of a theropod dinosaur, found in India. "Saurus" means lizard. So, they are reptiles
41. (2)  
41. We have,  
 $= \sqrt[3]{3x^{1/3}y^{1/3}(x^{1/3} + y^{1/3})}$   
 $= \sqrt[3]{(x^{1/3} + y^{1/3})^3}$   
 $= x^{1/3} + y^{1/3}$
42. (2)  
 $0.\overline{23} + 0.\overline{23}$   
 $= \frac{23}{99} + \frac{23-2}{90}$   
 $= \frac{23}{99} + \frac{21}{90}$   
 $= 0.4\overline{65}$
43. (1)  
 $x + \sqrt{2}$  is a factor of  $kx^2 - \sqrt{2}x + 1$   
 $\Rightarrow k(-\sqrt{2})^2 - \sqrt{2}(-\sqrt{2}) + 1 = 0$   
 $\Rightarrow 2k + 2 + 1 = 0$   
 $\Rightarrow 2k = -3$   
 $\Rightarrow k = \frac{-3}{2}$
44. (3)  
we have  
 $3x + 2y = 13xy$  ....(i)  
 $4x - 5y = 2xy$  ....(ii)  
these two equation satisfied by  $(\frac{1}{2}, \frac{1}{3})$   
putting in equation (i),  $x = 1/2$  and  $y = 1/3$   
 $\Rightarrow 3 \times \frac{1}{2} + 2 \times \frac{1}{3} = 13 \times \frac{1}{2} \times \frac{1}{3}$   
 $\Rightarrow \frac{3}{2} + \frac{2}{3} = \frac{13}{6}$

$$\Rightarrow \frac{13}{6} = \frac{13}{6}$$

Putting in equation (ii),  $x = 1/2$  and  $y = 1/3$

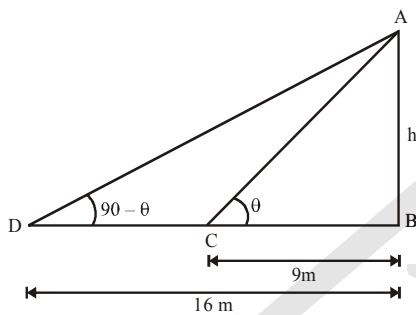
$$\Rightarrow 4 \times \frac{1}{2} - 5 \times \frac{1}{3} = 2 \times \frac{1}{2} \times \frac{1}{3}$$

$$\Rightarrow \frac{4}{2} - \frac{5}{3} = \frac{2}{3}$$

$$\Rightarrow \frac{2}{3} = \frac{2}{3}$$

45. (1)

Let  $h$  be the height of the tower  $AB$



$$\text{In } \triangle ABC, \tan \theta = \frac{AB}{BC}$$

$$\Rightarrow \tan \theta = \frac{h}{9} \quad \dots(i)$$

$$\text{In } \triangle ABD, \tan(90 - \theta) = \frac{AB}{BD}$$

$$\Rightarrow \tan(90 - \theta) = \frac{h}{16}$$

$$\Rightarrow \cot \theta = \frac{h}{16} \quad \dots(ii)$$

multiplying (i) & (ii)

$$\Rightarrow \tan \theta \cdot \cot \theta = \frac{h}{9} \times \frac{h}{16}$$

$$\Rightarrow 1 = \frac{h^2}{144}$$

$$\Rightarrow h = 12 \text{ m}$$

46. (4)

$$\text{We have, } \frac{p - 2p^3}{2q^3 - q}$$

$$= \frac{p(1 - 2p^2)}{q(2q^2 - 1)} \quad \dots(i)$$

Putting  $p = \sin \theta$  and  $\theta = \cos \theta$  in equation (i)

$$= \frac{\sin \theta (1 - 2 \sin^2 \theta)}{\cos \theta (2 \cos^2 \theta - 1)}$$

$$= \tan \theta$$

47. (4)

$AD \parallel BC$ ,  $AB$  is a transversal intersecting line

$$\Rightarrow \angle DAB + \angle ABC = 180^\circ$$

(consecutive interior angle)

$$\Rightarrow \frac{1}{2} \angle DAB + \frac{1}{2} \angle ABC = 90^\circ$$

$$\Rightarrow \angle PAB + \angle PBA = 90^\circ \quad \dots(i)$$

In  $\triangle APB$ ,

$$\Rightarrow \angle PAB + \angle PBA + \angle APB = 180^\circ \quad \dots(ii)$$

Solving equation (i) and (ii), we get

$$\Rightarrow \angle APB = 90^\circ$$

48. (1)

$$OA = OB \quad [\text{radii of circle}]$$

$$\Rightarrow \angle OBA = \angle OAB = y^\circ$$

$$\Rightarrow \angle AOB = 2 \angle ACB$$

$$\Rightarrow \angle AOB = 2x^\circ$$

In  $\triangle AOB$ ,

$$\Rightarrow \angle AOB + \angle OBA + \angle OAB = 180^\circ$$

$$\Rightarrow 2x^\circ + y^\circ + y^\circ = 180^\circ$$

$$\Rightarrow 2x^\circ + 2y^\circ = 180^\circ$$

$$\Rightarrow x^\circ + y^\circ = 90^\circ$$

49. (1)

In  $\triangle ABC$  and  $\triangle BDC$

$$\triangle BCA \sim \triangle BDC$$

$$\Rightarrow \frac{AB}{BC} = \frac{BC}{BD}$$

$$\Rightarrow \frac{AB}{BC} = \frac{BC}{9}$$

$$BC^2 = 9 \times 13 \quad \dots(i)$$

In  $\triangle ACB \sim \triangle ADC$

$$\Rightarrow \frac{AB}{AC} = \frac{AC}{AD}$$

$$\Rightarrow \frac{13}{AC} = \frac{AC}{4}$$

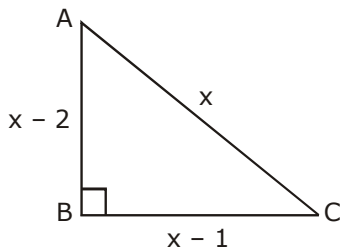
$$\Rightarrow AC^2 = 4 \times 13 \quad \dots(ii)$$

From equation (i) and (ii)

$$\Rightarrow \frac{BC^2}{AC^2} = \frac{9 \times 13}{4 \times 13}$$

$$\Rightarrow \frac{BC}{AC} = \frac{3}{2}$$

50. (3)



Let AC be the hypotenuse of a right angled triangle AC = x cm

by pythagoras theorem

$$AC^2 = AB^2 + BC^2$$

$$\Rightarrow x^2 = (x - 2)^2 + (x - 1)^2$$

$$\Rightarrow x^2 = x^2 - 4x + 4 + x^2 - 2x + 1$$

$$\Rightarrow x^2 = 2x^2 - 6x + 5$$

$$\Rightarrow x^2 - 6x + 5 = 0$$

$$\Rightarrow (x - 1)(x - 5) = 0$$

$$x = 1, x = 5$$

$$AC = 5, AB = 3, BC = 4$$

Perimeter of  $\Delta ABC$

$$AB + BC + AC = 3 + 4 + 5 = 12 \text{ cm}$$

51. (4)

$$\text{We have } 2x^2 + 3kx + 8 = 0$$

Since roots of a quadratic equation are equal

$$D = 0$$

$$\Rightarrow b^2 - 4ac = 0$$

$$\Rightarrow (3k)^2 - 4 \times 2 \times 8 = 0$$

$$\Rightarrow 9k^2 - 64 = 0$$

$$\Rightarrow 9k^2 = 64$$

$$\Rightarrow k = \pm \frac{8}{3}$$

52. (1)

$$a + b + c = x - y + y - 3 + 3 - x = 0$$

$$\Rightarrow a^3 + b^3 + c^3 = 3abc$$

$$\Rightarrow a^3 + b^3 + c^3 = 3(x - y)(y - 3)(3 - x)$$

53. (4)

$$\angle APO = \frac{1}{2} \angle APB$$

$$\angle APO = \frac{1}{2} \times 110^\circ = 55^\circ$$

In  $\Delta APO$ ,

$$\Rightarrow \angle APO + \angle OAP + \angle POA = 180^\circ$$

$$\Rightarrow \angle POA = 35^\circ$$

$$[\angle POA = 55^\circ \text{ and } \angle OAP = 90^\circ]$$

54. (4)

$$\text{Total outcomes} = [HH, HT, TH, TT] = 4$$

E = Probability of getting at least one tail

$$E = [HT, TH, TT] = 3$$

$$P(E) = \frac{\text{favourable outcomes at an event}}{\text{total number of outcomes}}$$

$$P(E) = \frac{3}{4}$$

55. (2)

We have,

$$\tan 25^\circ \tan 35^\circ \tan 45^\circ \tan 55^\circ \tan 65^\circ$$

$$= \tan(90 - 65^\circ) \tan(90 - 55^\circ) \tan 45^\circ$$

$$\tan 55^\circ \tan 65^\circ$$

$$= \cot 65^\circ \cot 55^\circ \tan 45^\circ \tan 55^\circ \tan 65^\circ$$

$$= 1$$

56. (1)

$$a = 5$$

$$a_n = 1 = 45$$

$$s_n = 400, a_4 = ?$$

$$a_n = 45$$

$$a + (n - 1)d = 45$$

$$\Rightarrow 5 + (n - 1)d = 45$$

$$\Rightarrow (n - 1)d = 40 \quad \dots(i)$$

$$s_n = 400$$

$$\Rightarrow \frac{n}{2}[a + l] = 400$$

$$\Rightarrow \frac{n}{2}[5 + 45] = 400$$

$$\Rightarrow n = 16 \quad \dots(ii)$$

Putting  $n = 16$  in equation (i)

$$\Rightarrow (16 - 1)d = 40$$

$$\Rightarrow 15d = 40$$

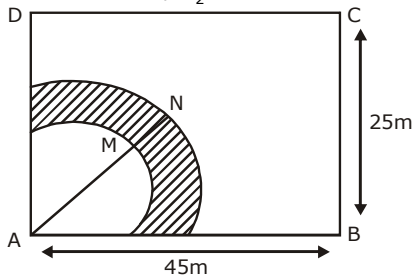
$$\Rightarrow d = \frac{40}{15} = \frac{8}{3}$$

fourth term,

$$\begin{aligned} \Rightarrow a_4 &= a + 3d \\ &= 5 + 3 \times \frac{8}{3} \\ &= 5 + 8 = 13 \end{aligned}$$

57. Bonus

$R_1 = AM = 12$  m,  $R_2 AN = 23$  m



additional grassy area in which the cow can graze

$$\begin{aligned} &= \frac{\pi R_2^2 \theta}{360^\circ} - \frac{\pi R_1^2 \theta}{360^\circ} \\ &= \frac{\pi R_2^2 \times 90^\circ}{360^\circ} - \frac{\pi R_1^2 \times 90^\circ}{360^\circ} \\ &= \frac{1}{4} \pi [23^2 - 12^2] \\ &= \frac{1}{4} \times \frac{22}{7} \times [529 - 144] \\ &= \frac{1}{4} \times \frac{22}{7} \times 385 \\ &= 302.5 \text{ m}^2 \end{aligned}$$

58. (4)

Volume of sphere = volume of cylinder

$$\begin{aligned} \Rightarrow \frac{4}{3} \pi r^3 &= \pi R^2 h \\ \Rightarrow \frac{4}{3} \pi 6^3 &= \pi (3)^2 h \\ \Rightarrow h &= 32 \text{ cm} \end{aligned}$$

59. (2)

We know that,  
mode = 3 median = 2 mean  
 $5 = 3 \times 3 - 2$  mean  
mean = 2

60. (3)

AD is the median. So,

$$\text{Area } (\triangle ABD) = \frac{1}{2} \text{ar} (\triangle ABC)$$

E is the mid point of median AD. So,

$$\text{area} (\triangle BED) = \frac{1}{2} \text{area} (\triangle ABD)$$

$$= \frac{1}{2} \times \frac{1}{2} \text{area} (\triangle ABC)$$

$$\text{area} (\triangle BED) = \frac{1}{4} \text{area} (\triangle ABC)$$

$$\frac{\text{area} (\triangle ABC)}{\text{area} (\triangle BED)} = \frac{\text{area} (\triangle ABC)}{\frac{1}{4} \text{area} (\triangle ABC)}$$

$$\begin{aligned} &= \frac{4}{1} \\ &= 4 : 1 \end{aligned}$$

61. (2)

62. (2)

63. (1)

64. (4)

65. (4)

66. (2)

67. (3)

68. (4)

69. (1)

70. (1)

71. (1)

72. (1)

73. (4)

74. (4)

75. (3)

76. (4)

77. (4)

78. (3)

79. (2)

80. (2)

81. (3)

82. (2)

83. (2)

84. (3)

85. (2)

86. (3)

87. (2)

88. (4)

89. (3)

90. (2)

91. (3)

92. (1)

93. (3)

94. (4)

95. (2)

96. (1)

97. (3)

98. (1)

99. (3)

100. (4)