NTSE STAGE – I
(2016- 17)
02/2016-17
MENTAL ABILITY TEST
SOLUTIONS

1. $z + y + z = 0$

    $\dfrac{x}{y} \dfrac{y}{z} \dfrac{z}{x} + 11 \, xyz$

    $= \dfrac{z}{x} \dfrac{x}{y} + 11 \, xyz$

    $= -1 + 11 = 10$

2. $\sin A + \cos A = \sqrt{2} \cos A$

    $\sin A = \sqrt{2} - 1 \cos A \quad \tan A =$

    $\sqrt{2} - 1$

    $\sqrt{2} - 1 \quad \tan A \quad 1$

3. $\sqrt{\left(k - 5\right)^2 + \left(2 - 2\right)^2} \sqrt{\left(k - 1\right)^2 + \left(2 - 2\right)^2}$

    $\left(k - 5\right)^2 - \left(k - 1\right)^2 \quad 0$

    $\left(k - 5\right)^2 \quad \left(k - 1\right)^2$

    $k - 5 = k - 1 \, k$

    $-5 = -k + 1 \, k$

    $= 3$

    $k^2 + 7 = 16$

4. $s = x \quad SA = 6x^2$

    $s_1 = 1.4x \quad SA_1 = 6(1.4x)^2 = 6(1.96x^2)$

    increase % $= \dfrac{6x^2 \cdot 1.96 - 1}{6x^2} \times 100$

    $= 96\%$

5. 6

    $\sqrt{2^2 + 10^2 \cdot 2 \cdot 2 \cdot 2}$

    2

    $= \dfrac{36 + 10}{2}$

    $= 13$

    $p = 13$

6. $54 \text{ km/hr} = 54 \times \dfrac{5}{18} \text{ m/s} = 15 \text{ m/s}$

Length of train $= 15 \times 12 \text{ m}$
$= 180 \text{ m}$

7. $x + y = 9$
$(10x + y) - (10y + x) = 45$
$9(x - y) = 45$
$x - y = 5$
$x = 7, y = 2$
72 is the number

8. All multiples of 8 from 16 to 88.
Total 10 numbers

9. $3 = x \times \dfrac{1}{1 - \dfrac{1}{5\frac{1}{3}}}$

$3 = x \times \dfrac{1}{1 - \dfrac{3}{16}}$

$3 = x \times \dfrac{16}{19}$

$x = 3 \times \dfrac{16}{19}$

$x = \dfrac{41}{19}$

10. $\dfrac{x+1}{x-1} - \dfrac{x-1}{x+1} - \dfrac{2x^2+2}{x^2-1}$

$= \dfrac{(x+1)^2(x^2-1) - (x-1)^2(x^2-1) - (2x^2+2)(1)^2}{(x^2-1)(x^2-1)}$

$= \dfrac{(x^2-1)[(x+1)^2 - (x-1)^2] - (2x^2+2)(1)^2}{(x^2-1)(x^2-1)}$

$= \dfrac{(x^2-1)(2x^2+2) - (2x^2+2)(1)^2}{(x^2-1)(x^2-1)}$

$= \dfrac{2[(x^2+1)^2 - (x^2-1)^2]}{(x^2-1)(x^2-1)_2}$

$= \dfrac{8x^2}{x^4-1}$

11. $c + h = 29$
$4c + 2h = 92$
$\quad 2c = 34$
$c = 17$

h = 12

12. $\dfrac{16}{-6} \dfrac{8}{8x} 4y\ 3\ d\ u$

$\dfrac{6}{u} \dfrac{24}{d}\quad 6\quad 4x\ y\ 1$

$\dfrac{1}{d}x,\ \dfrac{1}{u}y$

Solving, we get, y = ½, x = 1/8

b + s = 8 {b represents Parth's speed}

b – s = 2 {s represents speed of stream}

b = 5 km/hr

13. $\log\dfrac{75}{16}\ \log\dfrac{25}{81}\log\ \dfrac{32}{243}$

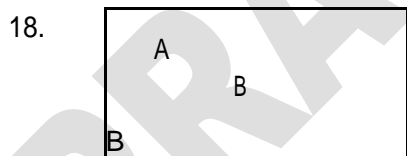$= \log\ \dfrac{75}{16}\ \dfrac{32}{243}\ \dfrac{81}{25}$

$= \log 2$

14. At 4:15, angle between hands = $\left| 4\ 30\ 5.5\ 15 \right.$

$\left| 120\ 82.5 \right|$

$= 37.5^0$

15. $3\ \overline{5}\,5\ \ \overline{5}\ 17.88$

$8\ \overline{5}\ 17.88$

$\overline{5}\quad 2.235$

$\overline{80}\,6\ \ \overline{5}\ 10\ \ \overline{5}\ 22.35$

16. LCM of 30 sec, 1 min , 45 sec and 75 sec = 15 min
    at 9:15 AM, they will simultaneously change again.

17. $\dfrac{A}{D}\ \dfrac{A}{B}\ \dfrac{B}{C}\ \dfrac{C}{D}\ \dfrac{2}{3}\ \dfrac{2}{4}\dfrac{2}{5}\dfrac{2}{1}5$

18.

(A)

(B)

B

$2B\ \ C\ \ \dfrac{1}{4}\ \dfrac{22}{7}\ 7^2$

$= \dfrac{77}{2}$

$B+C= \dfrac{1}{2}\ 7^2\ \dfrac{49}{2}$

$B = \dfrac{28}{2}\ 14$ Shaded area = 28 cm^2 2

19.   = x

$h = \dfrac{3}{2}x$

$w = \dfrac{1}{x} \cdot \dfrac{3}{2} \cdot \dfrac{3}{2}$

$= \dfrac{3}{4}x$

Area of floor $= \dfrac{3}{4}x^2$

$4 \quad \dfrac{3}{4}X^2 \quad 432$

$x^2 \quad 144$

$x = 12$

height $= \dfrac{3}{2}x = 18$

20. $3^{15} \quad 3^{16} \quad 3^{17}$

$= 3^{15} 1\ 3\ 9$

$= 13 \quad 3^{15}$ Divisible by 13

21. $CI = \quad 6000 1 \quad \dfrac{5}{100}^2 \quad 6000$

              441

$= 6000 \quad\quad 6000$

$= 615$

$SI = \dfrac{6000\ 5\ 2}{100} \quad 600$

difference = Rs 15

22. $3.5^3 \quad 2.5^3 \quad 27.25$

23. $\sqrt{13} \quad x\sqrt{10} \quad \sqrt{8} \quad \sqrt{5}$

      $13 \quad x\sqrt{10}\ 8\ 5\ 2\sqrt{8} \quad \sqrt{5} \quad x\sqrt{10}$

      $4\sqrt{10}$

$x = -4$

24.
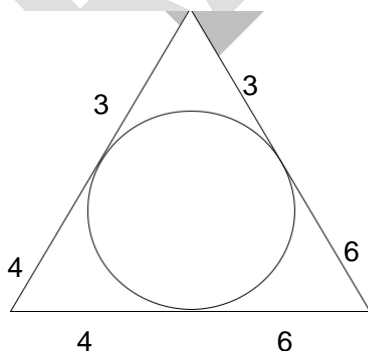
BC = 10 cm (Tangents from a point to the circle are of equal length)

25.   SP of 5 = CP of 3

Let CP of 1 be Re 1

SP of 5 = 3

CP of 5 = 5
Loss of 5 = 2

Loss % = $\dfrac{2}{5}$ 100 40% loss

26. The required sequence is:
MLKJIHGFEDCBAZYXWV |U̲| TSRQPO̅N

27. THREAT RHTTAE
    PEARLY AEPYLR
Logic : First half is reversed, then second half of reversed.

28. The pattern is: 2 2, 3 2, 4 2, 5 2 So, next
term is 308 x 6 – 2 = 1846

29. The arrangement is:
Kamal, Rashi, Vinita, Preeti, Leela
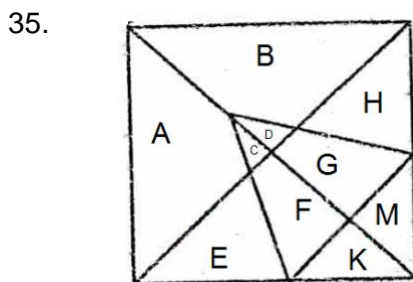   3rd in order of height is Vinita.

30. Figure (1) is the best illustration.

31. From Venn Diagram

32. From Venn Diagram

33. From Venn Diagram

34. 1. 77770
    2. 777771
    3. 777777
    4. 7 77777

35.

The triangles are represented by C, D, E, H, K, M, AC, CD, BD, CF, DG, KM, EGK, CFK, DGM, MGH, ABCD, CDFG, ACFKE, EFKGHM and DGMBH. So, 21 triangles.
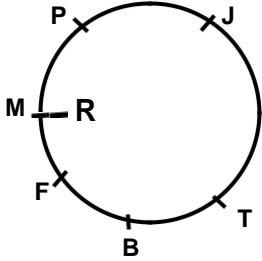
Total number of triangles = 21

36. Lateral inversion.

37. 20 10 2 [T is 20, J is 10] 24
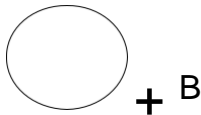   8 = 3 [X is 24, H is 8]

38. $\dfrac{1564}{10}$ 36

   $\dfrac{6\ 7\ 5}{10}$ 21

   $\dfrac{50\ 10\ 10}{10}$ 500

Solutions 39 – 41

The arrangement is:

39. no correct option . R is fourth to the right of M.

40. F is second to the left of T.

41. F is third to the left of R and fourth to the right of R.

42. Final movement = 45°
    ACW Answer = West

43. you ke, come se here
        ne

44. 4^2 2^2 1^2 21
    and 5^2 3^2 8^2 98
    6^2 7^2 3^2 94

45.   C

C is grandfather or grandmother.

46. 6R8SIR3Q5P7Q4P2
    =68135742 = 144

47. 1. 659 AND 837
    2. 837 AND 485
    3. 976 AND 659
    4. 976 AND 936
    Highest is 976 and 936.

48. 12:00 –
    9:30 = 2:30.

49. A ⟷ D,C ⟷ E,B ⟷ F
    (2) will be formed.

50.   By observation.