MENTAL ABILITY TEST

1. If x + y + z = 0, then value of $\frac{(x+y)(y+z)(z+x)}{xyz}+11$ is

(1) x + 11 (2) y + 11
(3) z + 11 (4) 10

2. If $\sin A+\cos A=\sqrt{2}\ \sin\left(90^0-A\right)$ then value of $\left(\sqrt{2}+1\right)\tan A$ will be

(1) 1 (2) 0
(3) $\sqrt{2}$ (4) 2

3. If the point (K, 2) is equidistant from the point (5, –2) and (1, –2) then value of K^2+7 will be

(1) 10 (2) 9
(3) 12 (4) 16

4. if each side of a cube is increased by 40%, then how much percent its total surface area will be increased.

(1) 76 (2) 80
(3) 96 (4) 85

5. If sum of squares of zeros of a quadratic polynomial $g(y)=y^2-6y+p$ is 10. What will be the value of p.

(1) 13 (2) 12
(3) 11 (4) 10

6. A train cross a pole in 12 seconds. If the speed of the train is 54 km/hr then length of train will be

(1) 648 meter (2) 150 meter
(3) 180 meter (4) 100 meter

7. If the sum of the digits of a two digit number is 9 and the difference between the number and that formed by reversing the digits is 45 then number is

(1) 81 (2) 72
(3) 45 (4) 54

8. How many numbers between 10 and 90 are divisible by 8 completely

(1) 12 (2) 10
(3) 11 (4) 8

9. Is $3=x+\cfrac{1}{1+\cfrac{1}{5+\frac{1}{3}}}$ Value of x will be

(1) 14/19 (2) 17/19
(3) 15/19 (4) 41/19

10. Simplify $\frac{x+1}{x-1}+\frac{x-1}{x+1}-\frac{\left(2x^2-2\right)}{x^2+1}$

(1) $\frac{4x^2}{x^4+1}$ (2) $\frac{8x^2}{x^4-1}$

(3) 1 (4) $\frac{4x^2+2}{x^4-1}$

11. Vinod has some cows and some hens in his shed. The total number of legs is 92 and total number of heads is 29. Then the number of hens in his shed is

(1) 14 (2) 12

(3) 17 (4) 21

12. Parth can row 16km downstream and 8km upstream in 6 hours. He can row 6km upstream and 24 km downstream in 6 hours. Find the speed of Parth in still water

(1) 5km/hr (2) 3km/hr

(3) 6km/hr (4) 8km/hr

13. Value of $\left(\log\frac{75}{16}-2\log\frac{5}{9}+\log\frac{32}{243}\right)$ is

(1) log 3 (2) 2 log 2

(3) log 5 (4) log 2

14. Find the angle between the two hands of a clock at 15 minutes past 4 O' clock (Minute hand and hour hand)

(1) 35.5^o (2) 30^o

(3) 37.5^o (4) 32.5^{o+}

15. If $3\sqrt{5}+\sqrt{125}=17.88$ then what will be the value of $\sqrt{80}+6\sqrt{5}$

(1) 22.35 (2) 21.66

(3) 20.12 (4) 20.46

16. The traffic signals at four road crossing change every 30 second, 1 minute, 45 seconds and 75 seconds respectively. If they change simultaneously at 9 AM, at what time will they change simultaneously again.

(1) 9:12 AM (2) 9.15 AM

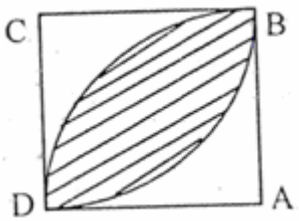
(3) 9.20 AM (4) 9.30 AM

17. If A:B = 2:3, B:C = 2:4, and C:D = 2:5 then A:D is equal to

(1) 2:15 (2) 2:5

(3) 1:5 (4) 3:5

18. In the adjoining figure, ABCD is a square of 7cm side length. $\overline{BD}$ is an arc of a circle of radius AB, what is the area of the shaded region?



(1) $28cm^2$ (2) $35cm^2$

(3) $21cm^2$ (4) $14cm^2$

19. Width of a room is half of its height and height of room is 3/2 times of its length. If cost of flooring carpet on floor at the rate of Rs $4/m^2$ is Rs 432, then what will be height of room?

(1) 18 m (2) 20 m

(3) 12 m (4) 15 m

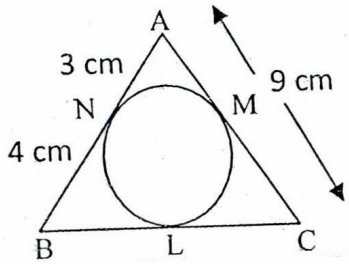
20. Which number in the following will completely divide $3^{15} + 3^{16} + 3^{17}$
(1) 11 (2) 14
(3) 13 (4) 17

21. What will be the difference between simple interest and compound interest on sum of Rs 6000 in 2 years at the rate of interest of 5% p.a.
(1) Rs 15 (2) Rs 20
(3) Rs 30 (4) Rs 10

22. Value of $(3.5)^3 - (2.5)^3$ is
(1) 25.27 (2) 29.25
(3) 27.25 (4) 25.29

23. If $\sqrt{13 - x\sqrt{10}} = \sqrt{8} + \sqrt{5}$, then what is the value of x?
(1) –2 (2) –5
(3) –6 (4) –4

24. In the adjoining figure, ΔABC, is circumscribing a circle. Then the length of BC is



(1) 10 cm (2) 7 cm
(3) 9 cm (4) 8 cm

25. The selling price of 5 articles is the same as the cost price of 3 article. The gain or loss percent is
(1) 25% gain (2) 25% gain
(3) 40% loss (4) 33.33% loss

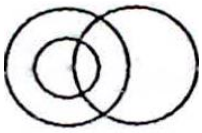
26. If the first half of the English alphabet is reversed and so is the 2nd half, then which letter is 7th to the right of the 12th letter from the left side?
(1) S (2) U
(3) R (4) T

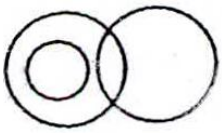
27. If in a certain code language 'THREAT' is written as 'RHTTAE' then how will 'PEARLY' be written in that code?
(1) YLRAEP (2) YLRPAE
(3) AEPYLR (4) AEPRYL

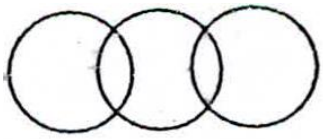
28. What comes in place of question mark '?'
4, 6, 16, 62, 308, ?
(1) 990 (2) 1721
(3) 698 (4) 1846

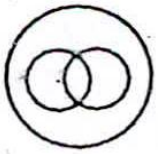
29. In a group of five persons Kamal is the tallest while Leela is the shortest. Rashi is shorter than Kamal but taller than Vinita and Priti. Priti is second shortest person in the group. Who is the third tallest?
(1) Vinita (2) Rashi
(3) Priti (4) Leela

30. Which is the following diagram best depicts the relationship between Males, Husbands and Doctors?

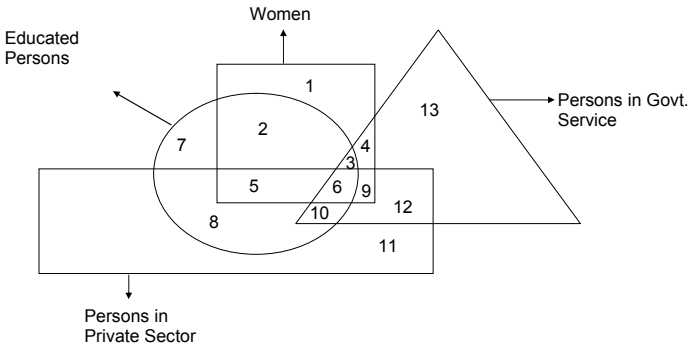
(1) 

(2) 

(3) 

(4) 

Instructions: (for Questions 31 – 33)
In the venn diagram given below, the square represents women, the triangle represents persons who are in Govt Service, the circle represents educated persons and the rectangle represents persons working in private sector. Each section of the diagram is numbered. Study the diagram and answer the following questions.



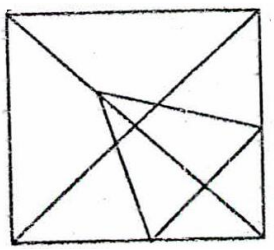
31. Which number represents educated women, who are in Govt. job?
(1) 2 (2) 3
(3) 4 (4) 6

32. Which number represents the uneducated women, who have Govt. Jobs as well as jobs in private sector?
(1) 6 (2) 4
(3) 12 (4) 9

33. Which number represent educated men having private jobs as well as govt. jobs?
(1) 7 (2) 8
(3) 6 (4) 10

34. Which is the smallest number?
(1) $-7 \div 7 \times 7 + 7$ (2) $(7 + 7 \times 7) \div 7 - 7$
(3) $7 - 7 \times 7 \div 7 + 7$ (4) $7 - (7 \div 7 \times 7 + 7)$

35. In the given figure, how many triangles are there?



(1) 26 (2) 16
(3) 18 (4) 19

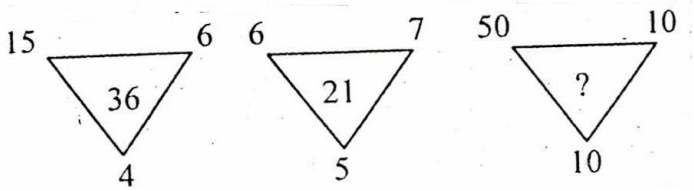
36. Choose the correct mirror image of the given figure form the alternatives.

DL8CAN7952

(1) 
(2) 
(3) 
(4) 

37. $\frac{T}{J} : 2 :: \frac{X}{H} : ?$

(1) 3/7
(2) 2
(3) 3
(4) 4

38. 

(1) 140
(2) 220
(3) 500
(4) 320

Instructions (Questions 39 – 41)
Read the following information carefully and answer the questions given below:
M, P, J, B, R, T and F are sitting around a circle facing the centre. B is the third to the left of J who is second to the left of M. P is third to the left of B and second to the right of R. T is not an immediate neighbour of M.

39. Who is fourth to the right of M?
(1) B
(2) T
(3) J
(4) M

40. Who is second to the left of T?
(1) F
(2) M
(3) P
(4) J

41. What is F's position with respect to R?
(A) Third to the left
(B) Fourth to the right
(C) Third to the right
(1) Only A
(2) Only B
(3) Only C
(4) Both A and B

42. A man is facing north west. If he turns 90^o in the clockwise direction and then 135^o in the anticlockwise direction. Which direction is he facing now?
(1) East
(2) West
(3) North
(4) South

43. If in a certain language 'how can you go' is written as 'je de ke pe', 'you come here' is written as 'ne ke se' and 'come and go' as 're pe se', then how will 'here' be written in the langauge?
(1) je
(2) pe
(3) me
(4) ke

44.

4	5	6
2	3	7

1	8	3
21	98	?

(1) 85 (2) 94
(3) 49 (4) 104

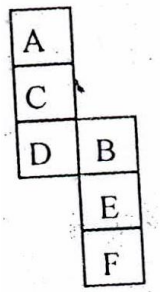
45. A's mother is sister of 'B' and daughter of 'C'. 'D' is the daughter of B and sister of E. How is 'C' related to E?
(1) Sister (2) Mother
(3) Father (4) Grand mother or Grand father

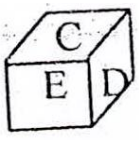
46. In a certain code
P stands for +
Q stands for –
R stands for x
S stands for ÷
Then number corresponding to
6R8S1R3Q5P7Q4P2 is
(1) 144 (2) 148
(3) 146 (4) 116

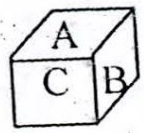
47. If the first and third digits of each number are inter changed and one is added to the second digit of each number, then which of the following pairs of numbers, will have highest total of their numerical value?
(1) 946 and 728 (2) 728 and 574
(3) 669 and 946 (4) 669 and 629

48. Looking into a mirror, the clock shows 9:30 as the time. The actual time is
(1) 2:30 (2) 3:30
(3) 4:30 (4) 6:30

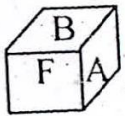
49. The sheet of paper shown in the figure is folded to form a box. Choose the correct alternative, which will truly represent the position of alphabets A to F shown in the following figure?



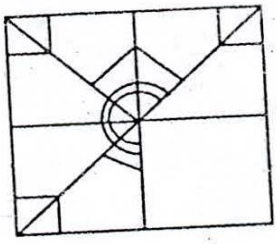
(1) 

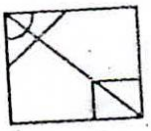
(2) 

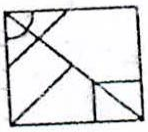
(3) 

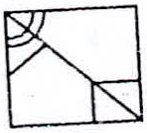
(4) 

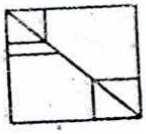
50. Select the figure from amongst the four alternatives which when placed in the blank space, would complete the pattern?



(1) 

(2) 

(3) 

(4) 

MENTAL ABILITY TEST
SOLUTIONS

1. $z + y + z = 0$

$\therefore \dfrac{(x+y)(y+z)(z+x)}{xyz} + 11$

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

$= -1 + 11 = 10$

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

$\sin A = \left(\sqrt{2} - 1\right)\cos A$

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

$\left(\sqrt{2} + 1\right)\tan A = 1$

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

$\Rightarrow (k-5)^2 - (k-1)^2 = 0$

$\Rightarrow (k-5)^2 = (k-1)^2$

$\Rightarrow k - 5 = |k - 1|$

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

$\Rightarrow k = \pm 3$

$\Rightarrow k^2 + 7 = 16$

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

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

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

$= 96\%$

5. $\alpha + \beta = 6$

$\alpha^2 + \beta^2 = 10$

$\alpha\beta = \dfrac{(\alpha+\beta)^2 - (\alpha^2+\beta)^2}{2}$

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

$= 13$

$p = 13$

6. 54 km/hr = $\left(54 \times \frac{5}{18}\right) m/s = 15 m/s$

$\therefore$ Length of train = $(15 \times 12) m$

= 180 m

7. x + y = 9

(10 x+y) - (10 y + x) = 45

9 (x – y) = 45

x – y = 5

$\therefore$ x = 7, y = 2

$\therefore$ 72 is the number

8. All multiples of 8 from 16 to 88.

$\therefore$ Total 10 numbers

9. $3 = x + \cfrac{1}{1 + \cfrac{1}{5 + \frac{1}{3}}}$

$\Rightarrow 3 = x + \cfrac{1}{1 + \frac{3}{16}}$

$\Rightarrow 3 = x + \frac{16}{19}$

$\Rightarrow x = 3 - \frac{16}{19}$

$\Rightarrow x = \frac{41}{19}$

10. $\frac{x+1}{x-1} + \frac{x-1}{x+1} - \frac{(2x^2-2)}{x^2+1}$

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

$= \frac{(x^2+1)\left((x+1)^2 + (x-1)^2\right) - 2(x^2-1)^2}{(x^2+1)(x^2-1)}$

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

$= \frac{2\left((x^2+1)^2 - (x^2-1)^2\right)}{(x^2+1)(x^2-1)}$

$= \frac{2[2x^2][2]}{x^4-1}$

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

11. c + h = 29

4c + 2h = 92

$\therefore$ 2c = 34

c = 17

h = 12

12. $\frac{16}{d}+\frac{8}{u}=6 \Rightarrow 8x+4y=3$

$\frac{6}{u}+\frac{24}{d}=6 \Rightarrow 4x+y=1$

$\left[\frac{1}{d}=x, \frac{1}{u}=y\right]$

Solving, we get, y = ½, x = 1/8

$\Rightarrow$ b + s = 8 {b represents Parth's speed}

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

$\Rightarrow$ b = 5 km/hr

13. $\log\frac{75}{16}-\log\frac{25}{81}+\log\frac{32}{243}$

$= \log\left[\frac{75}{16}\times\frac{32}{243}\times\frac{81}{25}\right]$

= log 2

14. At 4:15, angle between hands = $\left|(4\times30)-(5.5\times15)\right|$

$= \left|120-82.5\right|$

$= 37.5^0$

15. $3\sqrt{5}+5\sqrt{5}=17.88$

$8\sqrt{5}=17.88$

$\sqrt{5}=2.235$

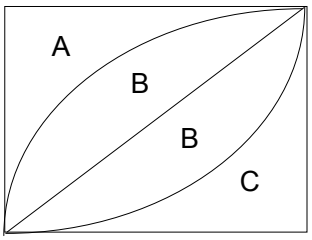
$\sqrt{80}+6\sqrt{5}=10\sqrt{5}=22.35$

16. LCM of 30 sec, 1 min , 45 sec and 75 sec = 15 min

$\therefore$ at 9:15 AM, they will simultaneously change again.

17. $\frac{A}{D}=\frac{A}{B}\times\frac{B}{C}\times\frac{C}{D}=\frac{2}{3}\times\frac{2}{4}\times\frac{2}{5}=\frac{2}{15}$

18.



$2B+C=\frac{1}{4}\times\frac{22}{7}\times7^2$

$= \frac{77}{2}$

B + C = $\frac{1}{2}\times7^2=\frac{49}{2}$

$\therefore$ B = $\frac{28}{2}=14$ $\Rightarrow$ Shaded area = 28 cm^2

19. $\ell = x$

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

$w = \frac{1}{2}.\frac{3}{2}x$

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

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

$4 \times \frac{3}{4}x^2 = 432$

$x^2 = 144$

$x = 12$

$\therefore$ height $= \frac{3}{2}x = 18$

20. $3^{15} + 3^{16} + 3^{17}$

$= 3^{15}(1 + 3 + 9)$

$= 13 \times 3^{15} \Rightarrow$ Divisible by 13

21. $CI = 6000\left(1 + \frac{5}{100}\right)^2 - 6000$

$= 6000 \times \frac{441}{400} - 6000$

$= 615$

$SI = \frac{6000 \times 5 \times 2}{100} = 600$

$\therefore$ difference = Rs 15

22. $(3.5)^3 - (2.5)^3 = 27.25$

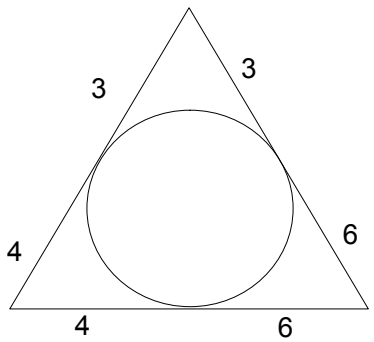
23. $\sqrt{13 - x\sqrt{10}} = \sqrt{8} + \sqrt{5}$

$\Rightarrow 13 - x\sqrt{10} = 8 + 5 + 2\sqrt{8}\sqrt{5}$

$\Rightarrow -x\sqrt{10} = 4\sqrt{10}$

$\Rightarrow x = -4$

24.



$\Rightarrow$ 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
$\Rightarrow$ Loss of 5 = 2
$\Rightarrow$ Loss % = $\frac{2}{5} \times 100 = 40\%$ loss

26. The required sequence is:
M L K J I H G F E D C B A Z Y X W V U T S R Q P O N

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

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

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

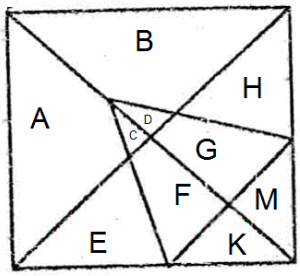
30. Figure (1) is the best illustration.

31. From Venn Diagram

32. From Venn Diagram

33. From Venn Diagram

34. 1. $-7 \div 7 \times 7 + 7 = 0$
2. $(7 + 7 \times 7) \div 7 - 7 = 1$
3. $7 - 7 \times 7 \div 7 + 7 = 7$
4. $7 - (7 \div 7 \times 7 + 7) = -7$

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

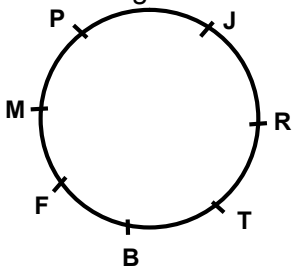
36. Lateral inversion.

37. $20 \div 10 = 2$ [T is 20, J is 10]
$\Rightarrow$ 24 ÷ 8 = 3 [X is 24, H is 8]

38. $\frac{15 \times 6 \times 4}{10} = 36$
$\frac{6 \times 7 \times 5}{10} = 21$
$\frac{50 \times 10 \times 10}{10} = 500$

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.

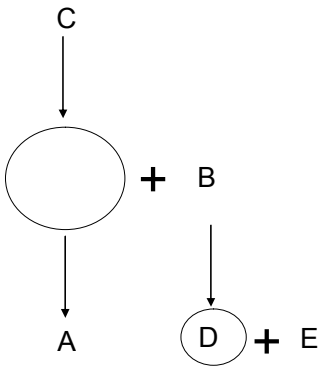
41. F is third to the left of R and fourth to the right of R.

42. Final movement = 45^{o} ACW
$\therefore$ Answer = West

43. you $\rightarrow$ ke, come $\rightarrow$ se
$\Rightarrow$ here $\rightarrow$ ne

44. $4^2 + 2^2 + 1^2 = 21$
and $5^2 + 3^2 + 8^2 = 98$
$\Rightarrow 6^2 + 7^2 + 3^2 = 94$

45.



$\therefore$ C is grandfather or grandmother.

46. 6 R 8 S I R 3 Q 5 P 7 Q 4 P 2
= $6 \times 8 \div 1 \times 3 - 5 + 7 - 4 + 2$
= 144

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

48. 12:00 – 9:30
= 2:30.

49. A $\longleftrightarrow$ D, C $\longleftrightarrow$ E, B $\longleftrightarrow$ F
$\therefore$ (2) will be formed.

50. By observation.