SOLUTIONS
NTSE STAGE 2 2020-21
MENTAL ABILITY TEST (MAT)

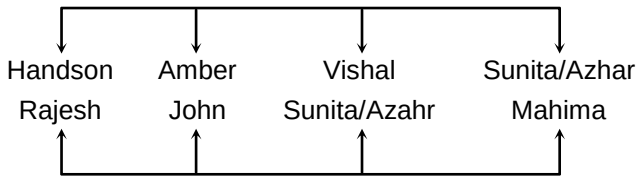
1. 3, 15, 63, 129, 1023, 4095

$3 = 2^2 - 1, 15 = 2^4 - 1, 63 = 2^6 - 1, 129 = 2^7 + 1$

$1023 = 2^{10} - 1, 4095 = 2^{12} - 1$

So wrong term is 129

2.



3. The schools of studies (Science/Humanities/Social Science Commerce/Edu./Engg and Tech)
Come under the jurisdiction of APC

4. APC, PD and FC are at the same level

5. **Statements:** Somedonutes are **dumb**
Some dumbs are sweets
All sweets are tall
No tall is donut
All donuts are **sugar**

Conclusion (i)Some sweets are sugar

Relevant statements: All sweets are tall
No tall is donut
All donuts are sugar

(A + E) + A = E + A = O^*

Some sugar are not sweets.

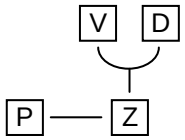
So some sweets are sugar is false conclusion

6. **B U I L D :C A W R Q**
Letters U and Ihaving reflection symmetry
Letters A and W having reflection symmetry
So, **L A U G H : G H T Z L**

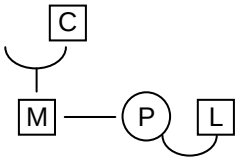
7. The lady clearly remembers that they got married in the month of February of the year 1955.
The man clearly remembers that he celebrated his 21st birthday with same year and it was Thursday, the 3rd February as a bachelor
Before 13th of February and after 3rd February and it was **WEEKEND**
i.e. Saturday or Sunday

3rd February – Thursday, 4thFebruary – Friday, 5th February – Statuary, 6th February – Sunday

8. + → Mother
– → Wife
× → Brother
÷ → Son
If P × Z ÷ D – V
"V is father of P"

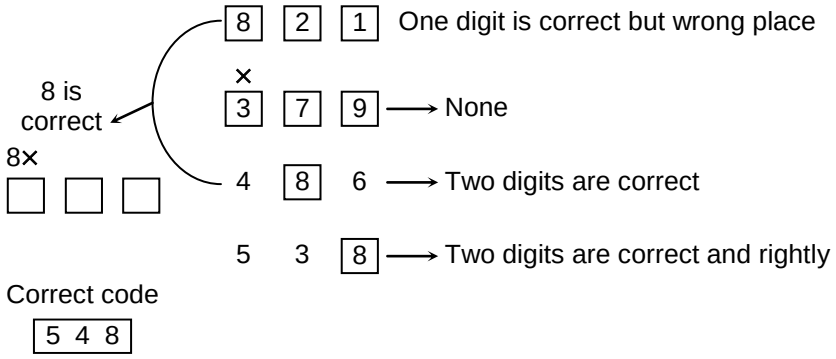


9. M ÷ C + P – L
M is brother-in-law of L



10. Spectacles, Earrings, Shoes, Bangles are wearing objects but bicycle is different thing from this group

11.



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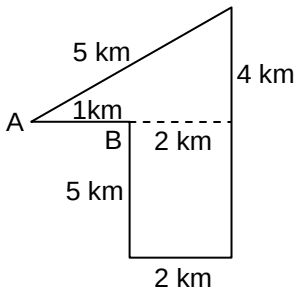


13. Number of odd dates in a week more than 1 so we can't say about the day

14. Many numbers possible

15. From statement-1
Pari >Ashvi>Kimaya>Vihane

16. **P A C M K I N G** after arrangement **A P E C A M I K G N**

17. Z X W, V T S, R P O, N L K, ??, F D C

Z,	V,	R,	N,	J
26,	22,	18,	14,	10

X,	T,	P,	L,	H
24,	20,	16,	12,	8

18. Sun $\rightarrow$ 520 visitors

Other day $\rightarrow$ 100 visitors

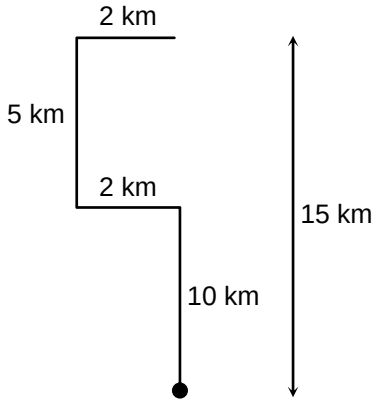
1^{st} (Sun)
8^{th} ″
15^{th} ″
22^{th} ″
29^{th} ″
$= 520 \times 5 = 2600$

Other 25 days $= 100 \times 25 = 2500$

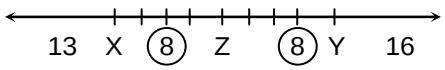
5100

Average $= \frac{5100}{30} = 170$

19.



20.



21. The series is based on the following difference:
X1, X5, X9, X13, X17, X21
This is further based on the difference of 14
So, answer is 2714985
Option (1)

22. $(4 \times 11) + (11 \times 1^2) = 55$
$(55 \times 9) + (9 \times 3^2) = 576$
$(576 \times 7) + (7 \times 5^2) = 4207$ and so on
Option (2)

23. Z = 2197, R = 729, P = 512, J = ?

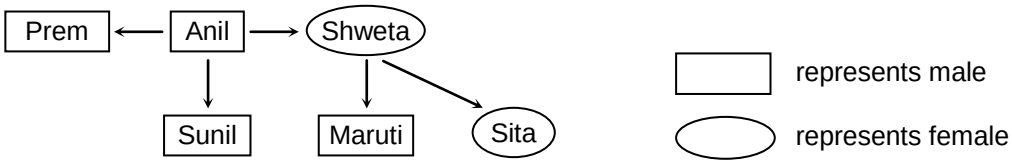
Z = 26 $\Rightarrow \left(\frac{26}{2}\right)^3 = 13^3 = 2197$

R = 18 $\Rightarrow \left(\frac{18}{2}\right)^3 = 9^3 = 729$

P = 16 $\Rightarrow \left(\frac{16}{2}\right)^3 = 8^3 = 512$

I = 10 $\Rightarrow \left(\frac{10}{2}\right)^3 = 5^3 = 125$

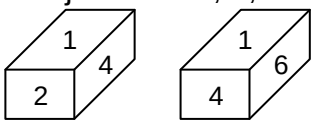
24.



Clearly Sunil is cousin of Maruti

25. By observation

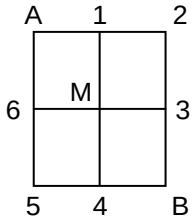
26. 1 adjacent to 2, 4, 6 means opposite of 1 will be either 3 or 5



Therefore, 3 and 5 are definitely adjacents

27. By comparing,
Sun shines brightly =>ba lo sul…(1)
Light comes from sun =>dopikup lo nro…(2)
We get, sun common
So, Sun code will be 'lo'
Houses are brightly lit => 'kado ula ariba' …(3)
By comparing (1) and (3)
Brightly would be 'ba'

28. Let mark the pathways as follows:



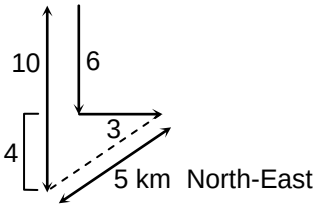
He will be covering like this

I-way :	A	1	2	3	B
II-way :	A	1	M	3	B
III-way:	A	1	M	4	B
IV-way :	A	6	M	3	B
V-way :	A	6	M	4	B
VI-way :	A	6	5	4	B

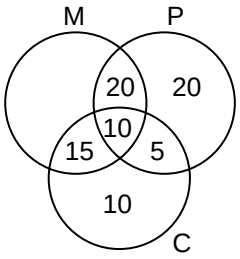
There are total 6-ways

29. By observation

30.

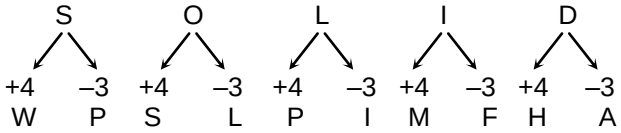


31. n(M) = 45
n(P) = 55
n(C) = 40
n(M ∩ P) = 30
n(P ∩ C) = 15
n(M ∩ C) = 25
n(M ∩ P ∩ C) = 10



Total % of students studying
= 20 + 10 + 15 + 5 + 10 + 20 = 80%
Total % of students not studying = 100 – 80 = 20%

32. Each letter of SOLID is first decoded as +4 and then followed by –3

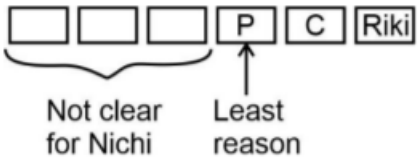


Similarly the code for ATEXXQIBVO will be WATER

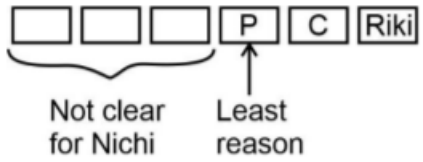
33. Opposite pair of dots will be
2 ↔2
3 ↔ 5
1 ↔ 6 Opposite to 1 will be 6

34. Z(26) + (4 + 4 + 5) = 39 ⇒ 13(M)
S(19) + (7 + 2 + 5) = 33 ⇒ 7(G)

35. **Logical -**
Sri > Ruchi >Puchi
Nichi>Chiki
Puchi>Chiki
Reasoning–
Sri > Ruchi >Puchi
Riki>Nichi>Chiki> Sri > Ruchi >Puchi
Logical order –



36. **Logical –**
Sri > Ruchi >Puchi
Nichi>Chiki
Puchi>Chiki
Reasoning-
Sri > Ruchi >Puchi
Riki>Nichi>Chiki> Sri > Ruchi >Puchi
Logical order-



37. Blue →1 male patient
Pink → 1 female patient
Green → 2 male and 3 female
Red →–1 male and –2 female
B → 10 → 10 × 1 = 10 male
P → 06 → 06 × 1 = 06 female
G → 07 → = 14 male + 21 female
R → 03 → –3 male – 6 female

(24 – 3) male and (27 – 6) female
21 male and 21 female

2nd sequence

B	P	G	B	B	G	P	B	R	P	B	P	B	G	G	R	B	G	B	B	G	P	P	R	G	B
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

P	R	B	B	B	G	P	B	R	R	B	R	B	G	B	R	B	G	B	B	B	R	P	R	B	B

B → 14 → 14 male
P → 2→ 2 Female
G → 3 → 6 male + 9 female
R → 7 →–7 male –14 female

13 male + (–3 female)
21 – 3 = 18 female

38. Prime number as it is in it position

4	9	1	13	15	14	4	→	22	33	1	13	35	27	22
D	I	A	M	O	N	D								

2 × 2

Prime number — Prime number as it is

B	R	O	N	Z	E	⟶	2	23	335	27	21	3	5
2					5								

Prime number — Prime number

S I L V E R ⟶ 19 33 22 23 11 5 29

19 — 5 (Prime number) — 19 (Prime number) — 5 (Prime number)

39. Tuesday noon to next Tuesday 2 PM = 170 hours

Time gain = $2 + 4 + \frac{48}{60} = \frac{34}{5}$ min

$\frac{34}{5}$ min gained in 170 hours

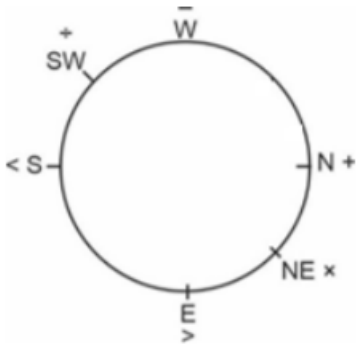
1 min gain = $\frac{170 \times 5}{34}$ = 25 hours

2 min slow = 2×25 hours = 50 hours

Thursday 12 noon + 50 hours = Thursday 2 pm

Option (3)

40. North will become West and so on. So the diagram will be as follows:



While solving the options and substituting the signs

(1) 6 N 4 S W 8 NE 2 E 9 W 6 N E 2 S W 3 E 3 N E 2 S W 1 W 5

$= 6 + 4 \div 8 \times 2 > 9 - 6 \times 2 \div 2 > 3 \times 2 \div 1 - 5$

$= 6 + \frac{4}{8} \times 2 > 9 - 6 \times \frac{2}{3} > 3 \times \frac{2}{1} - 5$

= 6 > 5 > 1 condition satisfied

41. **1**

+ → 7:25 + 0:05 = 7:30

× → 5:15 + 0:15 = 5:30

÷→ 9:00 – 0:20 = 8:40

<→ 10:55 + 0:25 = 11:20

>→ 3:30 – 0:30 = 3:00

= → 1:05 + 0:35 = 1:40

– → 11:25 – 0:10 = 11:15

(1) $6 - 4 \times 1 \div 2 + 3 > 1 \times 8 \div 4$

$4 + 3 > 2$ (correct)

(2) $6 + 4 - 1 \times 2 \div 3 > 1 = 8 < 4$

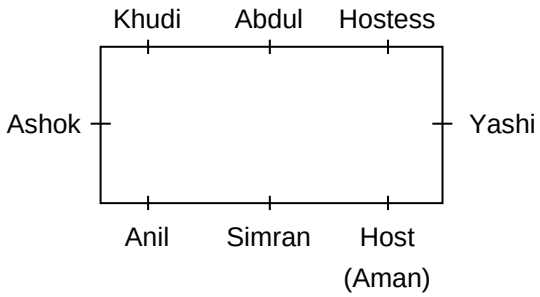
(3) $6 - 4 < 1 \div 2 > 3 = 1 + 8 \times 4$

$2 < ½ > 3 = 33$

(4) $6 \div 4 \times 1 \times 2 + 3 = 1 - 8 > 4$

$3/2 \times 2 = -7$ Clearly only (1) is correct

42.



43. M → 2, 5 5, 2 6, 1 7, 6

E → 1, 7 5, 4

R → 2, 1 8, 1

C → 3, 6 4, 7 5, 1 7, 1

U → 1, 2 3, 4

Y → 1, 1 3, 8 8, 3

J → 2, 7

P → 3, 1 4, 6

I → 3, 3 6, 7 6, 4

T → 1, 4 4, 2 8, 6 6, 5

N → 3, 5

Codes are based on sum of digits of respective letters

M	→	7
E	→	8, 9
R	→	3, 9
C	→	9, 8, 11
U	→	3, 6
Y	→	2, 7, 11
J	→	9, 11
P	→	4, 10
I	→	6, 13
T	→	5, 10, 14
N	→	8, 6, 11

Reject two digit values

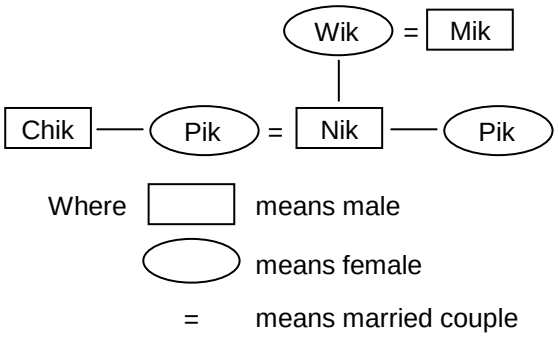
M E R C U R Y →7 8 3 8 3 9 2

After shuffling :3 3 7 9 2 8 8

Similarly N E P T U N E →6 9 4 5 3 8 8

After shuffling :3 5 9 4 6 8 8

44.



45. $+ \rightarrow 78^\circ \rightarrow 13 + 5 = 18$
$- \rightarrow 162^\circ \rightarrow 27 - 7 = 20$
$\times \rightarrow 210^\circ \rightarrow 35 + 9 = 44$
$\div \rightarrow 114^\circ \rightarrow 19 - 11 = 08$
$= \rightarrow 240^\circ \rightarrow 40 + 13 = 53$
$< \rightarrow 312^\circ \rightarrow 52 - 15 = 37$

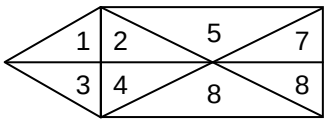
6 : 44	7 : 08	9 : 18	10 : 20	2 : 53
↓	↓	↓	↓	↓
×	÷	+	−	=

$8 \times 20 \div 5 + 9 - 3 = 38$
$8 \times 4 + 6 = 38$
$38 = 38$

46. QUARANTINE
Second appearance is A. And (A + 4) i.e. N and seven letters before N i.e. U

47. $(12 + 3) \div 5 = 3$,
$(15 + 5) \div 4 = 5$,
$(21 + 4) \div 5 = 5$,
$(29 + 7) \div 4 = 9$,
So answer is a = 5

48. $\Delta 1$, $\Delta 12$, $\Delta 13$, $\Delta 2$, $\Delta 24$, $\Delta 246$, $\Delta 245$, $\Delta 3$, $\Delta 34$



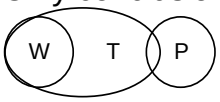
$\Delta 4$, $\Delta 5$, $\Delta 578$, $\Delta 6$, $\Delta 678$, $\Delta 7$, $\Delta 78$, $\Delta 8$
Hence, number of triangle is 17

49. Lion is related to claws in the same way Egle is related to Talon

50. Total number of students appeared i.e. 500 and number of students who failed in at least two subjects i.e. 10 + 12 + 12 + 5 = 39
So, $\frac{39}{500} \times 100 = 7.8\%$

51. Seed → sprout → Sapling → Plant → Tree

52. Only conclusion I follow

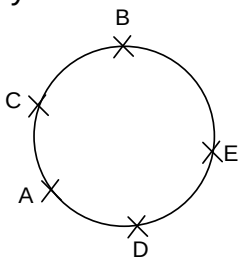


As if all women are trains then some trains are women is correct and the second conclusion does not follow as there is no confirm relation between women and painters.

53.

A	B	A	C	U	S
↓+2	↓+2	↓+2	↓+2	↓+2	↓+2
C	D	C	E	W	U

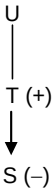
54. By observation



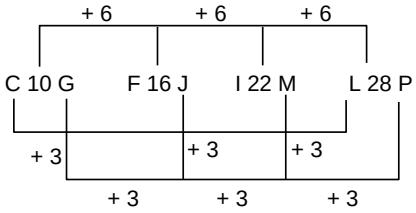
55. From Dice (iii) and (iv) two sides are common between them
i.e. E and A. So the third sides become opposite to other in both the dices. It means B is opposite F.

56. By observation both I and II are sufficient

57. S + T = U
Grand daughter

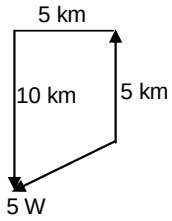


58.



59. By observation

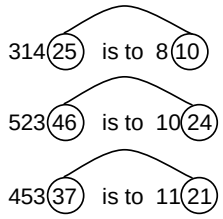
60. South – West



61. By observation

62. Friday + 4 = Tuesday is 7th day
7, 14, 21, 28 days is Tuesday
31 day = Tuesday + 3 = Friday

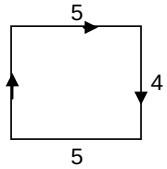
63.



3 + 1 + 4 = 8, 2 × 5 = 10 so, 31425 is 810
5 + 2 + 3 = 10, 4 × 6 = 24 so, 52346 is 1024
Now 64382 is → (6 + 4 + 3), (8 × 2) = 1316

64. Wrong question

65.



4 km towards north

66. By observation

67. Total students = 200
Students come by bicycle = 40% = 80 Students came by walk = 50% = 100 Students came by bus = 10% = 20
Students who came by bicycle and play cricket = 30% = 24
Students who came by walk and play cricket 40% = 40
Students who came by bus and do not play cricket = 40% = 8
So students who came by bus and play cricket = 20 – 8 = 12

68. Total + 1 = Top + Bottom 21 + 1 = T + 10
So, Madhav from Top is 12th
So by question Neethu is 13th from the top
Now, Total students are 22
So, 14th from the back means 9th from the top
So, by question Madhav is at 9th from the top
So, 3 students between Madhav and Neethu.

69. 4 + 2 + 1 = 7, 5 + 2 = 7 , 7
3 + 4 + 5 = 12, 6 + 6 = 12, 12
6 + 11 + 4 = 21, 19 + 2 = 21
5 + 5 + 9 = 19, 10 + 9 = 19, 19

70. 3rd Jan is Friday
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan
28 + 1 + 3 + 2 + 3 + 2 + 3 + 3 + 2 + 3 + 2 + 3 + 3
Friday + $\frac{58}{8}$ = 8W + 2P
Friday + 2 = Sunday

71. **1**
By Sudoku logic

72.

1	2	3	4	5	6
$,	AN ,	# ,	AT ,	* ,	IN ,

7	8	9	10	11	12
− ,	IT ,	+ ,	IF ,	Δ ,	AF

Class start at - IT, #	=	8 : 15
Teaches till - AN, *	=	2 : 25
Class till	=	10 : 40
Break	=	1 : 30 hr
Time	=	12 : 10

AF AN

73. Step 1 >> arrangement alphabetically taking last alphabet of each word
step2>> Alphabetic arrangement taking 1st alphabet
Step 3>> Taking 2nd last alphabet of each word
step 4 > Second alphabet of each word
Step 5 >> 3rd last alphabet
And lastly Step 6>> alphabetic arrangement on basis of 3rd alphabet

74. F 5 A Q 2 E 8 I 9 O L U R I 6 U J K A E 2 E V B I A M 3 O

75.

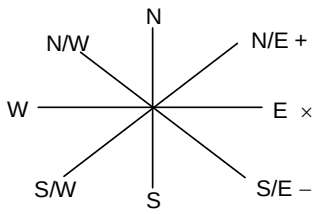
7 Bamboo – – – – – – – – – – Banyan 1
Peepal Neem

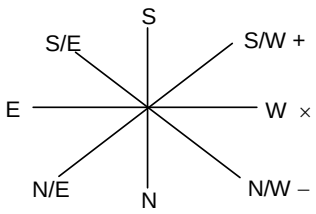
13 + 7 = 20

76. POPULAR is coded as 16-15-16-21-12-1-18
L + R = 18 + 12 = 30
U + A = 21 + 1 = 22
P + L = 16 + 12 = 28
O + U = 15 +21 = 36
P + P = 16 + 16 = 32
Similarly; code of VOCALIST will be:
V + C = 22 + 3 = 25
O + A = 15 + 1 = 16
C + L = 3 + 12
A + I = 1 + 9 = 10
L + S = 12 + 19 = 31
I + T = 9 + 20 = 29

77. Reading in odometer at = 1024 km
reading in parking
may be
1 2 2 1
1 3 3 1
1 4 4 1
1 5 5 1 etc
if reading in parking 12 distance corend
1221 – 1024 = 197
let initial speed = A.T.Q. $\frac{147}{142}$ = 65.7 km

78.





move 45°

SE	=
S	÷
W	+
NW	×
N	–

33 × 11 ÷ 3 – 6 = 115
$33 \times \frac{11}{3} - 6 = 115$
121 – 6 = 115
NW, S, N, SE

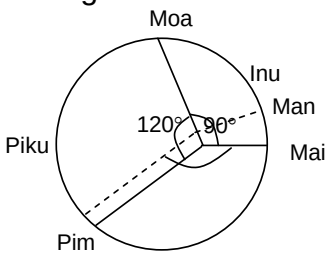
79. $5 - 4 \times 3 < 4 + 10 \div 2 = 3 \times 2 + 3 > 4 \div 7 \times 1$

$5 - 12 < 4 + 5 = 6 + 3 > \frac{4}{7} \times 1$

$=-7<9 \ = 9 > \frac{4}{7}$

$= -7<9>4/7$

80. 150Degree



81. Statement (A) $\leftarrow \leq \alpha$

(B) % > $

(C) $ $\geq \downarrow$

(D) $\leftarrow >$ $

Conclusion (1) $\alpha <$ $ ($\times$)

(2) $ = $\downarrow$ ($\times$)

(3) $\leftarrow > \downarrow$ ($\surd$)

Only conclusion (3) is correct

82.

5 sec gain ——— 3 min
× 20 × 20] 1 hour
10 sec gain ——— 3 min

10 sec loose ——— 3 min
× 20 × 20] 1 hour
200 sec loose ∴ 60 min

15 sec gain ——— 3 min
× 20 × 20] 1 hour
300 sec gain ——— 60 min

Therefore in 12 hours from 7:00 Am – 7:00 PM

100 – 200 + 300 - 400 + 500 - 600 + 700 -800 +900 -1000 +1000 – 1200

$\Rightarrow$ (–600 sec)

i.e. 10 min lose $\Rightarrow$6 : 50 PM

83. By observation

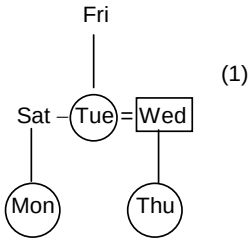
84. The following pair as follows

AL, DR, IM, NO, NT, OT, ES, CH

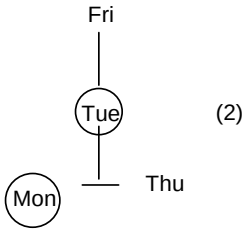
OP, EH, OT, ER, MO,PR

 # —> Question has different answers considering two different language segments.

85.



(1)



(2)

Whereas circle represent female, square male and double parallel lines means husband wife relation.

86. By observation

87. By observation

88. 5 + 6 (hexagon) = 11
(1 + 3) + 3 (triangle) = 7
9 + 8 (octagon) = 17
(2 + 1) + 4 (square) = 7

All of these are prime numbers

89. Figure (I), (II) and (III)
Sum of (1st and 2nd row) numbers
(3 + 8 + 5), (7 + 6 + 4), (2 + 13 + a)
16, 17, 2 + 13 + a = 18
a = 3
Similarly; Last row from figure (I), (II) and (III)
(4 + 7), (9 + 4), (b + 10)
11, 12, b + 10 = 13
b = 3

90. (3)
Numbers are first arranged in descending order and then it's ascending order is subtracted from it to get the solution.
4321 – 1234 = 3087
6432 – 2346 = 4086
Similarly,
7641 – 1467 = 6174

91. (2)
In 3858 $\rightarrow$ number 3 comes 1 time number 5 comes 1 time number 8 comes 2 times
$\therefore$ According to this logic answer is 315182

92. By observation

93. Except 5 all squares are possible.

94. Series are as follows
1 2 2 3 3 3 4 4 4 4 ……. 15 1 6 1

95. Let the radius 'r' of semicircle in the II path
So, $\rightarrow$(Path I) AXB 1/2 .2 rπ(7r) = 7π
(Path II) AYB 1/2 . 2πr × 7= πr × 7 (7 semicircle)
(Path III) for AZB, 2 types of semicircle
Small semicircle diameter is 3r
So ½.2π(3r/2)x2(for two semicircle)
$\therefore$ 3πr

For bigger semi-circle
Radius is 4r
$\therefore$ ½ . 2π(4r)= 4πr
Total=7πr

96. For 1st line ₹1 for the perpendicular line, we need to mark 4 arcs i.e. ₹80. Now we will draw 1 line by joining the arc
$\therefore$ ₹82 for a pair.
$\therefore$ 1000/82 = 12.195 (approx..)
= 12 pairs
 # —> Question has different answers considering two different language segments.

97. 6(First number) $\rightarrow$ 4(second number)
second number is the total number of factors of first number
Hence total number of factor of 42 is
$42 \rightarrow 2^1 \times 3^1 \times 7^1$
$(1 + 1) \times (1 + 1) \times (1 + 1)$
$= 2 \times 2 \times 2 = 8$

98. Mirror image of vowels by the observation. The mirror image of VI and X will be same but not of VII.

99. 2, 3, 5, 7, 13, 23, ?
Prime Numbers : 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47,
Prime Numbers sequence :
1, 2, 3, 4, 6, 9, (14)th no. prime number is the answer
+1 +1 +1 +2 +3 +5
14^{th}, 22^{nd} no. prime
+8

100. (1)

If $13 \rightarrow 5$, $17 \rightarrow 5$, $29 \rightarrow 7$, $41 \rightarrow 11$

$2^2 + 3^2 = 4 + 9 = 13 \Rightarrow 2 + 3 = 5$

$1^2 + 4^2 = 1 + 17 = 17 \Rightarrow 1 + 4 = 5$

$2^2 + 5^2 = 4 + 25 = 29 \Rightarrow 2 + 5 = 7$

$4^2 + 4^2 + 3^2 = 16 + 16 + 9 = 41 \Rightarrow 4 + 4 + 3 = 11$

then $73 \rightarrow 8^2 + 3^2 \Rightarrow 8 + 3 = 11$

ANSWER KEY -NTSE STAGE 2 2020-21 (MAT)

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

Question has different answers considering two different language segments.