

NTSE STAGE II
CODE: 13 – 15
MAT
HINTS & SOLUTIONS

1. 3
 Sol. mie pie sie → good person sing ...I
 pie sie rie → sing good lyrics ...II
 tie rie sie → love good lyrics ...III
 From e.q. I to III
 Good → sie
 Sing → pie
 Person → mie
 Lyrics → rie
 Love → tie
 Person love lyrics → mie tie rie

2. 2
 Sol. ab / a ab b / aaa b bb / aaa a bbbb

3. 2
 Sol. $24 + 25 = 49$
 $40 + 41 = 81$
 $\sqrt{49} = 7, \sqrt{81} = 9$
 $\therefore 7 + 9 = 16$
 Similarly,
 $36 + 45 = 81$
 $50 + 71 = 121$
 $\sqrt{81} = 9, \sqrt{121} = 11$
 $\therefore 9 + 11 = 20$
 Following the same logic
 $70 + 99 = 169$
 $100 + 125 = 225$
 $\sqrt{169} = 13, \sqrt{225} = 15$
 $\therefore 13 + 15 = 28$

4. 1
 Sol. $(12)^2 - (08)^2 = 144 - 64 = 80$
 $(16)^2 - (07)^2 = 256 - 49 = 207$
 $(25)^2 - (21)^2 = 625 - 441 = 184$

5. 4
 Sol.
$$\begin{array}{r} A \ 4 \ B \ C \\ \times \ C \\ \hline I \ A \ D \ C \end{array}$$

Substituting $A = 2, B = 3, C = 5, D = 7$

$$\therefore \begin{array}{r} 2 \ 4 \ 3 \ 5 \\ \times \ 5 \\ \hline \end{array}$$

6. 3

Sol. $\Delta + O = 4 \text{ gm} \dots \text{I}$

$\Delta + \square = 7 \text{ gm} \dots \text{II}$

$\square + O = 9 \text{ gm} \dots \text{III}$

Adding all three equations we get:

$2(\Delta + O + \square) = 20 \text{ gm}$

$\therefore \Delta + O + \square = 10 \text{ gm} \dots \text{IV}$

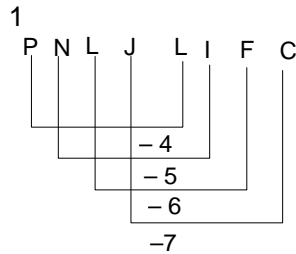
$\therefore \Delta = 1 \text{ gm}$ from eq.. III and IV

$\square = 6 \text{ gm}$ from eq. I and IV

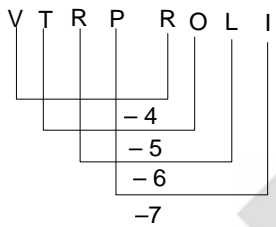
$O = 3 \text{ gm}$ from eq. II and IV

$8 \text{ gm} + \Delta = O + \square$

7. Sol.



Similarly,



8. 2

Sol. The rolling coin actually participates in two separate motions:

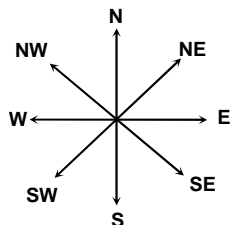
~It rotates around its own center.

~It revolves around the center of the other coin.

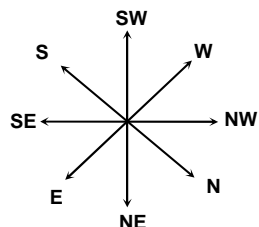
The point of contact on both the stationary coin and the rotating coin must move the same distance, half the circumference of the coin. This means the rotating coin has made one full rotation about its own center while its center has made one half revolution about the stationary coin. So finally, it rotates twice by the time it reaches the starting point.

9. 2

Sol.



Original Directions



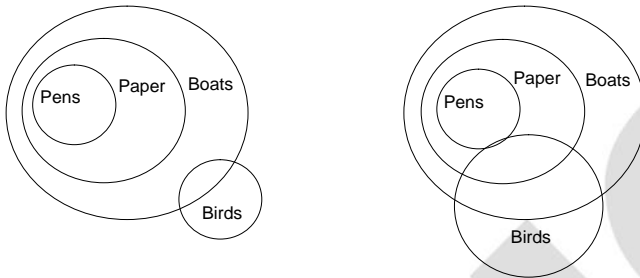
Changed Directions

 \therefore West becomes south east.

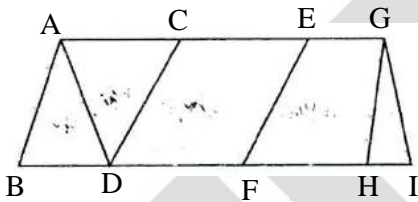
10. 3
 Sol. No face painted = $(n - 2)^2$ (where $n = 6$ i.e. number of smaller cubes along each edge)
 $= (6 - 2)^3$
 $= 64$

11. 2
 Sol. EF22, JK42, GH24, VW90, IJ38
 Logic – $2 \times (\text{position number of 1st letter} + \text{position number of 2nd letter}) = \text{number written after letters}$
 i.e. $2 \times (5 + 6) = 11$ (EF 22)
 $2 \times (10 + 11) = 42$ (JK 42)
 $2 \times (7 + 8) = 30$ (GH24), and so on...

12. 2
 Sol.

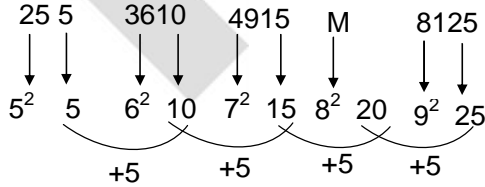


13. 3
 Sol.

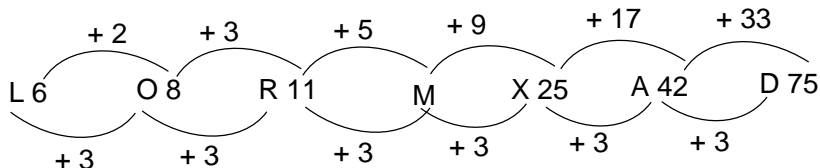


Quad \rightarrow ACDB, CEFD, EGHF, EGIF, AEFB, AGHB, AGIB, ADHG, ADIG, CDHG, CDIG

14. 3
 Sol.



15. 2
 Sol.



Logic \rightarrow Next letter = previous letter + 3, next number = (previous number \times 2 - 1)

16. 3
 Sol. $7 + 2 + 1 + 4 = 14$
 $3 + 8 + 1 + 2 = 14$
 $6 + 5 + 2 + 1 = 14$
 $2 + 4 + 4 + 4 = 14$

17. 3
 Sol. $\Sigma \rightarrow \times$
 $\delta \rightarrow \div$
 $\sigma \rightarrow +$
 $\infty \rightarrow -$
 $= 56 \delta (6 \sigma 8) \Sigma 4 \infty 1$
 $= 56 \div (6 + 8) \times 4 - 1$
 $= 56 \div 14 \times 4 - 1$
 $= 4 \times 4 - 1$
 $= 16 - 1$
 $= 15$

18. 3
 Sol. $100 - 81 \div 27 @ 3 < 6 = 115$
 $= 100 - 3 @ 3 < 6 = 115$
 $= 100 - 3 + 3 \times 6 = 115$
 $= 100 - 3 + 18 = 115$
 $= 115 = 115$

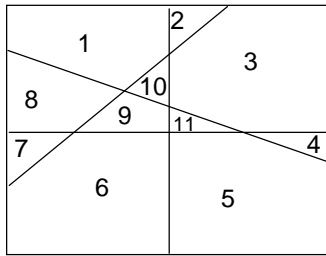
19. 2
 Sol. $\therefore x = 3p + 2 \dots I$
 $x = 5q + 3 \dots II$
 $x = 7r + 5 \dots III$
 from eq. I and II
 $0 = 5q - 3p + 1$
 or $p = \frac{5q + 1}{3}$
 and from eq. I and III
 $0 = 7r - 3p + 3$
 $\therefore p = \frac{7r + 3}{3}$
 \therefore Values of r and q for which p is an integer are 9 and 13 respectively for which $p = 22$
 $\therefore x = 3 \times 22 + 2 = 68$

20. 3
 Sol.

Box - 1	Box - 2
1	9
2	8
3	7
4	6
5	5
6	4
7	3
8	2
9	1

So, there are 9 possible ways through which balls can be distributed.

21. 4
Sol.



22. 3
Sol.

Minimum number of points is 5 in which, where even these points are placed atleast 2 will be at a distance less than equal to $\sqrt{2}$

23. 2
Sol.

Unit digit is 6 \Rightarrow X is even.
Sum of digits is 15 \Rightarrow X is divisible by 3.
 \therefore X is divisible by 6
Sum of digits is 15 \Rightarrow X is not divisible by 9.

24. 1
Sol.

Average age of A, B, C = 43 yrs
Sum of ages of A, B, C = 129
Taking the help of statement I.
If age of C is 65 then clearly C is the eldest because the sum of ages of A and B = 64

25. 3
Sol.

	A	B	C	D	E
Subject	Maths	Hindi	Chem	Phy	Bio
Period	4 th	5 th	3 rd	2 nd	1 st

26. 4
Sol.

	A	B	C	D	E
Subject	Maths	Hindi	Chem	Phy	Bio
Period	4 th	5 th	3 rd	2 nd	1 st

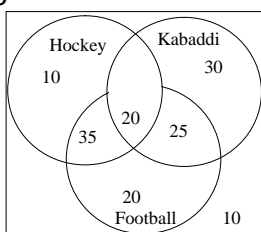
27. 3
Sol.

The volume of both the metallic cylinder is same
Taking radius of another solid cylinder of height 63 cm = R
So, $\pi r^2 \times h = \pi R^2 \times H$
 $\pi 12^2 \times 175 = \pi R^2 \times 63$
R = 20

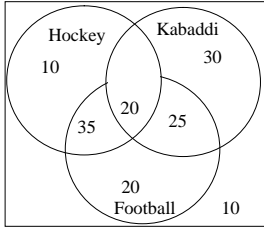
28. 3
Sol.

As per observation.

29. 3
Sol.



30. 1
Sol.



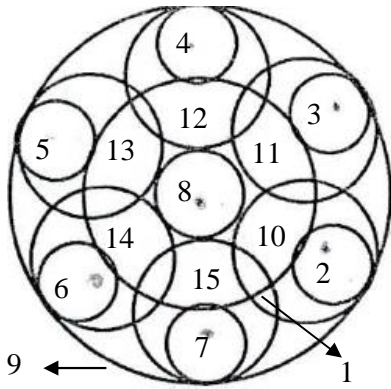
31. 4
Sol.

$$1^2 + 3^2 + 2^2 = 14$$

$$4^2 + 6^2 + 5^2 = 77$$

So, $7^2 + 9^2 + 8^2 = 194$

32. 3
Sol.

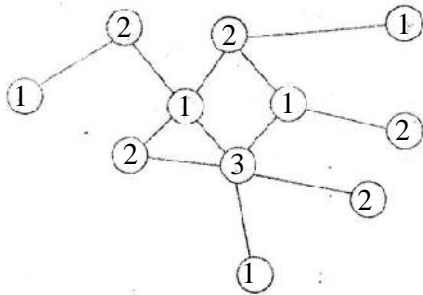


Total number of circles = 15

33. 3
Sol.

Quantity of milk in vessel = $\frac{5}{8}$ of itself
 Quantity of water in vessel = $\frac{3}{8}$ of itself
 \therefore Required quantity of milk in the vessel = $\frac{1}{2}$ of itself
 \therefore Required quantity to be withdrawn of milk from the vessel = $\frac{5}{8} - \frac{1}{2} = \frac{1}{8}$ of the vessel
 Now in order to withdraw $\frac{5}{8}$ of milk, one unit of mixture is withdrawn.
 \therefore To withdraw $\frac{1}{8}$ of itself, mixture withdrawn = $\left(\frac{1}{8} \div \frac{5}{8}\right) = \frac{1}{5}$

34. (*)
Sol.



Minimum three colours are required.

35. 3

Sol.

A		B	D
C	E	F	G
H	I	J	K
S	L		M

Path are →

- 1 SLIJKGD
- 2 SLIJFGD
- 3 SLIJFBD
- 4 SLIEFGD
- 5 SLIEFBD
- 6 SHIJKGD
- 7 SHIJFGD
- 8 SHIJFBD
- 9 SHIEFGD
- 10 SHIEFBD
- 11 SHCEFGD
- 12 SHCEFBD

36.

1

Sol.

$$\sqrt{16} \times (7 - 2) = 20$$

$$\sqrt{25} (8 - 2) = 30$$

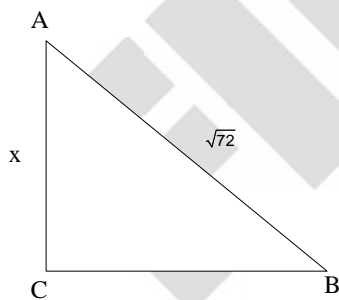
$$\therefore \sqrt{36} (9 - 5) = 24$$

$$\therefore \sqrt{49} (10 - 7) = 21$$

37.

3

Sol.



$$\sqrt{72 - x^2}$$

$$\Delta = \frac{1}{2} x \sqrt{72 - x^2}$$

$$\Delta^2 = \frac{x^2 (72 - x^2)}{4}$$

$$= \frac{-x^4 + 72x^2}{4} \leq 324$$

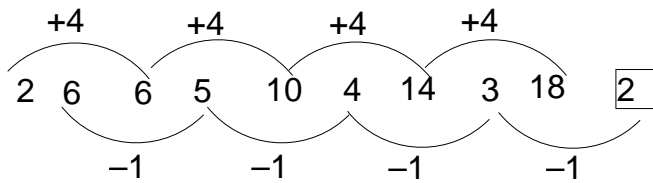
$$\text{Max value of } \Delta^2 = 324$$

$$\Rightarrow \text{max value of } \Delta = 18$$

38.

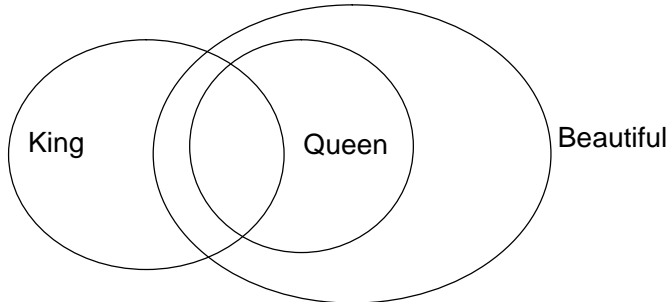
2

Sol.



39. 3

Sol.



Neither I or II follows.

40. 4

Sol.

A	B	C	D	E	F	G
2	3	5	7	11	13	17
H	I	J	K	L	M	N
19	23	29	31	37	41	43
O	P	Q	R	S	T	U
47	53	59	61	67	71	73
V	W	X	Y	Z		
79	83	87	89	97		

So, Code of MAT is $\rightarrow 41\ 2\ 71$

41. 2

Sol.

The number inside the square and circle is half of sum of numbers in circle.

So, $(9 + 3) 2 = 6$

42. 1

Sol.

$$2^3 = 8 = H$$

$$2^4 = 16 = P$$

$$3^2 = 9 = I$$

So,

$$1^4 = 1 = A$$

43. 1

Sol.

I M P H A L
 +1 -1 +2 -2 +3 -3

J L R F D I

Similarly,

M Y S U R U

+1 -1 +2 -2 +3 -3

N X U S U R

44. 2

Sol.

Time difference is increasing by 20 minutes.

So, answer is 1:20.

45. 4
Sol. The number of crosses is increasing by 2.

46. 1
Sol. a b d h p
2⁰ 2¹ 2² 2³ 2⁴

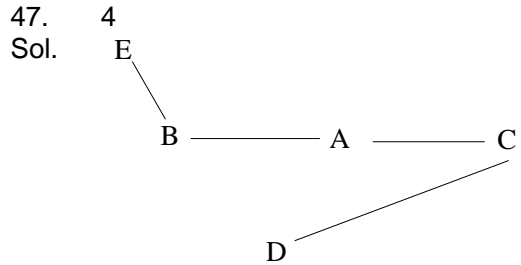


FIGURE I – EBDAC

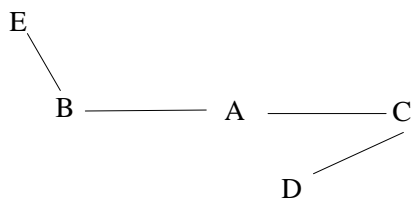


FIGURE II - EBADC

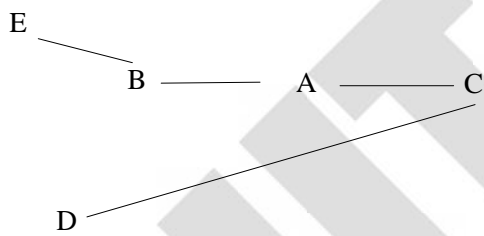


FIGURE III – EDBAC

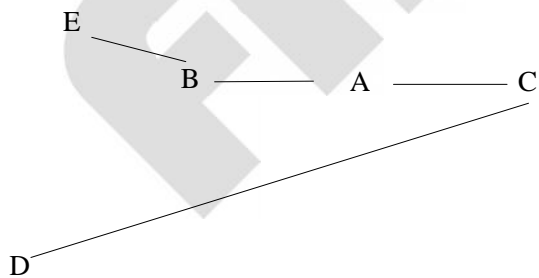


FIGURE IV - DEBAC

48. 4
Sol.

C	A/B	D	A/B
B	C	A	D
D	A/B	C	A/B
B	D	A	C
C	D	A	D
D	B	A	C

49. 4
Sol.

Day	Morning	Evening
Tuesday	Mrs. Sabita	Mrs. Firdaus
Wednesday	Mr. Aaditya	Mr. Naved
Friday	Mrs Seema	Mrs. Shalu
Saturday	Mr. Ronald	Mrs. Ritu

50. 1
Sol.

In the evening shadow will be in East direction.
As the shadow of Zeba is falling to her right so, she is facing North direction and Veena is facing South direction.

FITJEE