NATIONAL TALENT SEARCH EXAMINATION
(NTSE 2021) STAGE - 1

STATE : UTTAR PRADESH **PAPER : MAT**

Date : 13/12/2020

Max. Marks : 100 **SOLUTIONS** Time : 120 mins.

Direction: From question 1 to 12 each question has four terms. Three terms are alike in some way. One term is different from three others. Find out the correct term which is different from three others and write its alternative number on your answer sheet against the proper question number.

1. (1) Guru Ramdas (2) Guru Govind Singh

(3) Guru Granth Sahib (4) Guru Nanak Dev

Ans. **(3)**

Sol. Guru Granth Sahib is the primary scripture of the Sikhs. Guru Ramdas, Guru Govind Singh and Guru Nanak Dev, respectively were the fourth, tenth and first of the ten Gurus of Sikhism.

2. (1) Anxiety (2) Anger

(3) Sorrow (4) Feeling

Ans. **(4)**

Sol. Anxiety, Anger and Sorrow all three are types of feeling while feeling is their superset.

3. (1) Octopus (2) Dolphin

(3) Penguin (4) Seal

Ans. **(1)**

Sol. All the organisms mentioned in the options belong to Kingdom Animalia. Kingdom Animalia is further divided into phyla(singular: phylum). Dolphin, penguin and seal belong to the same phylum, i.e. they belong to phylum chordata. Whereas octopus belong to phylum mollusca. Also among the four, only octopuses are invertebrates; all others are vertebrates.

4. (1) 289 (2) 216

(3) 512 (4) 729

Ans. **(1)**

Sol. All numbers specified in the options except 289 are perfect cubes.
$289 = 17^2$
$216 = 6^3$
$512 = 8^3$
$729 = 9^3$
Hence, 289 is the odd one out.

5. (1) Mobile (2) Computer

(3) Gas heater (4) Television

Ans. **(3)**

Sol. All except the gas heater have a display screen.

6. (1) Pistol (2) Sword

(3) Gun (4) Rifle

Ans. **(2)**

Sol. All of them are weapons, but except for sword all of them use bullets.

7. (1) Konark (2) Khajuraho

(3) Ellora (4) Dilwara

Ans. **(3)**

Sol. Ellora temple is a rock cut cave temple, however all others are temples without any caves.

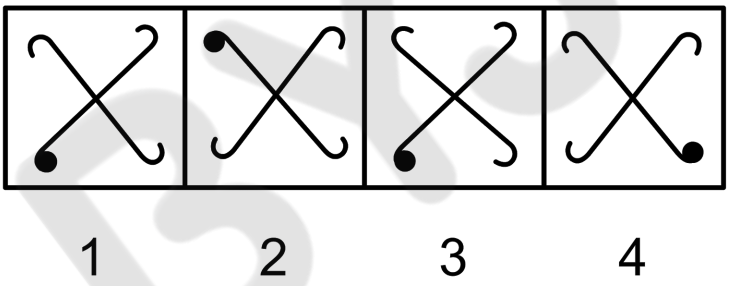
8. (1) Sky - Stars (2) Stadium - Players

(3) Hospital - Patient (4) Moon - Bird

Ans. **(4)**

Sol. There are stars in the sky, players in a stadium and patients in a hospital, however, there are no birds in the Moon.

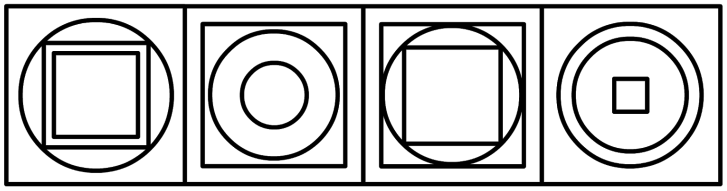
9.



Ans. **(1)**

Sol. The two 'S' shaped lines in options 2, 3 and 4 are facing their scoop side, i.e. they are facing each other. However, the scoop sides of the two lines in option 1 are not facing each other.

10.

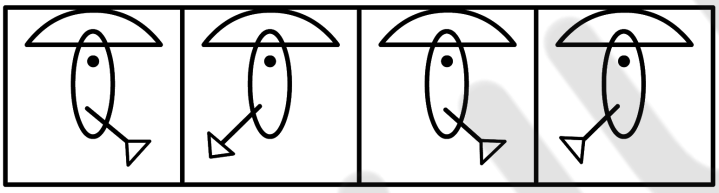


1 2 3 4

Ans. (3)

Sol. At least one shape is in succession in figures 1, 2 and 4. While in 3, the shapes are alternatively placed.

11.

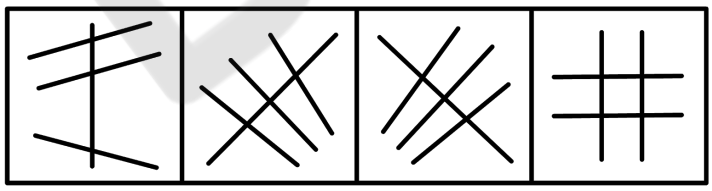


1 2 3 4

Ans. (2)

Sol. The triangle vertex is not connected to the line segment only in option 2.

12.



1 2 3 4

Ans. (4)

Sol. In options 1, 2 and 3, the number of intersection points is three, but the number of intersection points in option 4 is four.

Direction: Question 13 to 22 there are four terms/figures in each question. The terms right to the symbol :: have the same relationship as the two terms of the left symbol :: Out of the four terms/figure one is missing, which is shown by (?). Four alternatives are given for each question. Find out the correct alternative and write its number against the corresponding question on your answer sheet.

13. 326 : 3649 :: 534 : ?

(1) 5932 (2) 25916

(3) 16925 (4) 5874

Ans. **(3)**

Sol. 326 : 3649
$3^2 = 9$; $2^2 = 4$; $6^2 = 36$.
The square of the numbers are written in reverse as 3649.

Hence,
$326 : 6^2 2^2 3^2 : : 534 : 4^2 3^2 5^2$
326 : 3649 : : 534: 16925

14. Lungs : Oxygen :: Heart : ?

(1) Pump (2) Blood

(3) Heart beat (4) Breathing

Ans. **(2)**

Sol. Lungs pump oxygen in the body. Similarly, the heart pumps blood in the body.

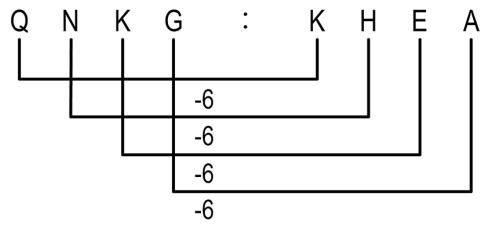
15. QNKG : KHEA :: YVSO: ?

(1) SPMI (2) LIFE

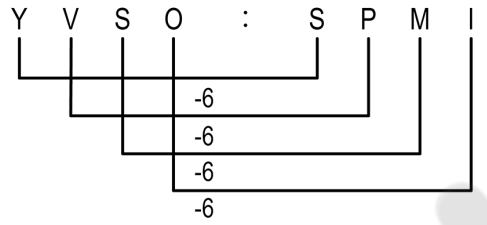
(3) CZWT (4) SVYC

Ans. (1)

Sol.



So,



16. BGF : 80 :: DHC : ?

(1) 90 (2) 94

(3) 92 (4) 96

Ans. (3)

Sol. B = 2; G = 7; F = 6
BGF: (2 X 7 X 6) - 4 = 84 - 4 = 80.

Similarly,
D = 4; H = 8; C = 3
DGF: (4 X 8 X 3) - 4 = 96 - 4 = 92.

17. Eye : tears :: Volcano : ?

(1) Air (2) Flame

(3) Ice (4) Water

Ans. **(2)**

Sol. Eye produces tears and in the same way as volcanoes produce flame.

18. Carpenter : wood :: Cobbler: ?

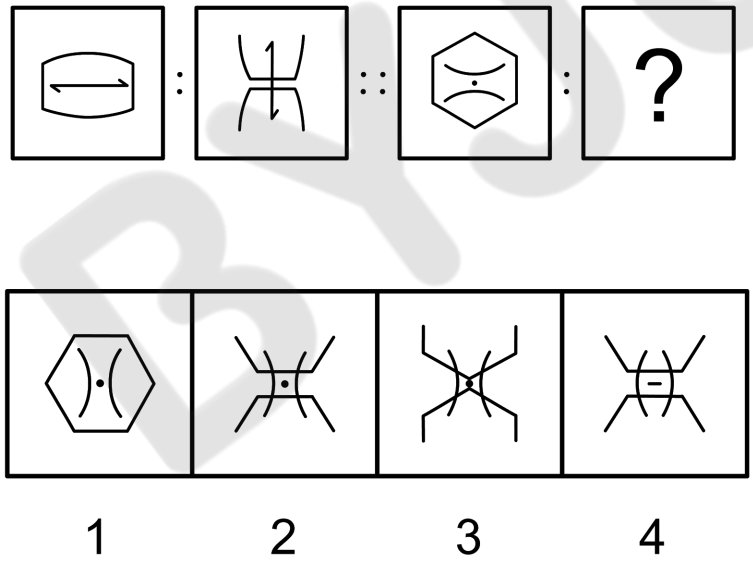
(1) Shoe (2) Sandil

(3) Animal (4) Leather

Ans. **(4)**

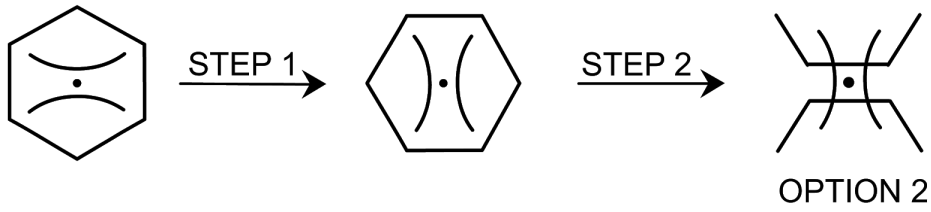
Sol. Carpenter uses wood (raw material) to make furniture, similarly, cobbler uses leather (raw material) to make shoes.

19.

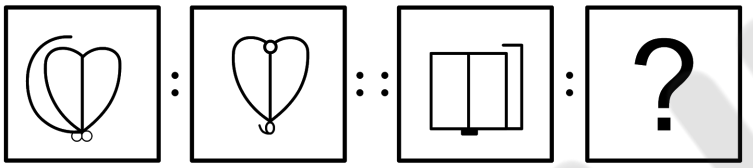


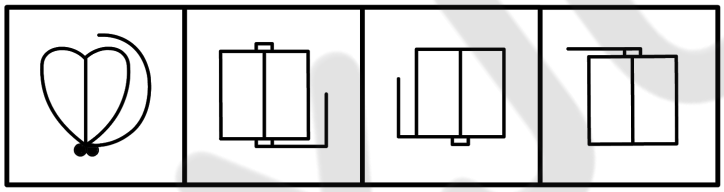
Ans. **(2)**

Sol. Step 1: The whole figure is rotated by 90^{o}.
Step 2: The outer figure is cut into two halves and the halves are rotated by 180^{o}.



20.

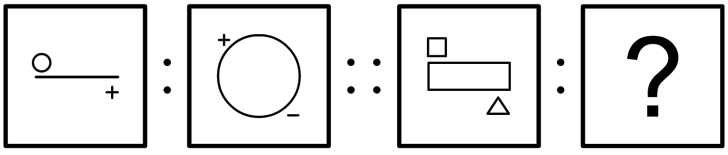


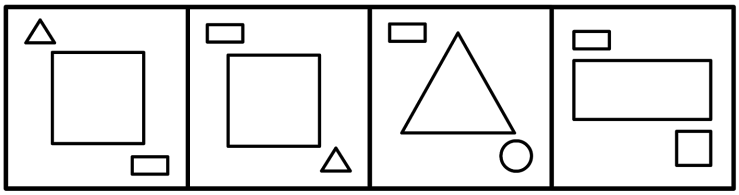


Ans. **(2)**

Sol. i. The tail should reduce.
ii. A small part should be added at the upper middle position of the figure.
iii. The final image obtained should have a quadrilateral in the centre.
All the mentioned points are followed by only option 2.

21.





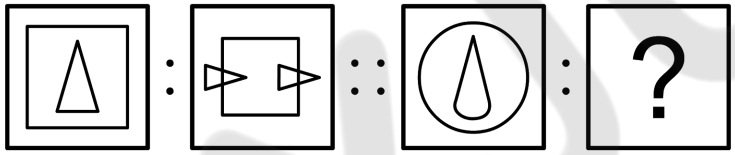
1 2 3 4

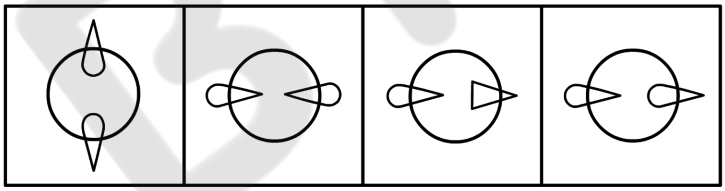
Ans. (1)

Sol. 1. The shape at the centre moves to the bottom right corner.
2. The shape at the top corner moves to the centre.
3. The shape at the right corner goes to the top left corner.

All the mentioned points are followed only by option 1.

22.

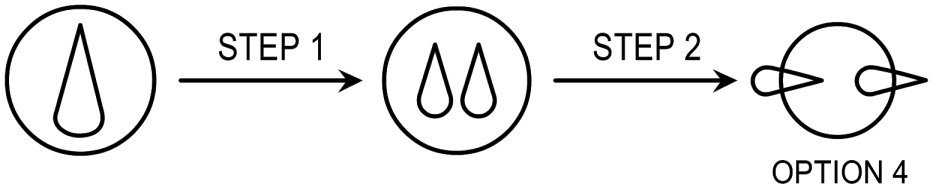




1 2 3 4

Ans. (4)

Sol.



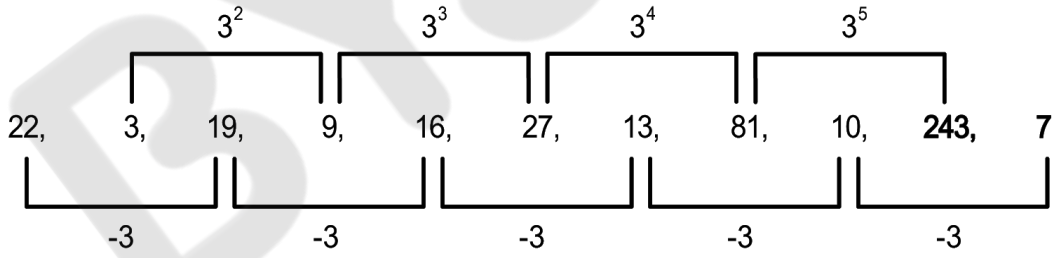
Direction: Questions from 23 to 32 are based on number/figure series. In each series the missing term is mentioned by question mark (?). Find out the missing term in given alternatives and write its alternative number against the correct question number on your answer sheet.

23. 22, 3, 19, 9, 16, 27, 13, 81, 10, ?, ?

(1) 7, 243 (2) 162, 13 (3) 243, 7 (4) 342, 4

Ans. (3)

Sol.

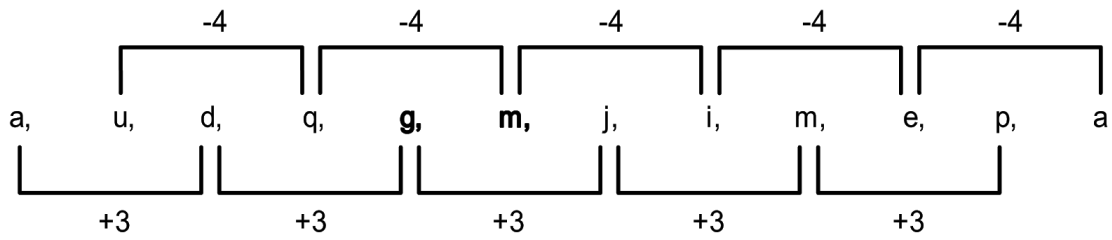


24. a, u, d, q, ?, ?, j, i, m, e, p, a

(1) h, l (2) g, l (3) h, m (4) g, m

Ans. (4)

Sol.

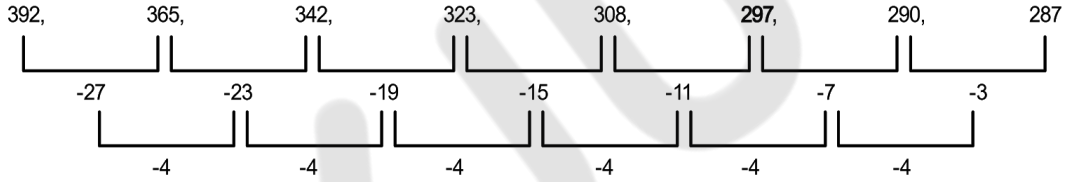


25. 392, 365, 342, 323, 308, ?, 290, 287

(1) 297 (2) 293 (3) 289 (4) 301

Ans. **(1)**

Sol.

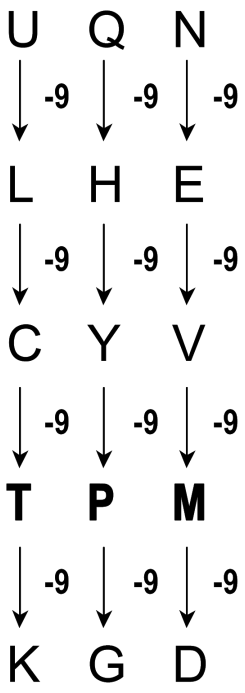


26. UQN, LHE, CYV, _ _ _, KGD

(1) QNK (2) WZD (3) TPM (4) KOS

Ans. **(3)**

Sol.

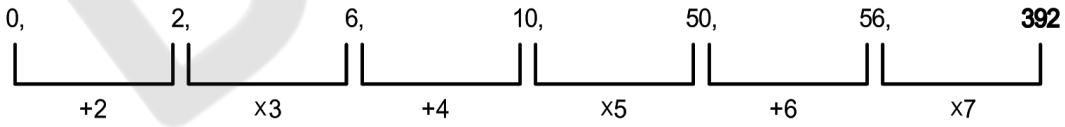


27. 0, 2, 6, 10, 50, 56, ?

(1) 392 (2) 336 (3) 112 (4) 64

Ans. **(1)**

Sol.

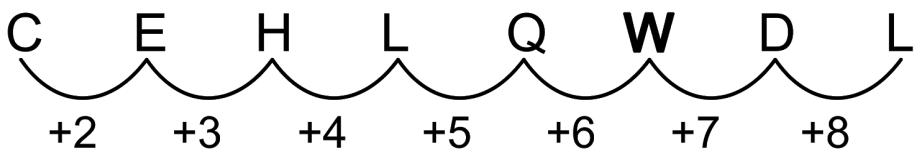


28. C, E, H, L, Q, ?, D, L

(1) U (2) W (3) V (4) X

Ans. **(2)**

Sol. The given series includes successive addition.



29. A2B, B3F, C4L, ?

(1) D5I (2) D5T (3) D5U (4) D5O

Ans. **(2)**

Sol. A2B: A(1) × 2 = 2 (B)
B3F: B(2) × 3 = 6 (F)
C4L: C(3) × 4 = 12 (L)

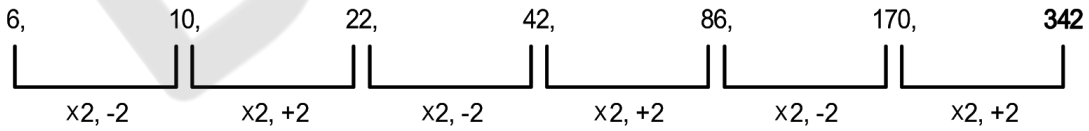
D5T: D(4) × 5 = 20 (T)

30. 6, 10, 22, 42, 86, 170, ?

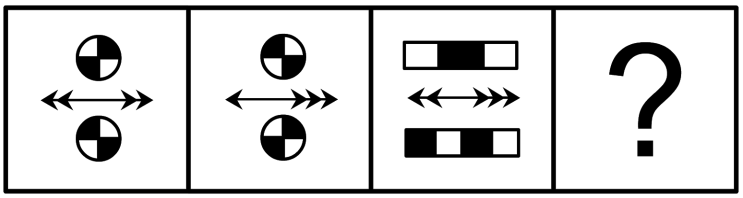
(1) 254 (2) 212 (3) 243 (4) 342

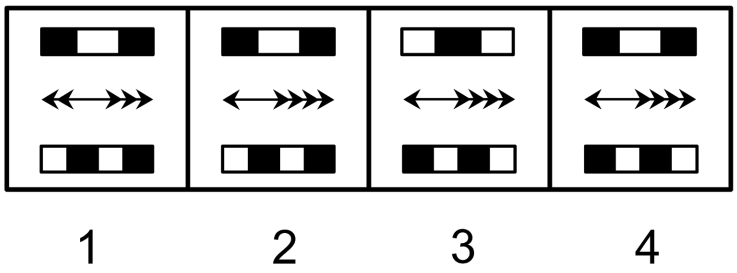
Ans. **(4)**

Sol.



31.

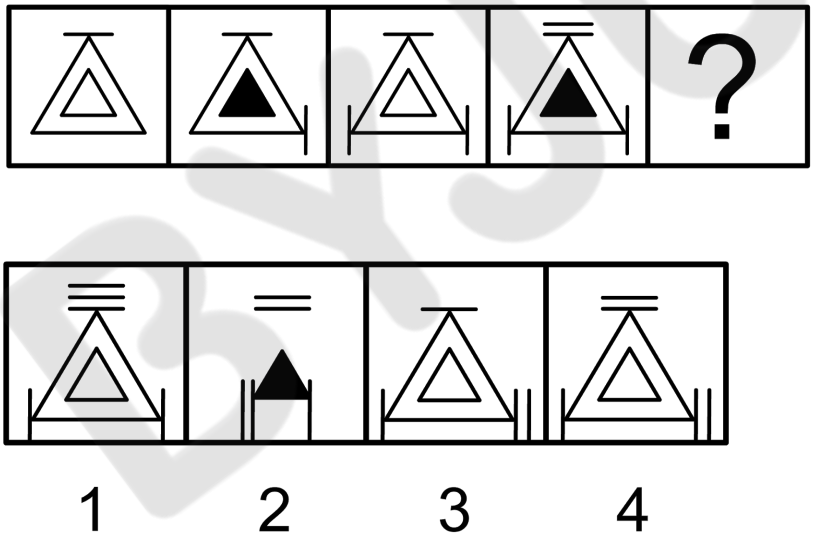




Ans. (2)

Sol. i. One of the arrow heads on the left should move to the right.
ii. Black and white regions in each rectangle should interchange their colours.
The mentioned points are followed only by option 2.

32.



Ans. (4)

Sol. i. The line segment is being added at the vertices in a successive manner. So the answer figure should have five line segments which are joined to the vertices.
ii. The inner triangle is being shaded alternatively in the series.

The mentioned points are followed by only option 4.

Direction: In Question 33 to 42 the questions have become wrong because of the wrong order of signs. Choose the correct order of signs from the four options given below so as to make the equations right. Write the alternative number of the correct option on the answer sheet against the corresponding question number.

33. 25 + 5 = 2 ÷ 2 x 12

(1) x + ÷ = (2) ÷ = x + (3) ÷ x + = (4) x + = ÷

Ans. (3)

Sol.

1. 25 x 5 + 2 ÷ 2 ≠ 12
   126 ≠ 12
2. 25 ÷ 5 = 2 x 2 + 12
   5 ≠ 16
3. 25 ÷ 5 x 2 + 2 = 12
   5 x 2 + 2 = 12 (Satisfies the equation)
4. 25 x 5 + 2 = 2 ÷ 12
   127 ≠ 2 ÷ 12

34. 18 = 5 + 4 ÷ 2 x 28

(1) + x ÷ = (2) = + x ÷ (3) + = ÷ x (4) x = ÷ +

Ans. (1)

Sol.

1. 18 + 5 x (4 ÷ 2) = 28 (Satisfies the equation)
   18 + 10 = 28
2. 18 ≠ 5 + 4 x 2 ÷ 28
   18 ≠ 37/7
3. 18 + 5 = 4 ÷ 2 x 28
   23 ≠ 56
4. 18 x 5 = 4 ÷ 2 + 28
   90 ≠ 30

35. 30 x 2 x 6 - 3 = 6

(1) - x x = (2) x = - x (3) - = x x (4) - x = x

Ans. (4)

Sol.

1. 30 - 2 x 6 x 3 = 6
   -6 ≠ 6
2. 30 x 2 = 6 - 3 x 6
   60 ≠ -12
3. 30 - 2 = 6 x 3 x 6
   28 ≠ 108
4. 30 - (2 x 6) = 3 x 6 (Satisfies the equation)
   18 = 18

36. 5 x 5 + 29 = 17 - 37

(1) = x - + (2) x + - = (3) + x = - (4) x = + -

Ans. (2)

Sol.

1. 5 = 5 x 29 - 17 + 37
   5 ≠ 165
2. 5 x 5 + 29 - 17 = 37 (Satisfies the equation)
   37 = 37
3. 5 + 5 x 29 = 17 - 37
   150 ≠ -20
4. 5 x 5 = 29 + 17 - 37
   25 ≠ 9

37. 6 = 3 ÷ 12 + 28 ÷ 2

(1) ÷ + ÷ = (2) + ÷ = ÷ (3) ÷ + = ÷ (4) = ÷ ÷ +

Ans. (3)

Sol.

1. 6 ÷ 3 + 12 ÷ 28 = 2

2 + 3/7 ≠ 2
17/7 ≠ 2

2. 6 + 3 ÷ 12 = 28 ÷ 2
   6 + ¼ ≠ 14
   25/4 ≠ 14
3. 6 ÷ 3 + 12 = 28 ÷ 2 (Satisfies the equation)
   14 = 14
4. 6 = 3 ÷ 12 ÷ 28 + 2
   6 ≠ 3 ÷ (3/7) + 2
   6 ≠ 9

38. 18 ÷ 6 = 3 x 9 + 36

(1) + ÷ x = (2) ÷ + = x (3) + x ÷ = (4) x ÷ = +

Ans. (1)

Sol.

1. 18 + 6 ÷ 3 x 9 = 36 (Satisfies the equation)
   36 = 36
2. 18 ÷ 6 + 3 = 9 x 36
   9 ≠ 324
3. 18 + 6 x 3 ÷ 9 = 36
   20 ≠ 36
4. 18 x 6 ÷ 3 = 9 + 36
   36 ≠ 45

39. 23 - 69 + 48 = 4 ÷ 80

(1) + = ÷ - (2) ÷ + = - (3) + - ÷ = (4) = + - ÷

Ans. (3)

Sol.

1. 23 + 69 = 48 ÷ 4 - 80
   92 ≠ -68
2. 23 ÷ 69 + 48 = 4 - 80
   145/3 ≠ -76

3. 23 + 69 - (48 ÷ 4) = 80 (Satisfies the equation)
   80 = 80
4. 23 = 69 + 48 - (4 ÷ 80)
   23 ≠ 117 - 1/20

40. 13 + 3 - 17 = 29 x 27

(1) - + x = (2) x + - = (3) + = x - (4) x - = +

Ans. **(2)**

Sol.

1. 13 - 3 + 17 x 29 = 27
   503 ≠ 27
2. (13 x 3) + (17 - 29) = 27 (Satisfies the equation)
   27 = 27
3. 13 + 3 = 17 x 29 - 27
   16 ≠ 466
4. 13 x 3 - 17 = 29 + 27
   22 ≠ 56

41. 24 + 17 ÷ 9 - 3 = 10

(1) ÷ + = - (2) - ÷ + = (3) + = ÷ - (4) - + ÷ =

Ans. **(4)**

Sol.

1. 24 ÷ 17 + 9 = 3 - 10
   177/17 ≠ -7
2. 24 - 17 ÷ 9 + 3 = 10
   226/9 ≠ 10
3. 24 + 17 = 9 ÷ 3 - 10
   41 ≠ -7
4. (24 - 17) + (9 ÷ 3) = 10 (Satisfies the equation)
   10 = 10

42. 14 x 3 = 7 + 63 - 14

(1) + = - x (2) x + = - (3) - x = + (4) x - + =

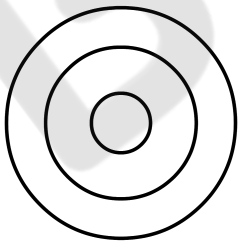
Ans. (2)

Sol.

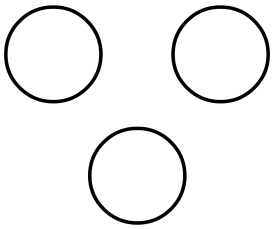
1. 14 + 3 = 7 - 63 x 14
   17 ≠ -875
2. (14 x 3) + 7 = 63 - 14 (Satisfies the equation)
   49 = 49
3. 14 - 3 x 7 = 63 + 14
   -7 ≠ 77
4. 14 x 3 - 7 + 63 = 14
   98 ≠ 14

Direction: In Question 43 to 52 each of the following questions has a group of the three words which are related to each other in some way. This relationship can be represented by one of the four figure alternatives given in the beginning. Find out the correct figure alternative and write its alternative number against the corresponding question on your answer sheet.

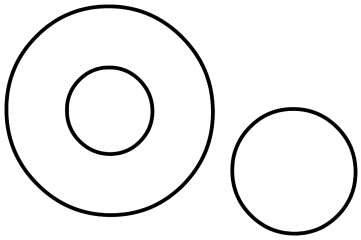
(1)



(2)



(3)



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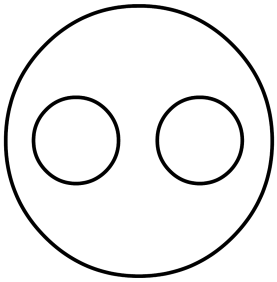
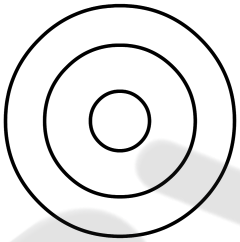


43. Atmosphere, air, oxygen

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

Ans. **(3)**

Sol.



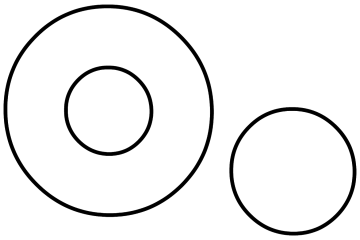
Oxygen is in the air which is within the atmosphere.

44. Earth, forest, sky

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

Ans. **(2)**

Sol.



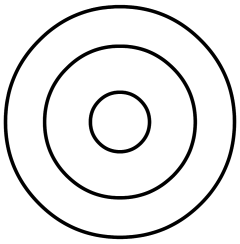
Forest is found on the Earth surface. Sky is a separate entity.

45. Universe, star, sun

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

Ans. (4)

Sol.



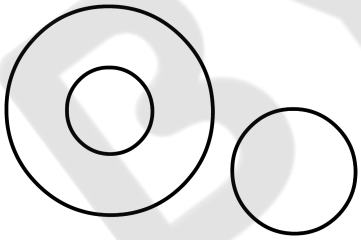
Sun is a star and each star is present in the universe.

46. Lawyer, criminal, thief

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

Ans. (2)

Sol.



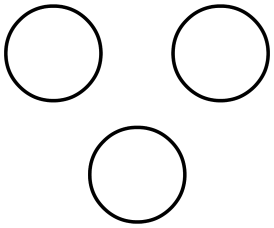
Every thief is a criminal. However, lawyers and criminals are separate entities.

47. Gas, liquid, metal

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

Ans. (4)

Sol.



Liquids are different from gases. Metals are different from liquids and gases.

48. Animals, tiger, cow

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

Ans. (3)

Sol.

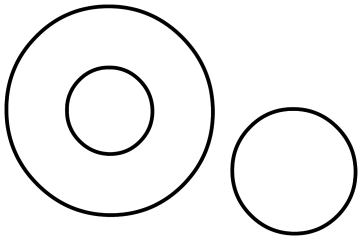
Tiger and cow are different animals.

49. Birds, parrot, bat

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

Ans. (2)

Sol.



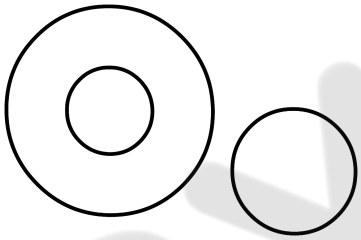
Bat is a mammal and parrot is a bird.

50. Mineral, silver, wood

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

Ans. (4)

Sol.



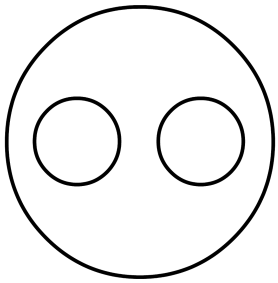
Silver is a native element mineral. Wood is a separate entity.

51. Atom, electron, proton

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

Ans. (2)

Sol.



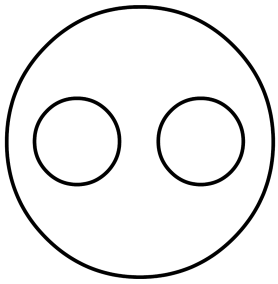
Electrons and protons both are present in an atom.

52. Carnivorous, tiger, wolf

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

Ans. **(3)**

Sol.



Tiger and wolf are carnivorous animals.

Direction: Question 53 to 57 are based on definite series. In the given question some symbols are missing shown by (-). The missing symbols are given in proper sequence as one of the four alternatives given under each question. Find out the correct alternative and write the number on the answer sheet against the question number.

53. c _ ba _ cb _cc _ ac _ ba

(1) cabac (2) ccabc (3) acabc (4) bcaac

Ans. **(2)**

Sol. Repeating group of letters: c c b a
Series : c c b a | c c b a | c c b a | c c b a

54. fr _ me _ ra _ ef _am _

(1) afrme (2) amfem (3) amerf (4) afmre

Ans. **(4)**

Sol. Repeating group of letters: f r a m e
Series : f r a m e | f r a m e | f r a m e

55. ma _ ma _ mam_ alm_ mm _ l

(1) lmala (2) mlama (3) mlmaa (4) lamam

Ans. (3)

Sol. Repeating group of letters: m a m m a l
Series: m a m m a l | m a m m a l | m a m m a l

56. _ nb _ cn _ cc _ bc _ nbc

(1) ccbnc (2) bcncb (3) cbncc (4) bcncb

Ans. (1)

Sol. Repeating group of letters: c n b c
Series: c n b c | c n b c | c n b c | c n b c

57. j _ l _ aja _ sa _ als _

(1) asjal (2) aslja (3) ajsja (4) ajsla

Ans. (2)

Sol. Repeating group of letters: j a l s a
Series: j a l s a | j a l s a | j a l s a

Direction: Question 58 to 62 the letters in column I are coded in the form of numbers. Which are written in column II, but the order of numbers is different. Read carefully the code of letters. Find the correct answer in the given alternative and write its alternative number against the corresponding question number on your answer sheet.

Column I	**Column II**
PAN	372

NIB	643
BET	156
TIP	241

//Values of common letters for use in Q. 58 - 62.
N = 3 (using PAN and NIB)
B = 6 (using BET and NIB)
T = 1 (using TIP and BET)
P = 2 (using TIP and PAN)
I = 4 (using TIP and NIB)**//**

58. The code for the word BEAN is

(1) 3576 (2) 6543 (3) 5763 (4) 6573

Ans. (4)

Sol. B = 6
T = 1
PAN = 372, and P = 2 and N = 3. So, A will be equal to 7.
Also, BET = 156 and B = 6, and T = 1. So, E = 5.
So, BEAT = 6573

59. The code for the word PAINT is

(1) 24713 (2) 27431 (3) 13427 (4) 42731

Ans. (2)

Sol. N = 3; B = 6; T = 1; P = 2; I = 4; A = 7; E = 5
PAINT = 27431

60. The code for the NEAT is

(1) 1752 (2) 3751 (3) 3571 (4) 5317

Ans. **(3)**

Sol. N = 3; B = 6; T = 1; P = 2; I = 4; A = 7; E = 5
NEAT = 3571

61. The code for the TAPE is

(1) 1725 (2) 1572 (3) 7251 (4) 5217

Ans. **(1)**

Sol. N = 3; B = 6; T = 1; P = 2; I = 4; A = 7; E = 5
TAPE = 1725

62. The code for the TAB is -

(1) 761 (2) 146 (3) 567 (4) 176

Ans. **(4)**

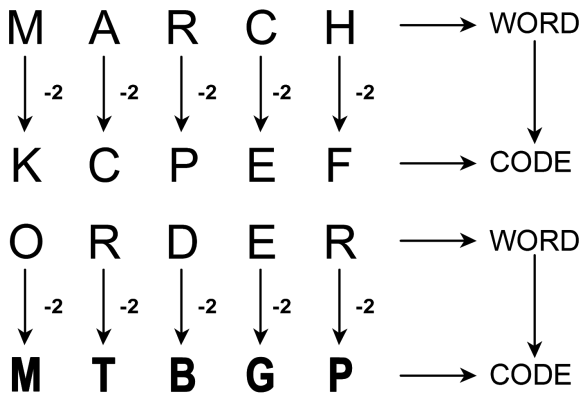
Sol. N = 3; B = 6; T = 1; P = 2; I = 4; A = 7; E = 5
TAB = 176

63. If any code language MARCH is written as KCPEF. What will be the code of ORDER in the same code language?

(1) MTBGP (2) MPBCP (3) LOABO (4) QPFCT

Ans. **(1)**

Sol.

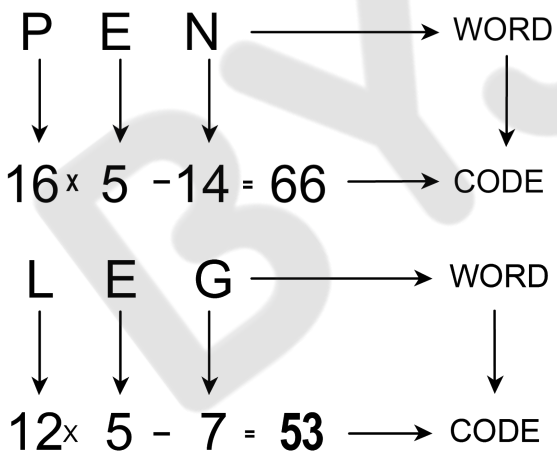


64. If in any code language PEN is written as 66. What will be the code of LEG in the same code language?

(1) 67 (2) 65 (3) 53 (4) 24

Ans. **(3)**

Sol.

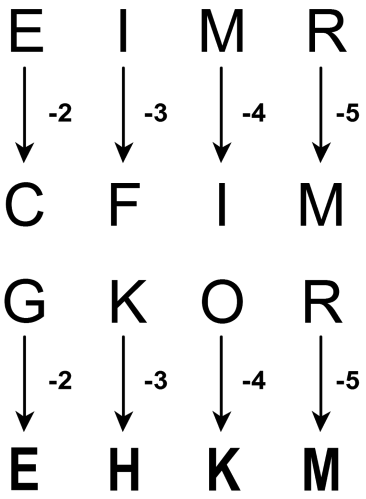


65. If in any code language EIMR is written as CFIM. How will GKOR be written in that code language?

(1) FIJN (2) EHKM (3) EILN (4) FHLN

Ans. **(2)**

Sol.

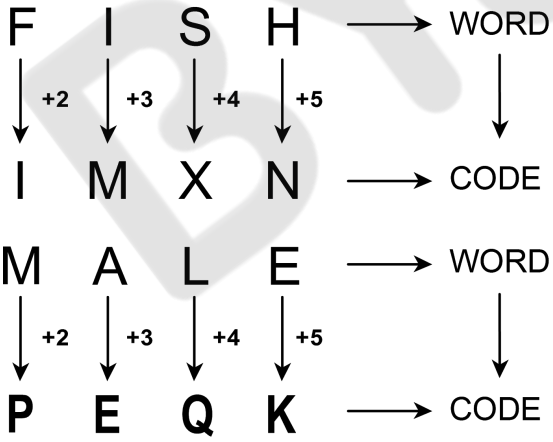


66. If in any code language FISH is written as IMXN. What will be the code of MALE in the same code language?

(1) PDOH (2) QEPJ (3) ODPJ (4) PEQK

Ans. **(4)**

Sol.



67. If in any code language PD is written as 8. What will be the code of HB in the same code language?

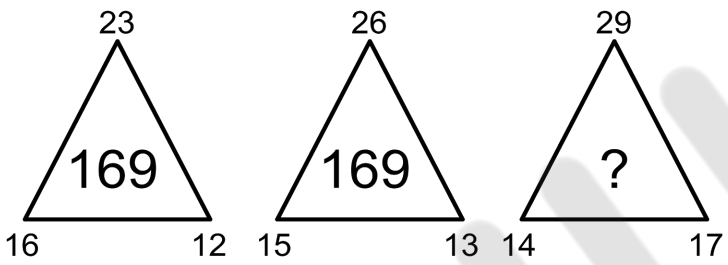
(1) 16 (2) 10 (3) 4 (4) 18

Ans. (3)

Sol. PD = 8
P = 16 and D = 4
PD = 16 - 2(4) = 8

Similarly, HB, H = 8, B = 2
HB = 8 - 2(2) = 4

68.

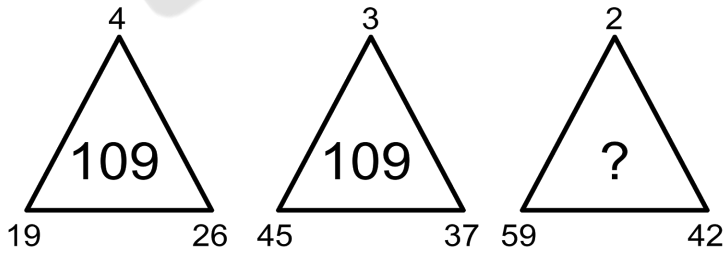


(1) 169 (2) 267 (3) 209 (4) 389

Ans. (3)

Sol. 16 x 12 - 23 = 169
15 x 13 - 26 = 169
14 x 17 - 29 = **209**

69.

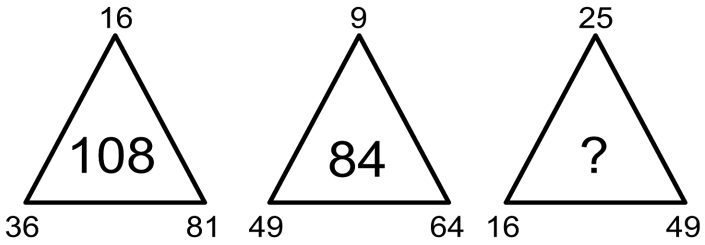


(1) 103 (2) 105 (3) 109 (4) 225

Ans. (3)

Sol. $19 + 26 + 4^3 = 45 + 64 = 109$
$45 + 37 + 3^3 = 82 + 27 = 109$
$59 + 42 + 2^3 = 101 + 8 = \mathbf{109}$

70.



(1) 60 (2) 70 (3) 90 (4) 58

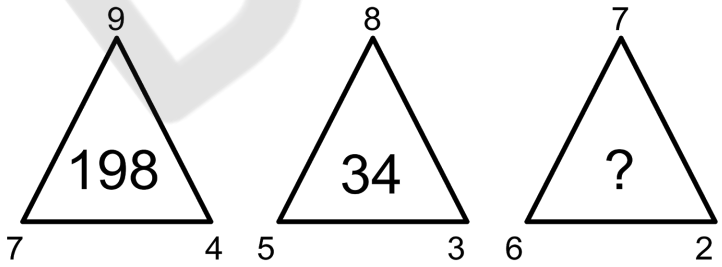
Ans. **(2)**

Sol. $\frac{\sqrt{16} \times \sqrt{36} \times \sqrt{81}}{2} = 108$

$\frac{\sqrt{9} \times \sqrt{49} \times \sqrt{64}}{2} = 84$

$\frac{\sqrt{25} \times \sqrt{16} \times \sqrt{49}}{2} = 70$

71.



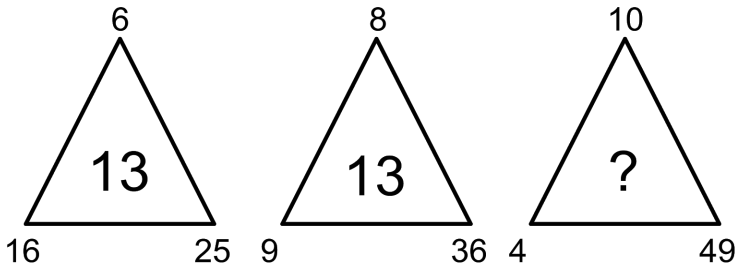
(1) 89 (2) 84 (3) 135 (4) 159

Ans. **(4)**

Sol. $7^3 - 4^3 - 9^2 = 343 - 64 - 81 = 198$
$5^3 - 3^3 - 8^2 = 125 - 27 - 64 = 34$

$6^3 - 2^3 - 7^2 = 216 - 8 - 49 =$ **159**

72.



(1) 12 (2) 13 (3) 35 (4) 63

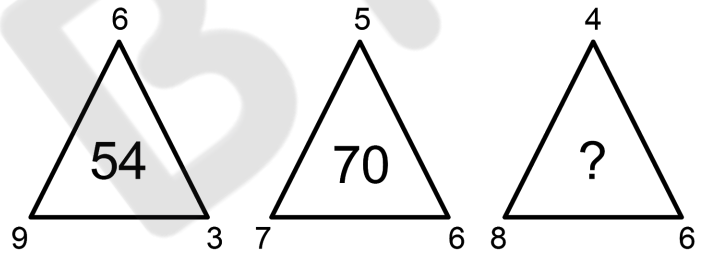
Ans. (1)

Sol. $\frac{(\sqrt{16} \times \sqrt{25}) + 6}{2} = 13$

$\frac{(\sqrt{9} \times \sqrt{36}) + 8}{2} = 13$

$\frac{(\sqrt{4} \times \sqrt{49}) + 10}{2} = 12$

73.



(1) 44 (2) 32 (3) 72 (4) 64

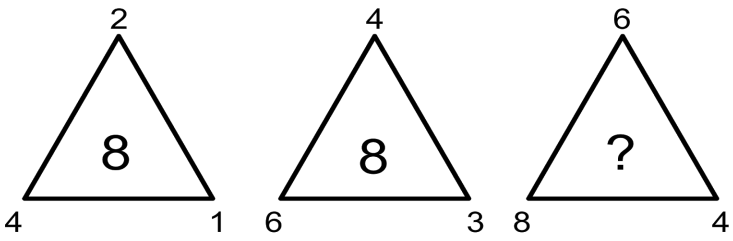
Ans. (4)

Sol. $\frac{3 \times 6 \times 9}{3} = 54$

$\frac{6 \times 5 \times 7}{3} = 70$

$\frac{4 \times 8 \times 6}{3} = 64$

74.



(1) 8 (2) 10 (3) 12 (4) 14

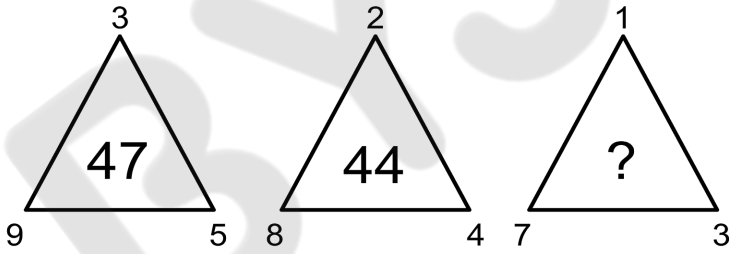
Ans. (3)

Sol. $\frac{4 \times 2}{1} = 8$

$\frac{6 \times 4}{3} = 8$

$\frac{8 \times 6}{4} = 12$

75.

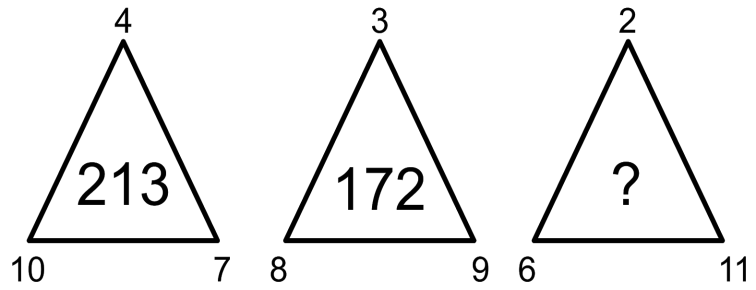


(1) 44 (2) 39 (3) 20 (4) 32

Ans. (2)

Sol. $9^2 - 5^2 - 3^2 = 47$
$8^2 - 4^2 - 2^2 = 44$
$7^2 - 3^2 - 1^2 = 39$

76.

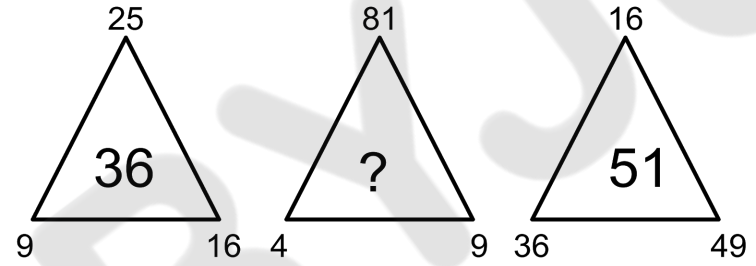


(1) 165 (2) 131 (3) 173 (4) 132

Ans. **(1)**

Sol. $10^2 + 7^2 + 4^3 = 213$
$8^2 + 9^2 + 3^3 = 172$
$6^2 + 11^2 + 2^3 =$ **165**

77.



(1) 29 (2) 42 (3) 27 (4) 86

Ans. **(2)**

Sol. $(\sqrt{25} + \sqrt{9} + \sqrt{16}) \times 3 = 36$
$(\sqrt{16} + \sqrt{36} + \sqrt{49}) \times 3 = 51$
$(\sqrt{81} + \sqrt{4} + \sqrt{9}) \times 3 =$ **42**

78. If the first day of any month is monday. What date will be on the fourth Saturday of that month?

(1) 26 (2) 27 (3) 28 (4) 29

Ans. **(2)**

Sol. If the 1st day of the month is Monday, the first Saturday will be the 6th of the month.
So, the fourth Saturday will be the 27th of the month (6 + 7 + 7 + 7).

79. If a child was born on 3rd August 2020 on Monday. After 5 months and five days what date and day will be?

(1) 9 Jan, Saturday (2) 10 Jan, Sunday

(3) 7 Jan, Thursday (4) 8 Jan, Wednesday

Ans. (1)

Sol. Child is born on 03 - 08 - 2020, Monday. Five months from 03-08-2020 will be 03-01-2021.

There are 28 days after 03 - 08 - 2020 in August 2020.
So till December 31st, there are 150 days (28 + 30 + 31 + 30 +31).

Now, 21 weeks x 7 days = 147 days.
As, 03-08-2020 is a Monday, so the 147th day will also be a Monday.
And, 03-01-2021 will be a Sunday.

After 5 more days, as in the 6th day after Sunday will be a Saturday, and the date will be 09-01-2021.

80. A frog leaps each time for two feet and rolldown for half feet. According to this procedure how many times will it attempt to reach for nine feet?

(1) 9 (2) 8 (3) 7 (4) 6

Ans. (4)

Sol. The distance moved by the frog in every attempt = 2 - 0.5 = 1.5 feet.
Distance covered in 5 attempts = 1.5 x 5 = 7.5 feet.
In 6th attempt, total distance covered = 7.5 + 2 = 9.5 feet.
So, the number of attempts the frog makes to cover 9 feet = 6.

Direction: In Question 81 to 85 are based on the information given below. Read the information carefully and find out the correct answer from the four alternatives and write its alternative number to your answer sheet against the proper question number

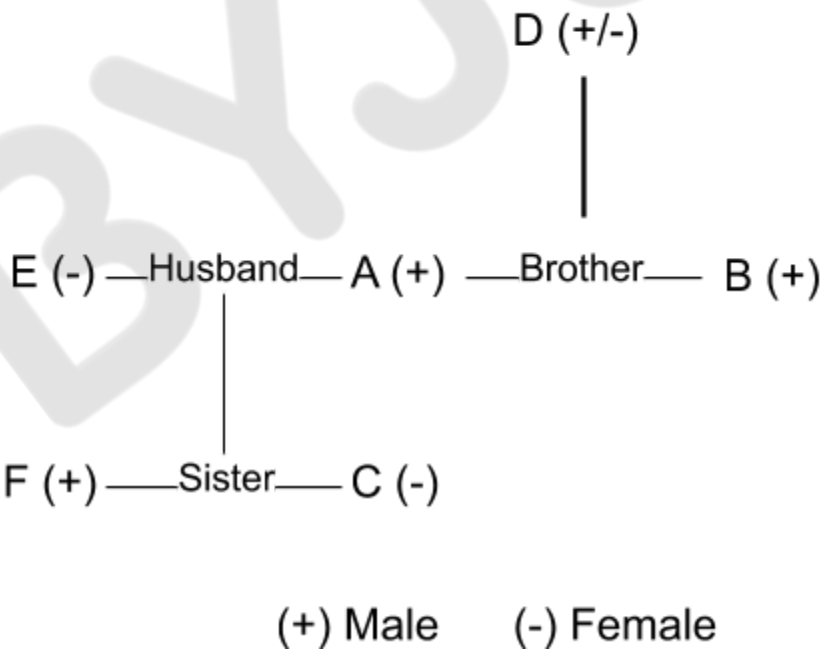
There is a family consisting of six members A B C D E and F. C is the sister of F. B is brother of E's husband. F is grandson of D.

81. How many male members are there in the family?

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

Ans. **(1)**

Sol. A, B, and F are male members of the family. (Nothing is given about D)



82. How is B related to F?

(1) Father (2) Brother (3) Uncle (4) Aunty

Ans. **(3)**

Sol. B and A are brothers. So, B is related to A's son as uncle.

83. Who is the husband of "E"?

(1) D (2) B (3) F (4) A

Ans. **(4)**

Sol. As can be seen from the family tree, A is the husband of E.

84. Which is the group of male members?

(1) a,b,c (2) d,b,a (3) d,e,f (4) a,e,c

Ans. **(2)**

Sol. The male members of the family are B, A and F.
But here assuming D is male as that is the only possibility from given options.

85. How is E related to C ?

(1) Mother (2) Aunty (3) Uncle (4) Father

Ans. **(1)**

Sol. As can be seen from the family tree, E is the Mother of C.

Direction: Read the following statement carefully and choose the correct answer for the question number 86 to 90. Write the correct alternative number on your answer sheet.

Five sisters Meena, Reema, Teena, Beena and Neena are there in a family. Meena was born in 1989. Teena is seven years older than Neena, while

eight years younger than Meena. Beena is five years older than Neena while seven years younger than Reena.

// Ages of sisters for use in Q. 86 - 90:

Meena : 1989.
Teena : Meena + 8 = 1989 + 8 = 1997.
Neena : Teena + 7 = 1997 + 7 = 2004.
Beena : Neena - 5 = 2004 - 5 = 1999.
Reena : Beena - 7 = 1999 - 7 = 1992.**//**

86. What is the age difference between Meena and Beena?

(1) 3 (2) 5 (3) 7 (4) 10

Ans. (4)

Sol. Meena - 1989.
Beena - 1999.
So the age difference between Meena and Beena is 10 years.

87. Who is the youngest among them?

(1) Beena (2) Neena (3) Reena (4) Teena

Ans. (2)

Sol. Meena : 1989, Reena : 1992, Teena : 1997, Beena : 1999, Neena : 2004.
Neena born in the year 2004 is the youngest.

88. Who is middle order among them?

(1) Teena (2) Reena (3) Beena (4) Neena

Ans. (1)

Sol. Meena : 1989, Reena : 1992, Teena : 1997, Beena : 1999, Neena : 2004.
Teena is the middle order among the five.

89. What is the age difference between Reena and Teena?

(1) 2 (2) 3 (3) 5 (4) 7

Ans. (3)

Sol. Reena : 1992, Teena : 1997.
Age difference between Reena and Teena is 5 yrs.

90. Who was born in leap year?

(1) Teena - Reena (2) Beena - Meena
(3)Neena - Teena (4) Reena - Neena

Ans. (4)

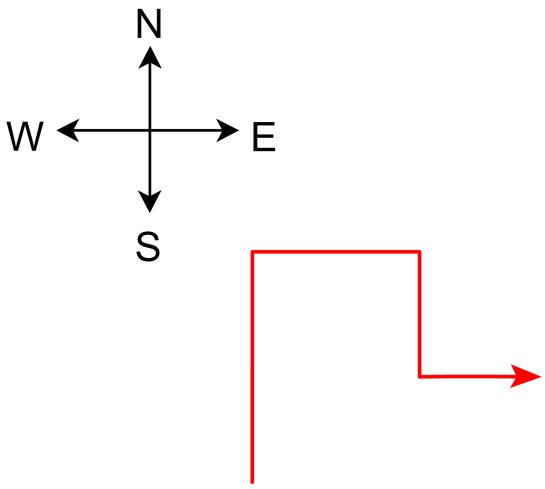
Sol. Meena : 1989, Reena : 1992, Teena : 1997, Beena : 1999, Neena : 2004.
1992 and 2004 are leap years. So Reena and Neena were born in leap year.

91. A student walks towards the north direction, he turns to his right and turns right again, after that he turns to his left. Now in which direction is he going?

(1) East (2) West (3) North (4) South

Ans. (1)

Sol.



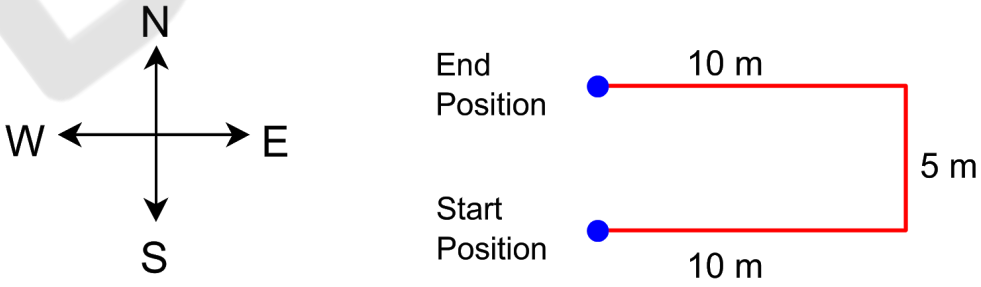
The red line shows the directions taken by the student and the arrow shows that he is going in the East direction now.

92. A student walks for 10 meter towards east from any point, turning to her left she walks for 5 meter, she turns to her left again and walks for 10 meter. Now how far and in which direction is she from the beginning point?

(1) 25 meter North (2) 5 meter West (3) 5 meter North (4) 15 meter West

Ans. **(2)**

Sol.



From the image, it can be seen that the student is 5 meter away from the starting position and is facing the West direction.

93. If in any code language, sun is called moon, moon is called as stars, stars is called cloud, cloud is called water and water is called sun, then by whom will it rain____

(1) Cloud (2) Stars (3) Sun (4) Water

Ans. (4)

Sol. Usually rain happens from the clouds. In the code language, the cloud is called water. So it rains by water.

94. Two people are standing facing each other. If one's face is towards the north, then in which direction will the left hand of the second person?

(1) West (2) South (3) East (4) North

Ans. (3)

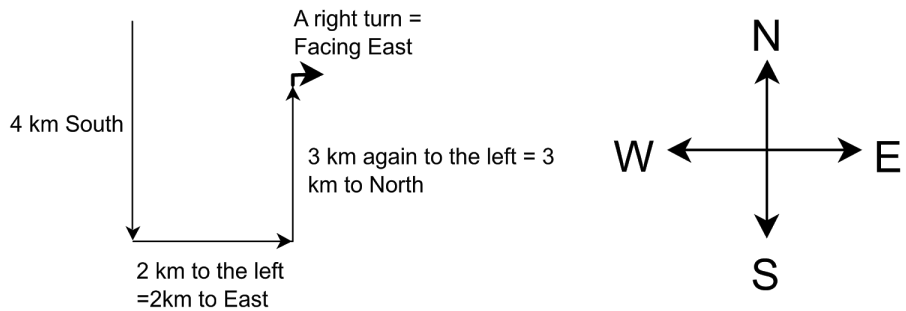
Sol. The direction of the left hand of the other person will be towards the East as he will be facing the South direction.

95. Ram walks for 4 km towards South, turning to his left he walks for 2 km he turns to his left again and walks for 3 km, then he turns to his right. In which direction is his face now?

(1) East (2) West (3) North (4) South

Ans. (1)

Sol.



Direction: Questions from 96 to 100 are based on the alphabet series which is given below. Read the alphabet series carefully and find out the correct answer for each question and write its alternative number on your answer sheet against the proper question number.

n o i j o n p t a k t l n o p u j e t b n a p u b

96. Which letter has been repeated the most in this series?

(1) o (2) n (3) p (4) t

Ans. **(2)**

Sol. **n** o i j o **n** p t a k t l **n** o p u j e t b **n** a p u b
n occurs the most number of times in the given set of letters. n occurs a total of 4 times.

97. In this series, how many times the vowel occurs just before and just after consonant?

(1) One time (2) Two times (3) Three times (4) Four times

Ans. **(4)**

Sol. n o **i j o** n p t a k t l n **o p u j e** t b n **a p u** b

98. In this series how many times the vowel occurs just before the consonant but not just after the consonant?

(1) One time (2) Two times (3) Three times (4) Four times

Ans. **(1)**

Sol. n **o i j** o n p t a k t l n o p u j e t b n a p u b

99. In this series, how many times the vowel occurs just after consonant but not just before consonant?

(1) Two times (2) One time (3) Four times (4) Three times

Ans. **(2)**

Sol. **n o i** j o n p t a k t l n o p u j e t b n a p u b

100. How many consonant letters are used in the series ?

(1) 6 (2) 7 (3) 8 (4) 9

Ans. **(2)**

Sol. **n** o i **j** o n **p t** a **k** t **l** n o p u j e t **b** n a p u b
7 consonant letters are used in the series. (n, p, t, k, l, j, b)

NATIONAL TALENT SEARCH EXAMINATION
(NTSE 2021) STAGE - 1

STATE : UTTAR PRADESH **PAPER : SAT**
Date : 13/12/2020

Max. Marks : 100 **SOLUTIONS** Time : 120 mins.

PHYSICS

101. What is the far point of the normal human eye?

(1) 25 cm (2) 50 cm (3) 100 cm (4) Infinity

Ans. **(4)**

Sol. The far point of the eye is the farthest distance to which the eye can see the objects clearly. Thus, the far point for a normal human eye is infinity.

102. Refractive index of water is -

(1) 1.00 (2) 1.33 (3) 1.52 (4) 2.42

Ans. **(2)**

Sol. The refractive index of water = speed of light in air or vacuum/ speed of light in water

The refractive index of water = $\frac{3\times10^8}{2.25\times10^8} = \frac{4}{3} = 1.33$

103. A man used a convex lens of focal length of 20 cm in his spects, the power of lens is -

(1) +2D (2) -2D (3) +5D (4) -5D

Ans. (3)

Sol. Power of lens = $(1/focal\ length\ (f) in\ metres)$
Given, focal length of convex lens is 20 cm = 0.2 m
Power of lens = $(1/0.2) = 10/2 = 5$
Thus, the power of a convex lens of focal length 20 cm is +5D (+ve as it is convex lens).

104. In an electric circuit, the voltmeter is used-

(1) in series (2) in parallel (3) in both manner (4) None of these

Ans. (2)

Sol. A voltmeter is a device used to measure voltage/potential difference between two points in an electric circuit. If the voltmeter is connected in series, there would be no current flow in the circuit due to its high resistance and the reading would be incorrect. Thus, the voltmeter is connected in parallel as no current or very less current flows through it and hence the current through the circuit is unaltered.

105. One horse power (H.P) is equal to -

(1) 467 watt (2) 500 watt (3) 746 watt (4) 1000 watt

Ans. (3)

Sol. One horse power (H.P) is equal to 746 watt.

106. A magnet attracts-

(1) Only iron (2) Only cobalt (3) Only nickel (4) All the above

Ans. (4)

Sol. Iron, Cobalt and Nickel are ferromagnetic materials. Thus, these materials have iron in theme and are attracted to magnets.

107. Which of the following is the Bio/Gobar gas?

(1) CH_4+CO_2 (2) CH_4+NO_2 (3) $CO+H_2$ (4) CO_2+N_2

Ans. (1)

Sol. Biogas or gobar gas is produced mainly by the breakdown of organic compounds such as cow dung and vegetable waste in the absence of oxygen. It is primarily composed of methane (CH_4) and Carbon dioxide (CO_2).

108. In an electric bulb filament 0.5 ampere current is passed for 10 minutes, calculate the electric charge passess through the circuit.

(1) 5C (2) 20C (3) 300C (4) 500C

Ans. (3)

Sol. Given,
Current (I) = 0.5 A
Time (t) = 10 minutes = 600 s.
Current (I) = Charge (Q)/ Time(t)
Charge $Q = I \times t$
$= 0.5 \times 600$
= 300 C.

109. Which of the following mirrors is used by a dentist to examine the patient's teeth?

(1) Convex mirror (2) Concave mirror
(3) Plane mirror (4) All of the above

Ans. (2)

Sol. A dentist uses a concave mirror as a concave mirror produces a magnified image of an object when the object is very close to the mirror.

110. An electric bulb has ratings of 30W, 12V. The maximum current pass through it, will -

(1) 0.4 amp (2) 2.5 amp (3) 12 amp (4) 360 amp

Ans. (2)

Sol. Given,
Power (P) = 30 W
Potential Difference (V) = 12 V
The formula for power $P = V \times I$
Thus, current $I = \frac{P}{V}$
$= \frac{30}{12}$
= 2.5 amp

111. What is the unit of magnetic field intensity?

(1) Weber (2) Newton/ampere-meter^2

(3) Tesla (4) None of these

Ans. (3)

Sol. Magnetic field intensity is defined as the force experienced by the unit north pole at a point in a magnetic field. The SI unit of magnetic field intensity is Tesla.

CHEMISTRY

112. The size of colloidal particles are

(1) 10^{-3} - 10^{-5} metre

(2) 10^{-6} - 10^{-9} metre

(3) 10^{-10} - 10^{-15} metre

(4) None of the above

Ans. (2)

Sol. A colloid is a mixture which consists of two phases - dispersed phase and a dispersion medium. The particles of the dispersed phase have a size ranging from 1 micrometer(10^{-6}m) to 1 nanometer(10^{-9}m). Since the particles dispersed are very small, they appear to be evenly distributed and do not settle down like mixtures. Few examples of colloidal dispersions are milk,glass,foam,butter etc.

113. Synthetic fibre Nylon is a -

(1) Polyamides (2) Polysaccharide (3) Polyester (4) Polyethene

Ans. (1)

Sol. Nylon is a synthetic fibre made from hydrocarbons. It is formed by the polymerization of chemical groups called amides. Hence they are polyamides. They are used in the manufacture of climbing ropes, parachutes, and in the bristles of toothbrushes.

114. Main component of L.P.G is

(1) Methane + Ethane

(2) Ethane + Propane

(3) Propane + Butane

(4) None of the above

Ans. (3)

Sol. LPG (liquefied petroleum gas) is composed mainly of propane (C_3H_8) and butane (C_4H_{10}).

115. "Cinnabar" is an ore of which of the following

(1) Mg (2) Hg (3) Ag (4) Au

Ans. (2)

Sol. Cinnabar is the chief ore of Mercury and has the formula HgS

116. The general formula of Alkanes is -

(1) C_nH_{2n} (2) C_nH_{2n+2} (3) C_nH_{2n-2} (4) $C_{n+2}H_{2n}$

Ans. (2)

Sol. Alkanes have the general formula of C_nH_{2n+2} where n is the number of carbon atoms.

117. What is formed when chlorine gas passes through dry slaked lime-

(1) $CaCl_2$ (2) CaO (3) $CaOCl_2$ (4) None of the above

Ans. (3)

Sol. Slaked lime($Ca(OH)_2$) is formed when quick lime(CaO) reacts with water. When chlorine gas is passed through dry slaked lime, Calcium hypochlorite($CaOCl_2$) is formed. Calcium hypochlorite is commonly called bleach. The reaction of chlorine gas with dry slaked lime is as follows:

$$Ca(OH)_2(s) + Cl_2(g) \rightarrow CaOCl_2(s) + H_2O(l)$$

118. Which of the following is a strong base -

(1) NH_4OH (2) $Ca(OH)_2$ (3) $NaHCO_3$ (4) KOH

Ans. (4)

Sol. Ammonium hydroxide(NH_4OH) and Sodium bicarbonate($NaHCO_3$) are weak bases.

119. $NaCl_{(Aq)} + AgNO_{3(Aq)} \rightarrow AgCl \downarrow + NaNO_{3(Aq)}$

above reaction is a -

(1) Reversible reaction (2) Decomposition reaction

(3) Addition reaction (4) Double displacement reaction

Ans. (4)

Sol. When Sodium chloride(NaCl) reacts with Silver nitrate($AgNO_3$) it gives Silver chloride(AgCl) and Sodium nitrate($NaNO_3$). In this reaction, there is an interchange of ions between the reactants and hence it is a double displacement reaction.

120. An alloy which does not contain copper id

(1) Magnalium (2) Bronze (3) Brass (4) German Silver

Ans. (1)

Sol. Bronze, brass, german silver are alloys of copper. Their composition is as follows
Bronze: Copper + Tin
Brass: Copper + Zinc
German Silver: Copper + Zinc + Nickel

Magnalium is an alloy of aluminium consisting of magnesium and aluminium. It is used in the manufacture of aeroplane frames.

121. Which of the following is not an allotropic form of carbon-

(1) Diamond (2) Graphite (3) Fullerene (4) None of these

Ans. (4)

Sol. The phenomenon by which an element can exist in more than one physical state is called allotropy. Diamond, graphite, and fullerene are allotropes of carbon.

122. A substance which oxidises itself and reduces other is a -

(1) An Oxidising Agent (2) A Reducing Agent

(3) A Dehydrating Agent (4) A Catalyst

Ans. (2)

Sol. A reducing agent is a substance that gets oxidised or loses an electron and reduces another substance (oxidizing agent) in a redox reaction.

123. Water of crystallization in Gypsum and plaster of paris are respectively,

(1) 2 (2) 2 & ½ (3) 1 & 2 (4) ½ & 2

Ans. (2)

Sol. The water of crystallization is the fixed number of water molecules present in one formula of a unit of salt. The formula of Gypsum is $CaSO_4.2H_2O$ and Plaster of paris is $CaSO_4.\frac{1}{2}H_2O$.
Hence the water of crystallization for gypsum is 2 and for plaster of paris is ½.

124. Which of the following sets does not belong to a group -

(1) Li, Na, K (2) Be, Mg, Ca (3) N, O, F (4) He, Ne, Ar

Ans. (3)

Sol. Elements nitrogen (N), oxygen (O) and fluorine (F) belong to the same period.

125. A by product of soap industry is -

(1) Sodium hydroxide (2) Sodium palmitate

(3) Glycerol (4) Fat or Oil

Ans. (3)

Sol. Soaps are sodium or potassium salts of fatty acids. Hydrolysis of fats occurs on reaction with sodium or potassium hydroxide and yields soap along with glycerol as the byproduct.

126. Corrosion of copper gives rise a green coating on it which is -

(1) CuO (2) $Cu(OH)_2$ (3) $CuCo_3$ (4) $CuCo_3.CuCo_3$

Ans. (4)

Sol. Copper on exposure to moist carbon dioxide slowly gets corroded and gets covered with a green layer of copper carbonate.This green layer of copper carbonate is called patina. The corrosion of copper is as follows:

$$Cu + H_2O + CO_2 \rightarrow CuCO_3.Cu(OH)_2$$

BIOLOGY

127. Which organelles of cell is called power house of cell -

(1) Mitochondria (2) Chloroplast (3) Ribosome (4) Lysosome

Ans. (1)

Sol. Mitochondria is a rod-shaped, double membraned organelle present in the cytoplasm of all eukaryotic cells. They are responsible for producing ATP, the energy currency of the cell. Hence they are called the powerhouse of the cell.

128. Scientists, who proposed five kingdom classification is:

(1) Carolus Linnaeus (2) Whittaker

(3) Robert Brown (4) Hugo de Vries

Ans. (2)

Sol. Five kingdom classification was proposed by R.H. Whittaker in 1969. Whittaker's classification was based upon certain characters like mode of nutrition, thallus organization, cell structure, phylogenetic relationships and reproduction. The five kingdom classification includes five kingdoms Monera, Protista, Fungi, Plantae and Animalia.

129. Menatoblast or stinging cells are found in which phylum of animals

(1) Porifera (2) Annelida (3) Cnidaria (4) Arthropoda

Ans. (3)

Sol. Stinging cells are found in the phylum Cnidaria, which includes jellyfishes and sea anemone. These animals have stinging capsules on tentacles or on their body which is used for anchorage, defense and capture of prey. Hence they are also called cnidarians.

130. Photosynthesis occurs in which cellular organelles?

(1) Mitochondria (2) Ribosome (3) Golgi body (4) Chloroplast

Ans. (4)

Sol. Photosynthesis is the process by which plants prepare their own food. The process of photosynthesis takes place in cell organelles called chloroplasts. Chloroplast contains chlorophyll (a green colour pigment) that plays a vital role in the process of photosynthesis by permitting plants to absorb energy from sunlight.

131. In which organ, bile juice formation take place

(1) Liver (2) Gallbladder (3) Pancreas (4) Stomach

Ans. (1)

Sol. Bile is formed in the liver and is stored in the gallbladder.

132. Where, glycolysis occurs in cell

(1) In Mitochondria (2) In Chloroplast

(3) In Cytoplasm (4) In Nucleus

Ans. (3)

Sol. Glycolysis is the process in which glucose is broken down to produce energy. It is the primary step of cellular respiration. The process takes place in the cytosol of the cell cytoplasm, in the presence or absence of oxygen.

133. In which animal, open blood vascular system is found?

(1) In Earthworm (2) In Periplaneta (3) In Man (4) In Fish

Ans. (2)

Sol. In an open blood vascular system, the blood is not enclosed in the blood vessels, it is pumped into a cavity called a hemocoel. In a closed blood vascular system, the heart pumps blood through vessels that are separate from the interstitial fluid of the body.
Periplaneta (cockroach) has an open blood vascular system. Whereas man, earthworm, fish have a closed vascular system.

134. Which endocrine gland is called master gland?

(1) Thyroid (2) Adrenal (3) Thymus (4) Pituitary

Ans. (4)

Sol. The pituitary gland is the size of a pea,located at the base of the brain. Pituitary gland is called the master gland as it controls the functions of all the other glands (such as the adrenal, thyroid glands) in the endocrine system.

135. Which plant hormone causes apical dominance?

(1) Auxine (2) Gibberellin (3) Cytokinin (4) Ethylene

Ans. (1)

Sol. Auxin is a plant hormone which helps in the regulation of plant growth.This plant hormone helps in stem elongation and is known to play a role in apical dominance.
When the growth of apical meristem inhibits the growth of axillary buds, the phenomenon is known as apical dominance.

136. Scientist who proposed the theory of natural selection was -

(1) Lamark (2) Charles Darwin (3) Waldayer (4) Muller

Ans. (2)

Sol. The theory of natural selection was proposed by Charles Darwin. The theory of natural selection states that the population of organisms which are better adapted to their environment tend to survive and produce more offspring, whereas the other which have less favourable traits tend to become eliminated.

137. Which gas is used in aerobic respiration -

(1) Oxygen (2) Carbon dioxide (3) Nitrogen (4) Methane

Ans. (1)

Sol. Aerobic respiration is the process of cellular respiration that takes place in the presence of oxygen gas to produce energy from food. This type of respiration is common in most of the plants and animals, birds, humans, and other mammals. In this process, water and carbon dioxide are produced as end products.

138. Cholera disease caused by which pathogen -

(1) Virus (2) Bacteria (3) Fungus (4) Protozoa

Ans. (2)

Sol. Cholera is a bacterial disease caused by the bacterium 'Vibrio Cholerae'. This type of bacteria is usually present in contaminated foods. It is also found in places where there is a lack of sanitation facilities.

139. Which group of organisms are heterotrophic

(1) Algae (2) Fungi (3) Bryophyta (4) Pteridophyta

Ans. (2)

Sol. Fungi are eukaryotic organisms and are heterotrophs (cannot make their own food), whereas algae, bryophyta and pteridophyta are autotrophs (make their own food).

140. Which is called currency of energy

(1) D.N.A (2) R.N.A (3) A.T.P (4) N.A.D

Ans. (3)

Sol. ATP (Adenosine triphosphate) is known as the energy currency of the cell.

SOCIAL SCIENCE

141. Where is the Sanchi stupa situated?

(1) Gaya (2) Lumbini (3) Sarnath (4) Bhopal

Ans. (4)

Sol. Sanchi stupa is located in Sanchi, in the north-east of Bhopal, capital of Madhya Pradesh. It was originally built by the Mauryan emperor Ashoka.

142. Which religion did Ashoka adopt?

(1) Buddhism (2) Hinduism (3) Jainism (4) Shaivism

Ans. (1)

Sol. Mauryan emperor Ashoka adopted Buddhism after witnessing the horrors of the Kalinga war. The sufferings of the people brought a change in him. He gave up the policy of conquest and made his administration benevolent.

143. Which is the oldest language of South India?

(1) Telugu (2) Kannada (3) Tamil (4) Malayalam

Ans. (3)

Sol. Tamil is the oldest language of South India. It is the official language of Tamil Nadu. It also has been given the status of classical language in India.

144. Who among the following had introduced market control policy?

(1) Balban (2) Alauddin Khilji
(3) Muhammad Bin Tuglaq (4) Jalaluddin Khilji

Ans. (2)

Sol. Alauddin Khilji introduced market control policy to maintain a large army with less expenditure. He fixed prices of essential commodities and imposed market control. The allowed soldiers and residents of Delhi to get consumables at cheaper rates.

145. Who among the following founded the VijayaNagar empire?

(1) Vijay Rai (2) Harihar and Bukka

(3) Pushyamitra Sunga (4) Rana Sanga

Ans. (2)

Sol. The Vijaya Nagar Empire was founded by Harihar and Bukka. It is a well-known empire of South India, which flourished on the banks of Tungabhadra river. Krishna Deva Raya was a famous ruler of the Vijayanagara empire.

146. Which of the following cities was built by Akbar?

(1) Daulatabad (2) Fatehpur Sikri (3) Agra (4) Delhi

Ans. (2)

Sol. Fatehpur Sikri was built by Mughal emperor Akbar in 1569 CE. It is located in the Agra district of Uttar Pradesh. The town served as a capital of the Mughal Empire for some time, but was later abandoned.

147. Who became the Mughal emperor after Aurangzeb?

(1) Jahandar Shah (2) Bahadur Shah I

(3) Shah Alam (4) Bahadur Shah Jafar

Ans. (2)

Sol. Auranzeb was succeeded by Bahadur Shah I. He ruled from 1707-1712 CE. After his reign, the Mughal Empire went into a steady decline due to the lack of leadership qualities among his immediate successors.

148. In which year Vasco da Gama came to India?

(1) 1350 AD (2) 1450 AD (3) 1498 AD (4) 1598 AD

Ans. (3)

Sol. Vasco Da Gama came to India in 1498 AD. He was the first European to reach India via the Atlantic Ocean. He set sail from Lisbon, Portugal and arrived on the western coast of India at Calicut, Kerala.

149. Who founded the Indian National Congress?

(1) Mahatma Gandhi (2) Queen Victoria

(3) Sardar Patel (4) A.O.Hume

Ans. (4)

Sol. A.O. Hume founded the Indian National Congress in 1885. He was a retired British civil servant. The first session of the Indian National Congress was held at Bombay on 28th December, 1885.

150. Who wrote "The Discovery of India"?

(1) Jawahar Lal Nehru (2) Sharat Chandra

(3) Karl Marks (4) Mahatma Gandhi

Ans. (1)

Sol. 'The Discovery of India' was written by Pandit Jawahar Lal Nehru. He wrote the book during his imprisonment at Ahmednagar Fort in present day Maharashtra.

151. When did the Jalianwala Begh incident occur?

(1) 1917 (2) 1918 (3) 1919 (4) 1920

Ans. (3)

Sol. The Jallianwala Bagh incident took place in 1919 CE. The unfortunate incident took place when people gathered in the park on the occasion of Baisakhi to peacefully protest against the passing of the Rowlatt Act by the British government.

152. Who started the Dandi March?

(1) Swami Dayananda (2) Madan Mohan Malviya

(3) Bal Gangadhar Tilak (4) Mahatma Gandhi

Ans. (4)

Sol. Dandi March was an act of nonviolent civil disobedience started by Mahatma Gandhi on 12th March, 1930 CE. It was an act of resistance against the British monopoly on salt manufacturing. It was also known as the Salt March.

153. Which among the following is the autobiography of Gandhiji?

(1) India Divided (2) Nation in Making

(3) Neel Darpan (4) My experiments with Truth

Ans. (4)

Sol. 'My Experiments with Truth' is the autobiography of Gandhiji. Mahatma Gandhi led the freedom movement of the country and became the face of Indian resistance against British imperialism.

154. Which one of the following is the oldest mountain system?

(1) Nilgiri (2) Aravali (3) Satpura (4) Vindhya

Ans. (2)

Sol. The Aravali range in India is one of the oldest fold mountain systems in the world. It is referred to as a relic mountain. The range has considerably worn down due to the processes of erosion.

155. The Ragur Soil is also known as:

(1) Red Soil (2) Yellow Soil (3) Black Soil (4) Alluvial Soil

Ans. (3)

Sol. Regur soil is also known as 'Black soil'. The black soils are generally clayey, deep and impermeable. Black soil is ideal for growing cotton and is also known as 'black cotton soil'

156. Which of the following groups represents cash crops?

(1) Wheat, Barley, Gram

(2) Cotton, Jute, Tobacco

(3) Paddy, Pea, Tur

(4) Gram, Maize, Moong

Ans. (2)

Sol. A cash crop is the one that is cultivated to be sold in the market to earn profits from the sale. Cotton, jute, tobacco, and coffee are a few examples of cash crops.

157. The state from which the Tropic of Cancer does not pass

(1) Tripura

(2) West Bengal

(3) Mizoram

(4) Manipur

Ans. (4)

Sol. Tropic of Cancer is an imaginary line which is at an angle of 23.50 degrees, north to the equator. The Tropic of Cancer passes through eight states in India which does not include Manipur.

158. Which one of the following is not correctly matched?

STATE		MINING AREAS
1. Odisha	-	Gurumahisani

2. Jharkhand - Novamandi
3. Chhattisgarh - Kalahandi
4. Karnataka - Bababoodan

Ans. (3)

Sol. Kalahandi is located in Odisha. It has some important mining sites for Manganese and Bauxite.

159. Which one of the following is the source of Aluminium?

(1) Bauxite (2) Zinc

(3) Lead (4) Tin

Ans. (1)

Sol. Bauxite is the source of Aluminium. It is a clay like substance, from which alumina and later aluminium is obtained.

160. Which of the following is the longest river of the world?

(1) Amazon river (2) Yangtze river

(3) Ganga river (4) Nile river

Ans. (4)

Sol. The Nile is the longest river of the world. The Nile river flows from south to north through eastern Africa.

161. The Toda tribes are the original inhabitants of

(1) Aravalli hills (2) Nilgiri hills

(3) Satpura hills (4) Guru Shikhar

Ans. (2)

Sol. People of Toda tribe live in the Nilgiri hills of southern India. This pastoral tribe is the original inhabitants of the Nilgiri hills.

162. The state where Shipki-la pass is located

(1) Arunachal Pradesh (2) Sikkim

(3) Himachal Pradesh (4) Meghalaya

Ans. (3)

Sol. Shipki-la pass is located in Himachal Pradesh. It is located through Sutlej Gorge and connects Himachal Pradesh with Tibet.

163. The source of the origin of river Narmada

(1) Bhedaghat (2) Brahmgiri

(3) Mahabaleshwar (4) Amarkantak

Ans. (4)

Sol. Amarkantak plateau is the source of the river Narmada. It flows towards the west in a rift valley from its origin in Amarkantak Hills in Madhya Pradesh.

164. The city where the first Earth summit was organized

(1) Rio de Janeiro (2) Shanghai

(3) Tokyo (4) Manila

Ans. (1)

Sol. The first Earth summit was held in 1992. It was organized in Rio de Janeiro, Brazil. This major United Nations conference is also known as the Rio summit.

165. The most densely populated state of India?

(1) Uttar Pradesh (2) Bihar (3) West Bengal (4) Kerala

Ans. (2)

Sol. Bihar is the most densely populated state in India. According to the Office of the Registrar General & Census Commissioner, India which comes under the Ministry of Home Affairs, Bihar is the state with highest population density. The population density of Bihar is 1106 persons per square kilometer as per the census 2011 data. West Bengal stands at the second rank with 1028 persons per square kilometer.

166. The first meeting of Constituent Assembly was held in

(1) 09 December 1946 (2) 10 July 1946

(3) 09 August 1946 (4) 20 January 1946

Ans. (1)

Sol. The first meeting of the Constituent Assembly was held on 9th December 1946 in the constitution hall which is today the Central Hall of the Parliament House.

167. The Architect of the Indian Constitution was

(1) Dr.B.R.Ambedkar (2) Dr.Rajendra Prasad

(3) Pt.Jawahar Lal Nehru (4) Mahatma Gandhi

Ans. (1)

Sol. Dr. B. R. Ambedkar, popularly known as Babasaheb is recognised as the chief architect of the Indian Constitution. Dr. B. R. Ambedkar was the chairman of the Drafting Committee. The Drafting Committee had seven members in total.

168. The Chief Election Commissioner is appointed by

(1) Election Commission of India (2) President of India

(3) Prime Minister of India (4) Chief Justice of Supreme Court

Ans. (2)

Sol. The President of India appoints the Election Commissioner of India. The Election Commission of India is a constitutional body which means the ECI is established by the Constitution of India. The ECI is reponsbible for conducting elections to the Lok Sabha, Rajya Sabha, State Legislative Assemblies and the offices of the President and Vice President in India.

169. The first speaker of Lok Sabha was

(1) Ganesh Vasudev Mavalankar (2) Pt.Govind Vallabh Pant

(3) Ananthasayanam Ayyangar (4) C.Subramaniam

Ans. (1)

Sol. Ganesh Vasudev Mavalankar, popularly known as Dadasaheb was the first speaker of the Lok Sabha. The first Lok Sabha session commenced on 13th May, 1952 after the first general elections of independent India in 1952.

170. Right to Education Act came into effect on

(1) 2005 (2) 2010 (3) 2008 (4) 2012

Ans. **(2)**

Sol. The RTE was enacted by the Parliament of India on 4 August 2009. However, the RTE or the Right to Education Act came into force on April 1, 2010. The RTE describes the importance of free and compulsory education for children aged between 6 to 14 years in India.

171. The Panchayati Raj System became more powerful in the year

(1) 1990 (2) 1993 (3) 1994 (4) 1996

Ans. **(2)**

Sol. The Panchayati Raj System gained its prominence in 1993 in India. Panchayats in India are bestowed with the idea of self government for village levels. They are involved in implementing schemes of the state and central government. Panchayats also spearhead economic development and ensure social justice in village levels.

172. Under 'Right to Freedom' _____ types of freedom is given to an Indian Citizen

(1) 5 (2) 6 (3) 4 (4) 8

Ans. **(2)**

Sol. The Constitution of India ensures 6 rights to the citizens of India under the "Right to Freedom".
The six types of rights are as follows:
1. Freedom of Speech and Expression
2. Freedom of Assembly
3. Freedom of Association
4. Freedom of Movement
5. Freedom of Residence
6. Freedom of Profession

173. 'Forward Bloc' is a regional party of

(1) Odisha (2) Jharkhand

(3) West Bengal (4) Chhattisgarh

Ans. (3)

Sol. "Forward Bloc" or the "All India Forward Bloc" is a regional party of the state of West Bengal. The All India Forward Bloc emerged as a faction within the Indian National Congress in 1939. The party was led by Subhas Chandra Bose.

174. 'National Democratic Alliance' was founded in

(1) May 1998 (2) June 1996 (3) May 1999 (4) June 1997

Ans. (1)

Sol. The "National Democratic Alliance" is a political alliance made between different political parties led by the Bharatiya Janata Party. The National Democratic Alliance was founded in May 1998.

175. The Chief Justice of India is

(1) Justice Sharad Arvind Bobde (2) Justice Ranjan Gogoi

(3) Justice Deepak Mishra (4) Justice Jagdish Singh Kheher

Ans. (1)

Sol. Justice Sharad Arvind Bobde is the present Chief Justice of India or the CJI. The Chief Justice of India is appointed by the President of India. The CJI presides over the Supreme Court's public sessions and the private conferences.

176. What was the prime objective of the first five year plan in India?

(1) Development of Agriculture (2) Heavy Industry

(3) Population control (4) Transportation

Ans. (1)

Sol. The first five year plan was introduced by the Government of India under the leadership of Former Prime Minister Jawaharlal Nehru in 1951. The first five year enlists the economical objectives to be achieved by the nation for the forthcoming five years. The first five year plan of India extended from 1951 to 1956 that focused on primary sector or development of agriculture in India.

177. Manrega was implemented from the year

(1) 2005 (2) 2006 (3) 2007 (4) 2008

Ans. (2)

Sol. MGNREGA stands for Mahatma Gandhi National Rural Employment Guarantee Act. It was passed by the Parliament of India in 2005 and came into effect from 2nd February, 2006. MGNREGA is a social security

measure that ensures employment for the rural population for hundreds of days a year.

178. Where is the headquarters of Life Insurance Corporation(LIC)?

(1) Delhi (2) Mumbai (3) Chennai (4) Kolkata

Ans. (2)

Sol. Life Insurance Corporation of India or the LIC is an investment and insurance group owned by the Government of India. The LIC is headquartered at Mumbai.

179. Which of the following comes under Primary Sector?

(1) Agriculture (2) Industry

(3) Manufacturing (4) Trade

Ans. (1)

Sol. The Primary Sector encompasses fields that deal with utilising the natural resources for human purposes. Some of the enlisted sectors are agriculture, mining, fishing, forestry and deposits.

180. Where is the headquarters of the Tea Board located?

(1) Darjeeling (2) Bengaluru (3) Kolkata (4) Mumbai

Ans. (3)

Sol. The Tea Board of India is headquartered in Kolkata, West Bengal. The Tea Board is responsible for the cultivation and trading of tea within India

(domestic trade) and outside India (international trade). The Tea Board is a state agency run by the Government of India.

MATHEMATICS

181. If x = $0.\overline{7}$ then what is the value of 2x?

(1) $1.\overline{4}$ (2) $1.\overline{5}$ (3) $1.\overline{54}$ (4) $1.\overline{45}$

Ans. (2)

Sol. x = $0.\overline{7}$

x = 0.77777777...

10x = 7.777777...

Subtracting we get

9x = 7

x = 7/9

2x = 14/9

= 1.55555....

= $1.\overline{5}$

182. If $a^x = b$, $b^y = c$ & $c^z = a$, then the value of xyz is?

(1) 1 (2) 0 (3) 1/abc (4) abc

Ans. (1)

Sol. $c^z = (b^y)^z = ((a^x)^y)^z = (a^{xy})^z = a^{xyz}$

$a^{xyz} = a$ (since $c^z = a$)

So, $xyz = 1$

183. If $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a + b\sqrt{3}$, then the value of 'a' and 'b' is

(1) a = 2, b = -1 (2) a = 2, b = 1 (3) a = -2, b = 1 (4) a = -2, b = -1

Ans. (1)

Sol. Rationalising the denominator:

$$\frac{\sqrt{3}-1}{\sqrt{3}+1} = \frac{\sqrt{3}-1}{\sqrt{3}+1} \times \frac{\sqrt{3}-1}{\sqrt{3}-1}$$ (Rationalised using the algebraic identity $a^2 - b^2$)

$$= \frac{(\sqrt{3}-1)^2}{(\sqrt{3})^2 - 1^2}$$

$$= \frac{(\sqrt{3})^2 + 1^2 - 2\sqrt{3}}{3-1}$$ (Numerator expanded using the algebraic identity $(a + b)^2$)

$$= \frac{4-2\sqrt{3}}{2} = \frac{2(2-\sqrt{3})}{2} = 2 - \sqrt{3}$$

Equating the solved LHS to RHS.

$a + b\sqrt{3} = 2 - \sqrt{3}$

So, a = 2 and b = -1

184. The value of $\frac{x^{a+b}.x^{b+c}.x^{c+a}}{(x^a.x^b.x^c)^2}$ is

(1) x^2 (2) x^{a+b+c} (3) x^{abc} (4) 1

Ans. (4)

Sol. This equation can be solved using the rules of exponents

$x^m.x^n = x^{m+n}$ *and* $(x^m)^n = x^{mn}$.

$$\frac{x^{a+b}.x^{b+c}.x^{c+a}}{(x^a.x^b.x^c)^2} = \frac{x^{a+b+b+c+c+a}}{(x^{a+b+c})^2} = \frac{x^{2a+2b+2c}}{x^{2(a+b+c)}} = \frac{x^{2(a+b+c)}}{x^{2(a+b+c)}} = 1$$

185. The solution of the equation $7^{1+x} + 7^{1-x} = 50$ is

(1) 0 (2) 2 (3) ±1 (4) None of these

Ans. (3)

Sol. $7^{1+x} + 7^{1-x} = 50$

$7(7^{x}) + \frac{7}{7^{x}} = 50$

From the options, the possible value of x should be 1 since the whole equation equals 50.

To check the same:

If x = 1, 7 (7) + 1 = 49 + 1 = 50

If x = -1, $\frac{7}{7} + \frac{7}{7^{-1}} = 1 + (7)(7) = 1 + 49 = 50$

So the value of x is ± 1

186. A man's salary is reduced by 10%. In order to have his salary back to the original amount it must be raised by-

(1) 8% (2) 10% (3) $11\frac{1}{9}\%$ (4) $12\frac{3}{7}\%$

Ans. (3)

Sol. Let the salary of the person be ₹100.

10 % of ₹100 is ₹10.

New salary after reducing 10 % = ₹90

Let the percentage raise required to increase ₹10 be a%.

So, $90 \times \frac{a}{100} = 10$ (Note: the new percentage is calculated on the new salary ₹90)

$a = \frac{100}{9} = 11\frac{1}{9}\%$

187. 10% of 15% of 20% of Rs.500 is

(1) 0.50 Rs. (2) 3.50 Rs. (3) 1.50 Rs. (4) 2.50 Rs.

Ans. (3)

Sol. $\frac{10}{100} \times (\frac{15}{100} \times (\frac{20}{100} \times 500)) = \frac{1}{10} \times (\frac{3}{20} \times (\frac{1}{5} \times 500))$

$= \frac{1}{10} \times (\frac{3}{20} \times 100)$

$= \frac{1}{10} \times 15$

$= \frac{3}{2}$

$= ₹1.50$

188. A shopkeeper purchases 11 pens for Rs. 10 and sells them at the rate of 10 for 11, then profit percent is;

(1) 18% (2) 19% (3) 20% (4) 21%

Ans. (4)

Sol. 11 pens were bought for ₹10.
Cost price of 1 pen = 10/11
Selling price of 10 pen = 11
Selling price of 1 pen = 11/10
Profit percentage = $\frac{Profit}{Selling\ Price} \times 100$

$= \left(\frac{\frac{11}{10} - \frac{10}{11}}{\frac{10}{11}}\right) \times 100 = \left(\frac{\frac{121-100}{110}}{\frac{10}{11}}\right) \times 100$

$= \frac{21}{100} \times 100$

= 21%

189. If the sum of ⅓ and ¼ is x times of their difference then the value of x is-

(1) 4 (2) 5 (3) 6 (4) 7

Ans. (4)

Sol. $\frac{1}{3} + \frac{1}{4} = x(\frac{1}{3} - \frac{1}{4})$

$\frac{7}{12} = x \cdot \frac{1}{12}$

$x = 7$

190. If A's income is 20% more than B. Then, B's income is-

(1) Same as A's (2) 20% less than A's (3) $16\frac{2}{3}\%$ less than A's (4)15% less than A's

Ans. (3)

Sol. If B's income is ₹100.
A's income is 20%. 20% of ₹100 is ₹20.
The income of A = ₹100 + ₹20 = ₹120.

To find what percentage of ₹120 is ₹20:
$₹120 \times \frac{x}{100} = ₹20$
$x = \frac{200}{12} = \frac{50}{3} = 16\frac{2}{3}\%$
So, B's income is $16\frac{2}{3}\%$ less than A's income.

191. What is the probability that a leap year contains 53 Sundays?

(1) 2/7 (2) 7/13 (3) 2/13 (4) None of these

Ans. (1)

Sol. In a leap year there are 52 weeks and 2 odd days.
There are 7 possible outcomes of the 2 odd days Such as (Sunday, Monday) (Monday, Tuesday) and so on till (Saturday, Sunday).
In the total 7 possible outcomes the favourable outcomes (with a sunday) are 2.
The probability of getting 53 sundays is 2/7.

192. The minimum value of $\sin\theta\cos\theta$ is

(1) 0 (2) -1 (3) -½ (4) ½

Ans. (3)

Sol. $\sin 2\theta = 2\sin\theta\cos\theta$
$\frac{1}{2}(\sin 2\theta) = \sin\theta\cos\theta$
The minimum value of $\sin\theta\cos\theta = \frac{1}{2}(-1) = -\frac{1}{2}$
(Since minimum value of $\sin 2\theta = -1$)

193. When $(10^{12} - 1)$ is divided by 111 the quotient is;

(1) 90009009 (2) 9009009009 (3) 9000009 (4) 900000009

Ans. (2)

Sol. The value of 10^{12} will be a 13 digit number with 12 zeros.
So, $10^{12} - 1$ will be a 12 digit number with all the numbers 9.
The number with maximum digits in the given options is 9009009009 (10 digits).

9009009009 x 111 = 999999999999, i.e., So the quotient is 9009009009.

Alternate method:
$(10^{12} - 1) = ((10^6)^2 - 1^2) = (1000000 + 1)(1000000 - 1) = (1000001)(999999)$
$(10^{12} - 1)/111 = (1000001)(999999)/(111)$
$= (100001)(9009)$
$= 9009009009$

194. If $\log 3^{x+4} = \log 729$ the value of x will be

(1) 3 (2) 1 (3) 6 (4) 2

Ans. (4)

Sol. $\log 3^{x+4} = \log 729$
$\log 3^{x+4} = \log 3^6$
So, $x + 4 = 6$
$x = 6 - 4 = 2$

195. If p persons working p hours a day for each of p days produce p units of works, then the units of work produced by q persons working q hours a day each q day is

(1) q^3/p^2 (2) q^2/p^3 (3) p^2/q^2 (4) p^3/q^2

Ans. (1)

Sol. p persons work for p hours for each of p days to produce p units:
Total man hours of work by p persons = p persons x p days x p hours = p^3

q persons work for q hours for each of q days:
Total man hours of work by q persons = q persons x q days x q hours = q^3

Number of units produce in p^3 man hours = p units
Number of units produced in q^3 man hours = $(q^3 \times p)/p^3 = q^3/p^2$

196. If $x^{100} + 2x^{99} + k$ is fully divisible by (x+1) then value of k will be

(1) 7 (2) -3 (3) 2 (4) 1

Ans. (4)

Sol. x + 1 is a factor of $x^{100} + 2x^{99} + k$.
So, x + 1 = 0
x = -1 , is the zero of $x^{100} + 2x^{99} + k$
$\therefore (-1)^{100} + 2(-1)^{99} + k = 0$
1 - 2 + k = 0
k = 1

197. If radius of a right circular cylinder is increased by 10%, then by what percent it height should be decreased so that its volume remains unchanged

(1) 17.26% (2) 17.36% (3) 17.46% (4) None of these

Ans. (2)

Sol. Let's take the radius and height of the cylinder as 10 units and 10 units respectively.

Volume of the cylinder = $\pi(10^2)(10) = 1000\pi$ cu units.
If the radius increases by 10%:
$\pi(11^2)$(New height) = 1000π
New height = 1000/121 = 8.264

Percentage change in height = $(\frac{10 - 8.264}{10}) \times 100$ = 1.736 x 10 = 17.36%

198. If $\sqrt{(x + 1} - \sqrt{x - 1} = 1,$ then value of x is

(1) 5/4 (2) 2/3 (3) 4/5 (4) 3/5

Ans. (1)

Sol. $\sqrt{(x + 1} - \sqrt{x - 1} = 1$

Squaring on both the sides.

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

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

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

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

Squaring again on both the sides.

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

$4x^2 - 4x + 1 = 4(x^2 - 1)$

$-4x + 1 = -4$

$x = \frac{5}{4}$

199. There are thirty cards numbered from 1 to 30. If a card is drawn at random find the probability that, the drawn card has a prime number-

(1) 1/2 (2) 1/3 (3) 1/4 (4) 1/5

Ans. (2)

Sol. The prime numbers from 1 to 30 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29.
There are 10 prime numbers between 1 to 30.
Total number of possible chances = 30
Total number of favourable chances = 10
Probability of a card drawn from 1 to 30 having a prime number = 10/30 = ⅓

200. An insect which is climbing on a vertical pole in such a way that one day it climbs a height of 2m on the next day it comes down 1 m. If the height of the pole is 12 m, find the no. of days in which it will reach on the top.

(1) 11 days (2) 12 days (3) 21 days (4) 22 days

Ans. (3)

Sol. The height of the pole = 12 m
One day the insect climbs 2 m and the next day it comes down by 1 m.
At the end of the 2nd day the insect would be at 1 m.
Climbing in the same way at the end of 20^{th} day the insect would be at 10 m.
On the 21st day the insect would climb 2 m and reach the top.