NATIONAL TALENT SEARCH EXAMINATION (NTSE-2020) STAGE -1

STATE : RAJASTHAN PAPER : MAT

Date: 03/11/2019 *CODE : 701 - A*

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

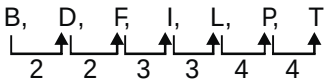
Instruction : In each of the question Nos. 1 to 8 a letter series is given with one term missing shown by question mark (?). This term is one of the four alternatives given under it. Find the correct alternative.

1. B, D, F, I, L, P, ? .

(1) R (2) S (3) T (4) U

Ans. *(3)*

Sol.



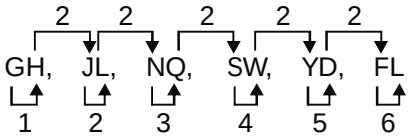
Answer is (3)

2. GH, JL, NQ, SW, YD, ? .

(1) EJ (2) FJ (3) EL (4) FL

Ans. *(4)*

Sol.



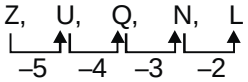
Answer is (4)

3. Z, U, Q, ? , L .

(1) I (2) K (3) M (4) N

Ans. *(4)*

Sol.



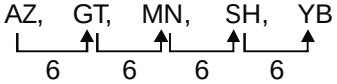
Answer is (4)

4. AZ, GT, MN, ? , YB.

(1) JH (2) SH (3) SK (4) TS

Ans. *(2)*

Sol.



Second letter is opposite of first letter.

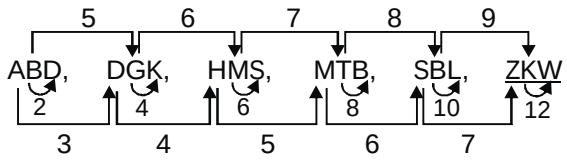
Answer is (2)

5. ABD, DGK, HMS, MTB, SBL, ? .

(1) XKW (2) ZAB (3) ZKU (4) ZKW

Ans. *(4)*

Sol.



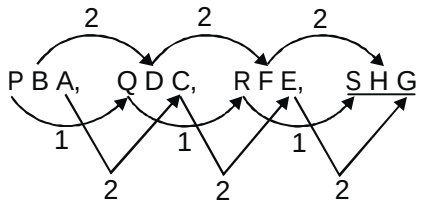
Answer is (4)

6. PBA, QDC, RFE, ? .

(1) SHG (2) OAB (3) TJI (4) ULK

Ans. *(1)*

Sol.



Answer is (1)

7. PERPENDICULAR, ERPENDICULA, RPENDICUL, ? .

(1) PENDICUL (2) PENDIC (3) ENDIC (4) PENDICU

Ans. *(4)*

Sol. PERPENDICULAR, ERPENDICULA, RPENDICUL, PENDICU

Answer is 4

8. ST, ND, RD, TH, ? .

(1) TH (2) VW (3) RW (4) ST

Ans. *(1)*

Sol.

Answer is (1)

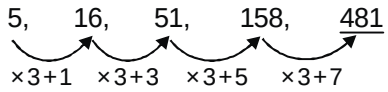
Instruction : In each of the question Nos. 9 to 16 a number series is given with one term missing shown by question mark (?). This term is one of the four alternatives given under it. Find the correct alternative.

9. 5, 16, 51, 158, ? .

(1) 1452 (2) 483 (3) 481 (4) 1454

Ans. *(3)*

Sol.



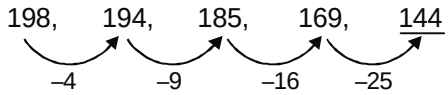
Answer is (3)

10. 198, 194, 185, 169, ? .

(1) 92 (2) 136 (3) 144 (4) 112

Ans. *(3)*

Sol.



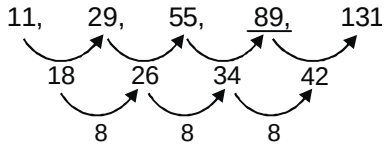
Answer is (3)

11. 11, 29, 55, ? , 131.

(1) 110 (2) 81 (3) 89 (4) 78

Ans. *(3)*

Sol.



Answer is (3)

12. 589654237, 89654237, 8965423, 965423, ? .

(1) 58965 (2) 65423 (3) 89654 (4) 96542

Ans. *(4)*

Sol. 589654237, 8965423**7**, 896542**3**, 96542**3**, 9654**2**.

Hence, Answer is (4)

13. 1, 1, 4, 8, 9, 27, 16, ? .

(1) 32 (2) 64 (3) 81 (4) 87

Ans. *(2)*

Sol. 1^2 , 1^3, 2^2, 2^3, 3^2, 3^3, 4^2, 4^3

Hence, Answer is (2)

14. 4, 9, 25, ? , 121, 169, 289, 361.

(1) 49 (2) 64 (3) 81 (4) 87

Ans. *(1)*

Sol. $\underset{2^2}{4},\ \underset{3^2}{9},\ \underset{5^2}{25},\ \underline{\underset{7^2}{49}},\ \underset{11^2}{121},\ \underset{13^2}{169},\ \underset{17^2}{289},\ \underset{19^2}{361}$

Answer is (1)

15. 980, 392, 156.8, ? , 25.088, 10.0352.

(1) 65.04 (2) 60.28 (3) 62.72 (4) 63.85

Ans. *(3)*

Sol. $\underset{\div10\times4}{980},\ \underset{\div10\times4}{392},\ \underset{\div10\times4}{156.8},\ \underline{\underset{\div10\times4}{62.72}},\ \underset{\div10\times4}{25.088},\ \underset{}{10.0352}$

Answer is (3)

16. 3, 10, 101, ? .

(1) 10101 (2) 10201 (3) 10202 (4) 11012

Ans. *(3)*

Sol. $\underset{}{3},\ \underset{3^2+1}{10},\ \underset{10^2+1}{101},\ \underline{\underset{101^2+1}{10202}}$

Answer is (3)

Instruction : Question Nos. 17 to 19 have two statements and two conclusions I and II. You have to assume the given statements as true even if it seems to vary from commonly known facts. Read all the conclusions carefully and decide which of the given conclusions logically follow(s) from the two given statements even disregarding commonly known facts.

17. *Statements :* (i) : Most of the 64 number buses go to my office.

(ii) : This is 64 number bus.

Conclusions : (I) : This bus goes to my office.

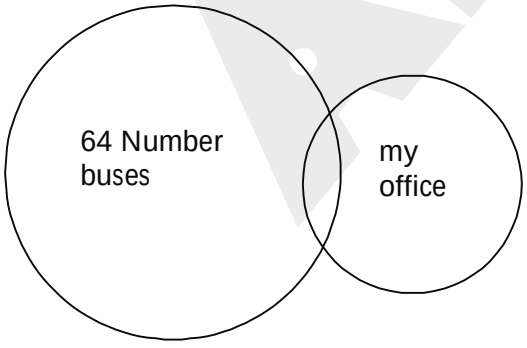
(II) : This bus does not go to my office.

(1) Only conclusion I follows. (2) Only conclusion Ii follows.

(3) both conclusions I and II follow. (4) Neither conclusion I nor II follows.

Ans. *(4)*

Sol.



Answer is (4)

18. *Statements :* (i) Some Indians are educated.

(ii) Educated persons like small families.

Conclusions : (I) All small families are educated.

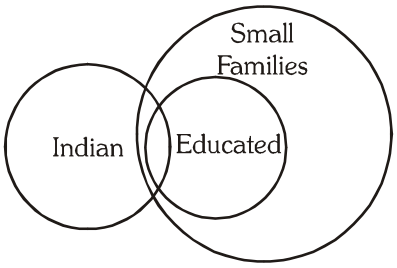
(II) Some Indians like small families.

(1) Only conclusion I follows. (2) Only conclusion II follows.

(3) Both conclusions I and II follows. (4) Neither conclusion I nor II follows.

Ans. *(2)*

Sol.



Answer is (2)

19. *Statements :* (i) Vitamin B-complex is best for health.

(ii) Fruits contain Vitamin b-complex

Conclusions : (I) We should grow fruits.

(II) Fruits are good for health.

(1) Only conclusion I follows. (2) Only conclusion II follows.

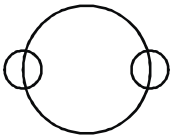
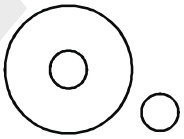
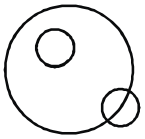
(3) both conclusions I and II follows. (4) Neither conclusion I nor II follows.

Ans. *(2)*

Sol. Only conclusion II follows

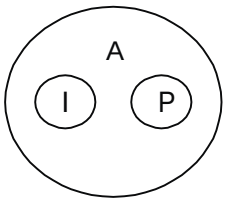
Answer is (2)

20. Which one of the following venn diagrams correctly represents the relation between India, Pakistan and Asia ?

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

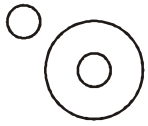
Ans. *(2)*

Sol. India and Pakistan are both in Asia



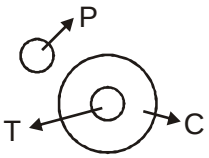
So, Answer is (2)

21. Which one of the following Venn diagrams correctly represents the relation between Police, Thief and Criminal ?

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

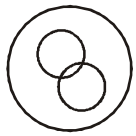
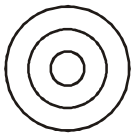
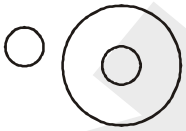
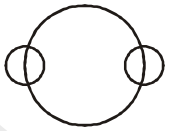
Ans. *(1)*

Sol. All thieves are criminals and Police is different.



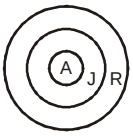
So answer is (1).

22. Which one of the following Venn diagrams correctly represents the relation between Rajasthan, Jaipur and Amer ?

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

Ans. *(2)*

Sol. Jaipur is in Rajasthan and Amer is in Jaipur.



So, option (2) is correct.

23. In a coded language, BRAIN is written as *%÷#× and TIER is written as $#+%; then in the same coded language, RENT will be written as

(1) %×#$ (2) %#×$ (3) %+×$ (4) +×%$

Ans. *(3)*

Sol. BRAIN = *%÷#×
TIER = $#+%
So, RENT = %+×$
So, answer is option (3).

24. In a coded language, TILE is written as 7235 and DEAL is written as 9543; then in the same coded language, DIET will be written as

(1) 9257 (2) 9527 (3) 9725 (4) 9275

Ans. *(1)*

Sol. TILE = 7235
DEAL = 9543
DIET = 9257
So answer is (1).

25. In a coded language, ZEBRA is written as 2652181; then in the same coded language, COBRA will be written as

(1) 3152181 (2) 1182153 (3) 31822151 (4) 302181

Ans. *(1)*

Sol. Z E B R A = 265181
26 5 2 18 1
So, C O B R A = 3152181
3 15 2 18 1
So, answer is (1).

26. In a coded language, E is written as 5 and HOTEL is written as 12; then in the same coded language, LAMB will be written as

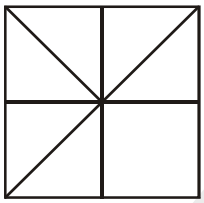
(1) 28 (2) 26 (3) 7 (4) 10

Ans. *(3)*

So. HOTEL = $\frac{8+15+20+5+12}{5}$ = 12

So, LAMB = $\frac{12+1+13+2}{4}$ = 7

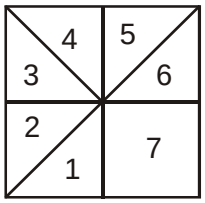
27. How many triangles are there in the figure given below ?



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

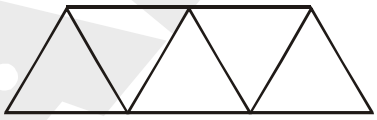
Ans. *(1)*

Sol.



Required triangles = 1, 2, 3, 4, 5, 6, 23, 45, 2345, 176 = 10

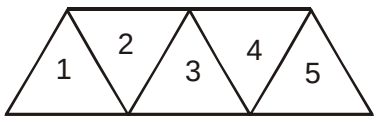
28. How many parallelograms are there in the following figure ?



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

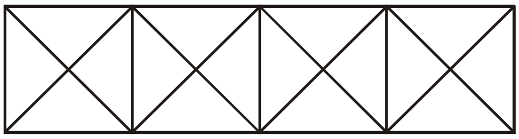
Ans. *(1)*

Sol.



Required parallelograms are = 6 (12,34,23,45,1234,2345)

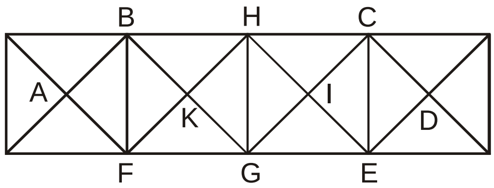
29. How many hexagons are there in the following figure ?



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

Ans. *(3)*

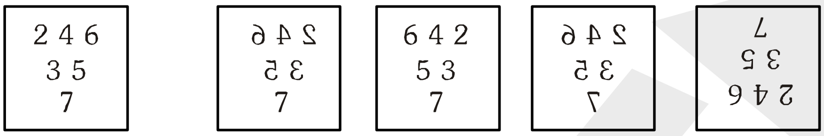
Sol.



Required hexagons are = 3 (ABHIGF, DCHKGE, ABCDEF)

Instruction : In Questions Nos. 30 to 33, find the correct mirror image of the given figure, when mirror is placed on right side of the figure.

30. Questions Image

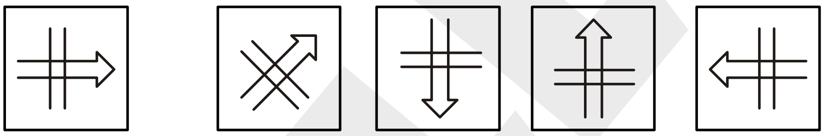


(1) (2) (3) (4)

Ans. *(3)*

Sol. By Visulisation only

31. Questions Image



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

Ans. *(4)*

Sol. By Visulisation only

32. PRAYER

(1) ꟼЯAYƎЯ (2) ЯƎYAЯꟼ (3) ЯƎꟼƎAЯ (4) ꟼЯAYƎЯ

Ans. *(2)*

Sol. By Visulisation only

33. 1 2 6 9 8

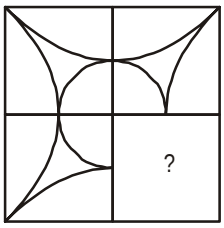
(1) 1 2 6 9 8 (2) 1 2 6 9 8 (3) 8 9 6 2 1 (4) 1 2 9 6 8

Ans. *(3)*

Sol. By Visulisation only

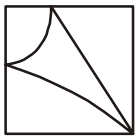
34. Which of the following answer-figures will complete the matrix figure

Questios Image

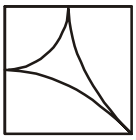


Answer Image

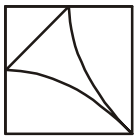
(1)



(2)



(3)



(4)

Ans. *(3)*

Sol. By Visulisation only

35. How many numbers from 1 to 50 are there which are prime ?

(1) 10 (2) 20 (3) 15 (4) 18

Ans. *(3)*

Sol. Required prime numbers = 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47,

36. If it was Sunday on 1st January, 2006 then what was the day on 1st January, 2007 ?

(1) Sunday (2) Monday (3) Tuesday (4) Saturday

Ans. *(2)*

Sol. Odd number from 1st January, 2006 to 1st January 2007 = 1. So Sunday + 1 = Monday

Instruction : In each of the question Nos. *37* to *42*, three alternative are alike in a certain way but the rest one is different. Select the odd one.

37. (1) Bengaluru (2) Nagpur (3) Bhopal (4) Ranchi

Ans. *(2)*

Sol. Rest all are capitals.

38. (1) Green (2) Pink (3) Indigo (4) Violet

Ans. *(2)*

Sol. All except Pink are the colours seen in a rainbow.

39. (1) September (2) April (3) November (4) January

Ans. *(4)*

Sol. All are 30 days months except January.

40. (1) Tomato (2) Potato (3) Carrot (4) Onion

Ans. *(1)*

Sol. All are roots except tomato.

41. (1) Rectangle (2) Square (3) Triangle (4) Rhombus

Ans. *(3)*

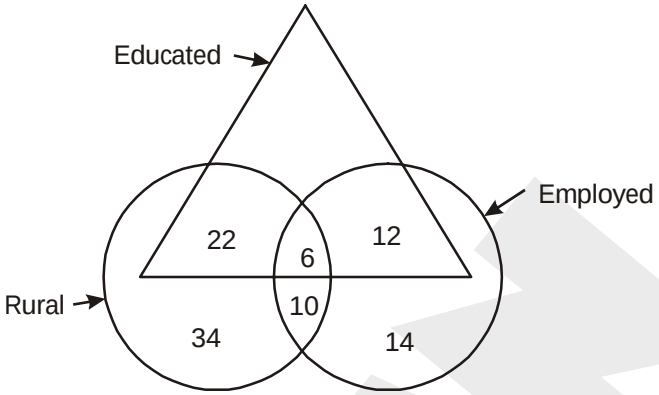
Sol. All are 4 sided figure.

42. (1) 23 (2) 51 (3) 63 (4) 15

Ans. *(1)*

Sol. 23 is only prime number.

43. How many educated people are employed?



(1) 18 (2) 26 (3) 24 (4) 20

Ans. *(1)*

Sol. Total number of ducated people who are employed = 6 + 12 = 18.

Question (44 - 48)

Instruction : The following questions are based on the diagram given below. Study the diagram carefully and answer the questions based upon it.

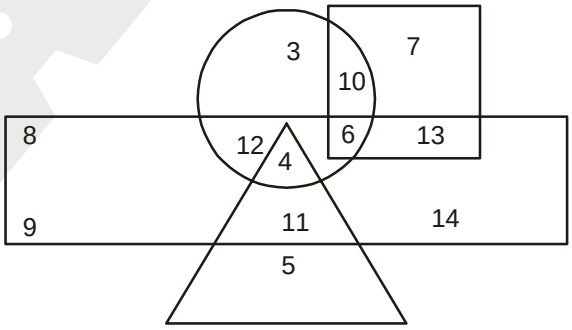
In the diagram

(i) Rectangle represents males

(ii) Triangle represents educated

(iii) Circle represents urban, and

(iv) Square represents civil servants.



44. How many among the following are educated males, who are not an urban resident?

(1) 10 (2) 4 (3) 11 (4) 9

Ans. *(3)*

Sol. 11 represents educated males, who are not an urban resident.

45. How many among the following are neither civil servant nor educated but are urban and not a male?

(1) 2 (2) 3 (3) 6 (4) 10

Ans. *(2)*

Sol. 3 represents who are neither civil servant nor educated but are urban and not a male.

46. How many among the following are female, urban resident and also a civil servant?

(1) 6 (2) 7 (3) 10 (4) 14

Ans. *(3)*

Sol. 10 represents female, urban resident and also a civil servant.

47. How many among the following are educated male who hail from urban area?

(1) 4 (2) 2 (3) 5 (4) 11

Ans. *(1)*

Sol. 4 represents educated male who hail from urban area.

48. How many among the following are only a civil servant but neither male nor urban oriented and uneducated?

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

Ans. *(3)*

Sol. 7 represents a civil servant but neither male nor urban oriented and uneducated.

49. Arrange the following in a meaningful sequence:

1. Probation
2. Interview
3. Selection
4. Appointment
5. Advertisement
6. Application

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

Ans. *(1)*

Sol. A meaningful sequence is

Advertisement, Application, Interview, Selection, Appointment, Probation.

50. Arrange the following in a meaningful sequence:

1. Jaipur
2. Universe
3. Rajasthan
4. India
5. Asia

(1) 1, 2, 3, 4, 5 (2) 1, 3, 4, 5, 2 (3) 1, 4, 3, 5, 2 (4) 1, 3, 5, 2, 4

Ans. *(2)*

Sol. A meaningful sequence is

Jaipur, Rajasthan, India, Asia, Universe.

51. As Kandla is related to Gujarat, in the same way Kochin is related to which of the following?

(1) Karnataka (2) Goa (3) Chennai (4) Kerala

Ans. *(4)*

Sol. Kandla is a port in Gujarat where as Kochin is a port Kerala

52. As India is related to New Delhi, in the same way Pakistan is related to which of the following?

(1) Rawalpindi (2) Peshawar (3) Lahore (4) Islamabad

Ans. *(4)*

Sol. New Delhi is a capital of India in the same way Islamabad is a capital of Pakistan

53. As rupee is related to India, in the same way yen is related to which of the following

(1) Turkey (2) Bangladesh (3) Japan (4) Pakistan

Ans. *(3)*

Sol. Yen is the currency of Japan

54. If A > B, B > C and C > D, then which of the following conclusions is definitely wrong?

(1) A > C (2) A > D (3) B > D (4) D > A

Ans. *(4)*

Sol. A > B, B > C, C > D

A > B > C > D

So D > A is wrong

Questions (55 -59)

Instruction : In each of the Question Nos. 55 to 59, choose the correct alternative assuming α stands for '='; β stands for '>' ; γ for '<' and δ for '$\neq$'.

55. If 6x α 5y and 2y β 3z, then

(1) 2x β 3z (2) 4x β 3z (3) 2x γ z (4) 4x α 3z

Ans. *(2)*

Sol. $6x = 5y$, ... (1)

$2y > 3z$ ..... (2)

Eq. (1) × 2

$12x = 10y$

Eq. (2) × 2

$10y > 15z$

By Using above equation

$12x > 15z$

$4x > 5z$ and $5z > 3z$

$4x > 3z$

$4x \beta 3z$

56. If $ax \gamma by$, $bx \alpha cz$ and $b^2 \alpha ac$, then

(1) $ax \beta cy$ (2) $ay \alpha cz$ (3) $y \gamma z$ (4) $y \beta z$

Ans. *(4)*

Sol. $ax < by$ .... (1)

$bx = cz$ .... (2)

$b^2 = ac$ .... (3)

$a = \frac{b^2}{c}$ Put equation (1)

$bx < cy$ using equation (2)

$cz < cy$

$z < y$

$y > z$

$y \beta z$ Option (4)

57. If $abxy \alpha c^2z$, $bx \beta ay$ and $b^2 \alpha ac$, then

(1) $ax^2 \beta cz$ (2) $a^2x^2 \beta cz$ (3) $b^2x \beta c^2z$ (4) $bx^2 \beta c^2z$

Ans. *(1)*

Sol. $abxy = c^2z$ ... (1)

$bx > ay$ ... (2)

$b^2 = ac$ ... (3)

from (1) & (2)

$b^2x^2 > c^2z$ ... (4)

from (3) & (4)

$acx^2 > c^2z$

$\Rightarrow ax^2 > cz$

$ax^2 \beta cz$

58. If $bcy \gamma ax$, $cy \alpha bz$ and $a^2 \gamma bc$, then

(1) $cx \alpha abz$ (2) $cx \gamma abz$ (3) $cx \delta abz$ (4) $c^2x \gamma a^2z$

Ans. *(3)*

Sol. $bcy < ax$ ..... (1)

$cy = bz$ ..... (2)

$a^2 < bc$ ..... (3)

by equation (1) $bc < \frac{ax}{y}$ Put equation (3)

$a^2 < \frac{ax}{y}$

$ay < x$ ..... (4)

using equation (2) $y = \frac{bz}{c}$ Put eq. (4)

$a\frac{bz}{c} < x$

$abz < cx$

$cx > abz$

$cx \delta abz$ Option (3)

59. If $a^2x \alpha byz$, $czx \alpha b^2y$ and $c^2z \alpha axy$, then

(1) $abc \alpha xyz$ (2) $abx \beta xyz$ (3) $abc \delta xyz$ (4) $abc \gamma xyz$

Ans. *(1)*

Sol. $a^2x = byz$ ..... (1)

$czx = b^2y$ ..... (2)

$c^2z = axy$ ..... (3)

By eq. (2) $by = \frac{czx}{b}$ Put equation (1)

$a^2x = \frac{czx}{b}z$

$a^2b = cz^2$

$a^2b = (cz)z$

By using (3)

$a^2b = \frac{axy}{c}z$

$abc = xyz$

$abc \alpha xyz$ Option (1)

Questions (60 - 63)

Instruction : Read the information given below to answer the questions that follow:

(i) A $ B means A is mother of B.

(ii) A ≠ B means A is father of B.

(iii) A @ B means A is husband of B.

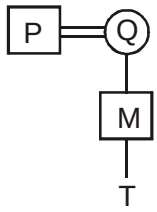
(iv) A % B means A is daughter of B.

60. If P @ Q $ M ≠ T, then what relationship is of P with T ?

(1) Maternal grandfather (2) Maternal grandmother (3) Paternal grandfather (4) Paternal grandmother

Ans. *(3)*

Sol.



P is the paternal grandfather of T

Answer is (3)

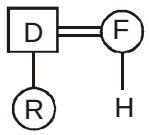
61. Which of the following expressions indicates that 'R is the sister of H' ?

(1) H $ D @ F ≠ R (2) R % D @ F $ H (3) R $ D @ F ≠ H (4) H % D @ F $ R

Ans. *(2)*

Sol. By option (2)

R % D @ F $ H



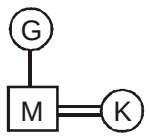
R is the sister of H.

62. If G $ M @ K, then how is K related to G ?

(1) Mother–in–law (2) Daughter (3) Daughter–in–law (4) None of these

Ans. *(3)*

Sol.



K is the daughther–in–law of G.

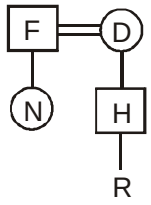
63. Which of the following expressions indicates H is the brother of N ?

(1) H ≠ R $ D $ N (2) N % F @ D $ H ≠ R (3) N % F @ D $ H (4) N % F @ D % H

Ans. *(2)*

Sol. By option (2)

N % F @ D $ H ≠ R



So, H is the brother of N.

64. If $2x + y = 35$ and $3x + 4y = 65$, then $\frac{x}{y} =$

(1) 30 (2) 2 (3) 5 (4) 3

Ans. *(4)*

Sol. $2x + y = 35$ ...(i)

$3x + 4y = 65$

Equation (i) × 4

$8x + 4y = 140$

$3x + 4y = 65$

$- \quad - \quad -$

$5x = 75$

$x = 15$ Put eq. (i)

$2(15) + y = 35$

$y = 5$

$\frac{x}{y} = \frac{15}{5} = 3$

65. If $4P = (47)^2 - (43)^2$, then P = ?

(1) 360 (2) 90 (3) 4^2 (4) None of these

Ans. *(2)*

Sol. $4P = (47)^2 - (43)^2$

$4P = (47 + 43)(47 - 43)$

$4P = 90 \times 4$

$P = 90$

66. Value of $\frac{(3.572)^3 + (2.428)^3}{(3.572)^2 - 3.572 \times 2.428 + (2.428)^2}$ is

(1) 17.12 (2) 7 (3) 6 (4) None of these

Ans. *(3)*

Sol. $\frac{a^3 + b^3}{(a^2 - ab + b^2)} = \frac{(a + b)(a^2 - ab + b^2)}{(a^2 - ab + b^2)}$

$\frac{a^3 + b^3}{a^2 - ab + b^2} = a + b$

$\Rightarrow \frac{(3.572)^3 + (2.428)^3}{(3.572)^2 - 3.572 \times 2.428 + (2.428)^2} \Rightarrow 3.572 + 2.428 = 6$

67. The surface area of a cube is 150 sq.cm. What is the length of its diagonal (in cm) ?

(1) $\frac{5}{2}$ (2) $\frac{5\sqrt{3}}{2}$ (3) $5\sqrt{2}$ (4) $5\sqrt{3}$

Ans. *(4)*

Sol. $6a^2 = 150$

$a^2 = 25$

$a = 5$

Diagonal = $a\sqrt{3}$

$= 5\sqrt{3}$

68. The average of three numbers is 20. If two of the numbers are 16 and 22, then the third is

(1) 18 (2) 20 (3) 19 (4) 22

Ans. *(4)*

Sol. $\frac{x+16+22}{3} = 20$

$38 + x = 60$

$x = 22$

69. Of which number is 10608049 a square ?

(1) 4135 (2) 3009 (3) 13263 (4) 3257

Ans. *(4)*

Sol.

	3257
	$\overline{10}$ $\overline{60}$ $\overline{80}$ $\overline{49}$
3	
+3	9
62	160
+2	124
645	3680
+5	3225
6507	45549
	45549
	X

$(3257)^2 = 10608049$

70. Identify the missing term (?) :

6	7	42	13
13	3	39	16
4	?	28	11

(1) 1 (2) 0 (3) 5 (4) 7

Ans. *(4)*

Sol. In first row = $6 \times 7 = 42$, $6 + 7 = 13$

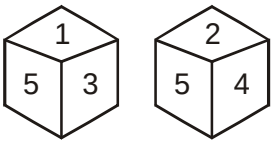
In third row

$4 \times x = 28$ $4 + x = 11$

$x = 7$ $x = 7$

so ? will be 7

71. The two positions of a single die are given below. Which digit will be at the face opposite to the face having digit 4 ?



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

Ans. *(3)*

Sol. 5 1 3
6 2 4
So, opposite of 4 is 3.
So, answer is option (3).

72. How many smaller cubes of 1 cm side can be formed with a solid cube of 3 cm side?

(1) 3 (2) 6 (3) 9 (4) 27

Ans. *(4)*

Sol. Number of smaller cubes

$$= \frac{(\text{size of biger cube})^3}{(\text{size of smaller cube})^3} = \frac{3^3}{1^3} = 27$$

73. How many times the hour hand and the minute hand of a clock are at right angle in a day?

(1) 24 (2) 48 (3) 22 (4) 44

Ans. *(4)*

Sol. 44 times form right angle in a day.

74. If 1 + 4 = 9, 2 + 8 = 18 and 3 + 6 = 15, then 7 + 8 = ?

(1) 32 (2) 41 (3) 23 (4) 30

Ans. *(3)*

Sol.

	1 + 4 = 9
Logic	1 + 2 (4) = 9
	2 + 2 (8) = 18
	3 + 2(6) = 15
So	7 + 2 (8) = 23

Question (75 – 79)

Instruction : Study the following information carefully and answer the questions given below :

Eight people E, F, G, H, J, K, L and M are sitting around a circular table facing the centre. Each of them is of a different profession : Chartered Accountant, Columnist, Doctor, Engineer, Financial Analyst, Lawyer, Professor and Scientist but not necessarily in the same order. F is sitting second to the left of K. The Scientist is an immediate neighbour of K. there are only three people between the Scientist and E. Only one person is sitting between the Engineer and E. The Columnist is to the immediate right of the Engineer. M is second to the right of K. H is the Scientist. G and J are immediate neighbours of each other. Neither G nor J is an Engineer. The Financial Analyst is to the immediate left of F. The lawyer is second to the right of the columnist. The Professor is an immediate neighbour of the Engineer. G is second to the right of the Chartered Accountant.

75. Who is sitting second to the right of E?

(1) Lawyer (2) G (3) Engineer (4) F

76. Who amongst the following is the Professor?

(1) F (2) L (3) M (4) K

77. Three of the following four are alike in a certain way based on the given arrangement and hence form a group. Which of the following does not belong to the group?

(1) Chartered Accountant – H (2) Doctor – M

(3) Engineer – J (4) Financial Analyst – L

78. What is the position of L with respect to the Scientist?

(1) Third to the left (2) Second to the right (3) Second to the left (4) Third to the right

79. Which of the following statement(s) is/are true according to the given arrangement?

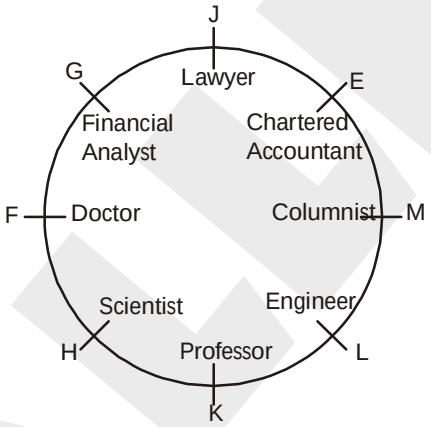
(1) The Lawyer is second to the left of the Doctor.

(2) E is an immediate neighbour of the Financial Analyst.

(3) H sits exactly between F and the Financial Analyst.

(4) Only four people sit between the Columnist and F.

Sol. *(75 to 79)*



75. *Ans. (2)*

G is sitting right of E.

76. *Ans. (4)*

K is Professor.

77. *Ans. (3)*

Except option (3) all other have opposite sitting arrangement.

78. *Ans. (2)*

L is sitting to the second right of Scientist.

79. *Ans. (1)*

Option (1), the Lawyer is second to the left of Doctor.

80. If 381A is divisible by 9 then the value of the smallest natural number A is–

(1) 5 (2) 6 (3) 7 (4) 9

Ans. *(2)*

Sol. Divisibility of 9 is sum of digit divided by 9.

3 + 8 + 1 + A = 9K

12 + A = 9K

Hence A = 6 is the smallest value to divide the 381 A by 9.

81. The average of first five multiples of 3 is–

(1) 3 (2) 9 (3) 12 (4) 15

Ans. *(2)*

Sol. First five multiples of 3 are

3, 6, 9, 12, 15

$$\text{average} = \frac{3+6+9+12+15}{5} = \frac{45}{5} = 9$$

82. If $81^{y} = \frac{1}{27^{x}}$, then the value of x in terms of y is

(1) $\frac{3y}{4}$ (2) $-\frac{3y}{4}$ (3) $\frac{4y}{3}$ (4) $-\frac{4y}{3}$

Ans. *(4)*

Sol. $81^{y} = \frac{1}{27^{x}}$ $3^{4y} = 3^{-3x}$ $4y = -3x$ $x = \frac{-4y}{3}$

83. If $\frac{10a^2 + ab}{3ab - b^2} = \frac{10}{1}$, then a : b is

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

Ans. *(2)*

Sol. By using options, it we use option (2) i.e., a : b = 2 : 5

let a = 2x b = 5x

Put it in given equation

$$\frac{10a^2 + ab}{3ab - b^2} = \frac{10}{1}$$

$$\text{L.H.S } \frac{10a^2 + ab}{3ab - b^2} = \frac{10 \times (2x)^2 + 2x + 5x}{3 \times 2x \times 5x - (5x)^2}$$

$$\Rightarrow \frac{10 \times 4x^2 + 10x^2}{30x^2 + 25x^2}$$

$$\Rightarrow \frac{40+10}{5} = \frac{50}{5} = \frac{10}{1} = \text{R.H.S.}$$

84. If $\sqrt{5+\sqrt[3]{x}}=3$, then the value of x is–

(1) 125 (2) 64 (3) 27 (4) 9

Ans. *(2)*

Sol. $\sqrt{5+\sqrt[3]{x}}=3$

Square both sides

$5+\sqrt[3]{x}=9$

$\Rightarrow \sqrt[3]{x}=4$

Cube both sides

x = 64

85. The Least Common Multiple (LCM) of the two numbers is 12 times their Highest Common Factor (HCF). the sum of HCF and LCM is403. If one number is 93, then the other is–

(1) 134 (2) 128 (3) 124 (4) None of these

Ans. *(3)*

Sol. Let

L.C.M. = x

H.C.F. = y

x = 12 y

we know that

$x \times y = a \times b$

$12y^2 = 93 \times b$

Put y = 31

$12 \times 31 \times 31 = 93 \times b$

b = 124

x + y = 403

12y + y = 403

13 y = 403

y = 31

86. If one integer is greater than another integer by 3 and the difference of their cubes is 117, then what would be the sum of those two integers?

(1) 7 (2) 8 (3) 9 (4) 11

Ans. *(1)*

Sol. Let the integers are x and y

x = y + 3

given that

$x^3 - y^3 = 117$

$(y + 3)^3 - y^3 = 117$

$y^3 + 27 + 3 \times y \times 3 (y + 3) - y^3 = 117$

9y (y + 3) = 117 – 27

9y (y + 3) = 90

y (y + 3) = 10

$y \times (y + 3) = 2 \times 5$

so y = 2

then x = 2 + 3 = 5

Sum = x + y = 7

87. How many four digit numbers can be formed using 7, 5, 0, 2 only once in a number?

(1) 4 (2) 12 (3) 9 (4) 18

Ans. *(4)*

Sol.

7502	5702	2705
7520	5720	2750
7250	5270	2570
7205	5207	2507
7052	5072	2057
7025	5027	2075

88. The greatest four digit even number that can be formed using the digits 7, 0, 6, 5 without repeating the digit is–

(1) 6570 (2) 7560 (3) 7650 (4) 7065

Ans. *(3)*

Sol. Greatest four digit number will be 7650.

89. A person covers half of his journey at 30 km/hr and the remaining half at 20 km/hr. The average speed for the whole journey is–

(1) 24 km/hr (2) 28 km/hr (3) 32 km/hr (4) none of these

Ans. *(1)*

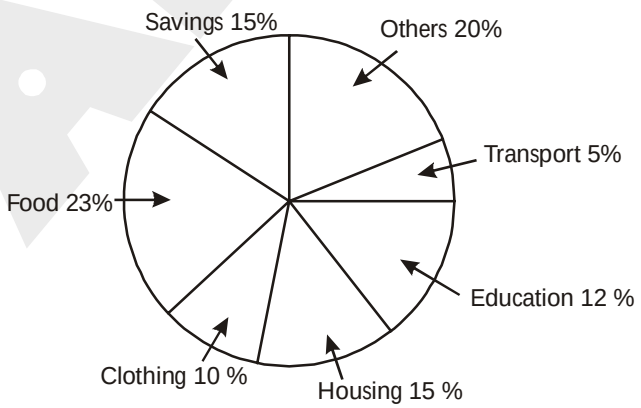
Sol. Avg. speed $= \frac{2v_1v_2}{v_1 + v_2}$

$= \frac{2 \times 30 \times 20}{20 + 30}$

$= 24$ km /hr

Question (90 – 94)

Instruction : The pie-chart represented below shows the spending by a family on various items during the year 1999. Study the pic-chart carefully and answer the following questions :



90. If the total amount spent during the year 1999 was Rs. 46,000 then the amount (in rupees) spent on food was

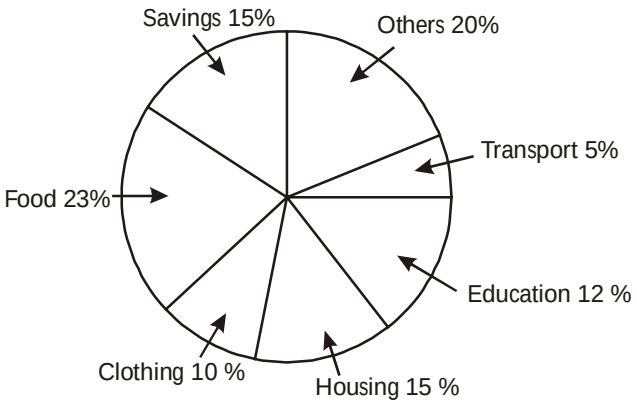
(1) 2,000 (2) 10, 580 (3) 23,000 (4) 2,300

Ans. *(2)*

Sol. Amount spent on food = 23% of total

$= \frac{23}{100} \times 46000 = 10580$

Hence, answer is (2)



91. If the total amount spent during the year 1999 was Rs. 46,000 then how much money (in rupees) was spent on clothing and housing together?

(1) 11,500 (2) 1,150 (3) 10,000 (4) 15,000

Ans. *(1)*

Sol. Spent on clothing and housing is 10% + 15% = 25%

Hence, $\frac{25}{100} \times 46000 = 11500$

Hence, answer is (1)

92. If the total expenditure of the family for the year 1999 was Rs. 46,000 then the savings (in rupees) of the family was

(1) 1,500 (2) 15,000 (3) 6,900 (4) 3,067

Ans. *(3)*

Sol. Savings is 15% of Rs 46000

So, $\frac{15}{100} \times 46000 = 6900$

Hence, Answer is (3)

93. According to the pie-chart, the maximum amount was spent on which iterm ?

(1) Food (2) Housing (3) Clothing (4) Other

Ans. *(1)*

Sol. Maximum amount is spent on food which is 23%

Hence, answer is (1)

94. The ratio of the toal amount of money spent on housing to the total amount of money spent on education was

(1) 5 : 2 (2) 2 : 5 (3) 4 : 5 (4) 5 : 4

Ans. *(4)*

Sol. $\frac{\text{Housing}}{\text{Education}} = \frac{15\%}{12\%} = \frac{15}{12} = 5/4$

Answer is (4)

95. The sum of three numbers is 98. If the ratio between first and second be 2 : 3 and that between second and third be 5 : 8, then the second number is

(1) 30 (2) 20 (3) 58 (4) 48

Ans. *(1)*

Sol. Let the numbers are a, b and c

then $a + b + c = 98$ ...(1)

so, $a : b = 2 : 3 \rightarrow a = \frac{2}{3}b$

$b : c = 5 : 8 \rightarrow c = \frac{8}{5}b$

so, $\frac{2}{3}b + b + \frac{8}{5}b = 98$

Hence, $b = 30$

So, Answer is (1)

Instruction : In each of the following equations, there is a certain relationship between two given numbers on left side of (::) and one number is given on the right side of (::) while another number is the be found from the given alternatives, having the same relationship with the number as the numbers of the given pair bear. Choose the correct alternative.

96. 21 : 3 :: 574 : ?

(1) 23 (2) 82 (3) 97 (4) 113

Ans. *(2)*

Sol. $21 : 3 :: 574 : 82$ (÷7 in both)

Hence, Answer is (2)

97. 42 : 20 :: 64 : ?

(1) 31 (2) 32 (3) 33 (4) 34

Ans. *(1)*

Sol. $42 : 20 :: 64 : 31$ (÷2–1 in both)

Hence, answer is (1)

98. 3 : 11 :: 7 : ?

(1) 22 (2) 29 (3) 18 (4) 51

Ans. *(4)*

Sol. $3 : 11 :: 7 : 51$

3^2+2 7^2+2

Hence, answer is (4)

99. 42 : 56 :: 72 : ?

(1) 81 (2) 90 (3) 92 (4) 100

Ans. *(2)*

Sol. $42 : 56 :: 72 : 90$

$6^2+6 : 7^2+7 \quad 8^2+8 \quad 9^2+9$

Answer is (2)

100. 9 : 80 :: 100 : ?

(1) 901 (2) 1009 (3) 9889 (4) 9999

Ans. *(4)*

Sol. $9 : 80 :: 100 : 9999$

9^2-1 100^2-1

Answer is (4)

* * * * * *