MAT-1 **NTSE(I)/19-20**

राष्ट्रीय प्रतिभा खोज परीक्षा (प्रथम स्तर) 2019-20
NATIONAL TALENT SEARCH EXAMINATION (Stage-I) 2019-20

701 – A

Roll No. रोल नम्बर

Booklet Number पुस्तिका संख्या

311624

MENTAL ABILITY TEST
(For Students of Class X)

Time : 120 Minutes Max. Marks : 100

(For Candidate with benchmark disabilities Time : 2 Hours 30 Minutes)

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you open the question booklet.

1. Answers are to be given on a **separate answer sheet (OMR sheet)**.
2. Please write your **Roll Number** as allotted to you in the admission card very clearly on **the test-booklet** and darken the appropriate circles on the **answer sheet** as per instructions given.
3. There are 100 questions in this test. All are compulsory.
4. Please follow the instructions given on the answer sheet for marking the answers.
5. If you do not know the answer to any question, do not waste time on it and pass on to the next one. Time permitting, you can come back to the questions, which you have left in the first instance and attempt them.
6. Since the time allotted for this question paper is very limited, you should make the best use of it by not spending too much time on any one question.
7. **Rough work** can be done **on the given Blank Pages at the back of the booklet** but not on the answer sheet/loose paper.
8. Every correct answer will be awarded one mark. There will be no negative marking.
9. **Please return the Answer sheet (OMR) only to the invigilator after the test.**
10. Hindi version of the question paper will be considered as final in case of any dispute arising out of variation in translated version.

PLEASE TURN OVER THE PAGE AND START YOUR WORK.

बौद्धिक योग्यता परीक्षा
(कक्षा X के विद्यार्थियों के लिए)

समय : 120 मिनट पूर्णांक : 100

(विशेष योग्यजन के लिए समय : 2 घंटे 30 मिनट)

परीक्षार्थियों के लिए निर्देश

प्रश्न पुस्तिका खोलने से पहले निम्न निर्देशों को ध्यान से पढ़िए।

1. उत्तर एक **अलग उत्तर-पत्रक (ओ० एम० आर० शीट)** में देने हैं।
2. कृपया अपना **रोल नम्बर** जैसा कि आपके प्रवेश पत्र पर दिया गया है, निर्देशानुसार **टेस्ट पुस्तिका** पर बहुत स्पष्ट लिखिये और **उत्तर-पत्रक** पर दिये गये गोलों को काला करें।
3. इस परीक्षा में 100 प्रश्न हैं। सभी प्रश्न अनिवार्य हैं।
4. कृपया उत्तर चिह्नित करने के लिए उत्तर-पत्रक पर दिये गये निर्देशों को ध्यान से समझ कर उनकी अनुपालना कीजिए।
5. यदि आप किसी प्रश्न का उत्तर नहीं जानते हैं तो उस पर बहुत समय न गंवाइये और अगले प्रश्न पर बढ़ जाइये। यदि बाद में समय मिले तो जिन प्रश्नों को आपने पहले छोड़ दिया था, उन पर वापस आकर उनके उत्तर दीजिए।
6. क्योंकि इस प्रश्न पत्र के लिए निर्धारित समय बहुत सीमित है, इसलिए इसका अधिकतम उपयोग कीजिये और किसी प्रश्न पर बहुत समय न लगाइये।
7. **रफ कार्य** पुस्तिका के अंत में दिये गये रिक्त पृष्ठों पर किया जा सकता है किन्तु **उत्तर-पत्रक/अलग कागज** पर नहीं।
8. प्रत्येक सही उत्तर का एक अंक प्रदान किया जाएगा। इसमें ऋणात्मक अंकन नहीं होगा।
9. **कृपया परीक्षा के बाद केवल उत्तर-पत्रक (ओ० एम० आर०) ही निरीक्षक को लौटाइए।**
10. अनुवादित विवरण में अन्तर से उठे किसी भी विवाद की स्थिति में प्रश्न-पत्र के हिन्दी अनुवाद को निर्णायक माना जाएगा।

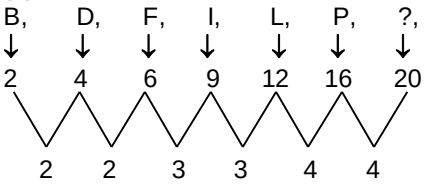
कृपया पृष्ठ पलटिये और अपना कार्य आरम्भ कीजिए।

MENTAL ABILITY TEST (MAT)_ PAPER & HINTS & SOLUTION

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.

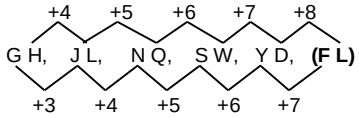
1. B, D, F, I, L, P, ?
(1) R (2) S (3) T (4) U

Sol. **(3)**



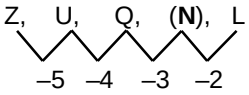
2. GH, JL, NQ, SW, YD, ?
(1) EJ (2) FJ (3) EL (4) FL

Sol. **(4)**



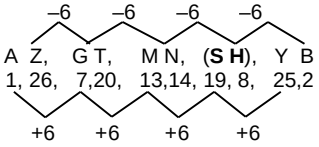
3. Z, U, Q, _ , L
(1) I (2) K (3) M (4) N

Sol. **(4)**



4. AZ, GT, MN, ?, YB
(1) JH (2) SH (3) SK (4) TS

Sol. **(2)**



5. ABD, DGK, HMS, MTB, SBL, ?
(1) XKW (2) ZAB (3) ZKU (4) ZKW

Sol. **(4)**

A	B	D,	D	G	K,	H	M	S,	M	T	B,	S	B	L,	Z	K	W
1	2	4	4	7	11	8	13	19	13	20	2	19	2	12	26	11	23

First Value +3, + 4, +5, +6 __
Mid Value +5, +6, +7, +8, +9
Last Value +7, +8, +9, +10, +11

6. PBA, QDC, RFE, ?

(1) SHG (2) OAB (3) TJ I (4) ULK

Sol. **(1)**

P B A, Q D C, R F E, SHG

7. PERPENDICULAR, ERPENDICULA, RPENDICUL, ?

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

Sol. **(4)**

P E R P E N D I C U L A R, E R P E N D I C U L A, R P E N D I C U L, ?

8. ST, ND, RD, TH, ?

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

Sol. **(1)**

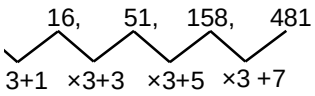
ST-Last two letters of first
ND-Last two letters of second
RD-Last two letters of third
TH- Last two letters of fourth
TH-Last two letters of fifth

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

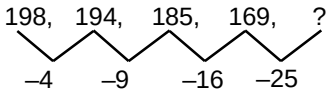
Sol. **(3)**



10. 198, 194, 185, 169, ?

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

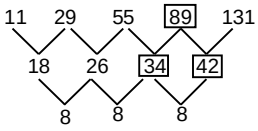
Sol. **(3)**



11. 11, 29, 55, ?, 131

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

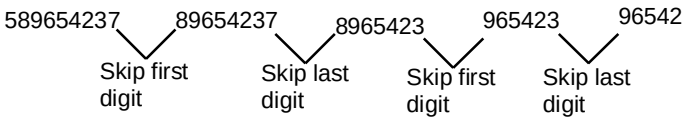
Sol. **(3)**



12. 589654237, 89654237, 8965423,965423, ?

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

Sol. **(4)**



13. 1, 1, 4, 8, 9,27, 16, ?
(1) 32 (2) 64 (3) 81 (4) 256

Sol. **(2)**

1, 1, 4, 8, 9, 27, 16, $\boxed{64}$
1^2, 1^3, 2^2, 2^3, 3^2, 3^3, 4^2, 4^3

14. 4, 9, 25, ?, 121, 169, 289, 361.
(1) 49 (2) 64 (3) 81 (4) 87

Sol. **(1)**

4, 9, 25, $\square$, 121, 169, 289, 361
2^2 3^2, 5^2, 11^2, 13^2, 17^2, 19^2
Square of prime numbers

15. 980, 392, 156.8, ?, 25.088, 10.0352
(1) 65.04 (2) 60.28 (3) 62.72 (4) 63.85

Sol. **(3)**

980, 392, 156.8, $\square$, 25.088, 10.0352

$980\times\frac{2}{5}=392$

$392\times\frac{2}{5}=\frac{784}{5}=156.8$

$156.8\times\frac{2}{5}=\frac{313.6}{5}=62.72$

16. 3, 10, 101, ?
(1) 10101 (2) 10201 (3) 10202 (4) 11012

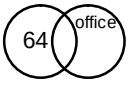
Sol. **(3)**

3 10 101 $\square$
3^2+1 10^2+1 101^2+1
10202

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.

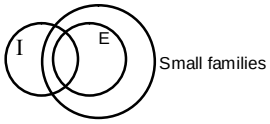
17. Statements : (i) : Most of the 64 numbers buses go to my office
(ii) : This is 64 number bus.
Conclusions (I) : This bus goes to my office
(II) : This bus does not go to my office
(1) Only conclusion I follows (2) Only conclusions II follows
(3) Both conclusions I and II follow (4) Neither conclusion I nor II follows

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

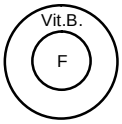
Sol. **(2)**



Only conclusion II follows

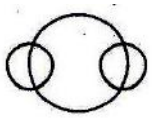
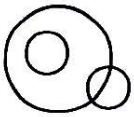
19. Statements : (i) : Vitamin B-complex is best for health.
(ii) : Fruits contain Vitamin B-complex.
Conclusions (I) : We should grow fruits
(II) : Fruits are good for health.
(1) Only conclusion I follows (2) Only conclusions II follows
(3) Both conclusions I and II follow (4) Neither conclusion I nor II follows

Sol. **(2)**

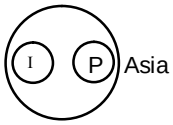


Both conclusion I and II follows

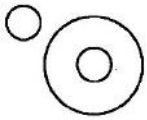
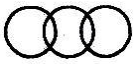
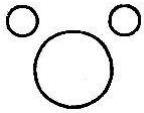
20. Which one of the following Venn diagrams correctly represents the relation between Indian, Pakistan and Asia ?

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

Sol. **(2)**

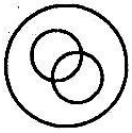
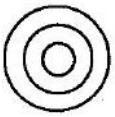
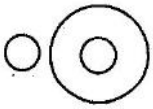
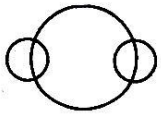


21. Which one of the following Venn diagrams correctly represents the relation between police, Thief and Criminal ?

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

Sol. **(1)**

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

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

Sol. **(2)**

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

(1) %×#$ (2) %#×$ (3) %+×$ (4) +×%$

Sol. **(3)**

Direct coding

R-%, E-+, N-×, T-$

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

Sol. **(1)**

Direct coding

D-9, I-2, E-5, T-7

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

Sol. **(1)**

COBRA $\rightarrow$ 3 15 2 18 1

26. In 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

Sol. **(3)**

E = 5

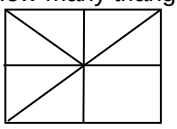
H + 0 + T + E + L

= 8 + 15 + 20 + 5 + 12

$= \frac{60}{5} = 12$

LAMB = 12 + 1 + 13 + 2 = $\frac{28}{7} = 4$

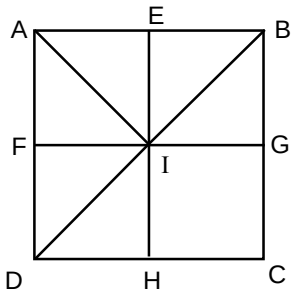
27. How many triangles are the in the figure given below :



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

Sol. **(1)**

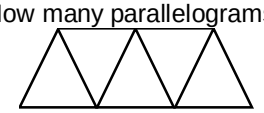
(10 Triangle)



(1) ΔAEI (2) ΔEIB (3) ΔBIG (4) ΔAFI (5) ΔFID (6) ΔDIH

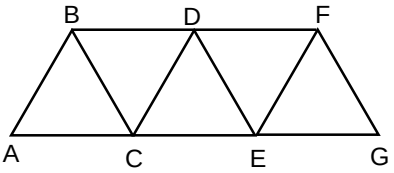
(7) ΔAIB (8) ΔAID (9) ΔADB (10) ΔCDB

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



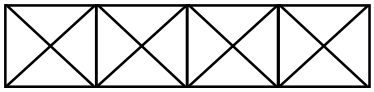
(1) 6 (2) 3 (3) 4 (4) 5

Sol. **(1)**



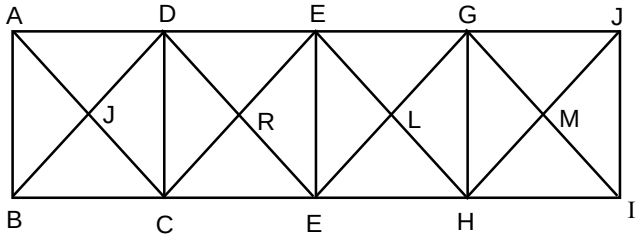
(1) ACBD (2) CEFD (3) EGFD (4) BCED
(5) AEFB (6) CGFB

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



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

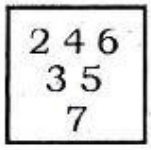
Sol. **(3)**



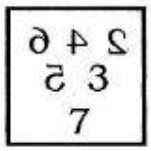
(1) DJCELFD (2) FKEHMGF

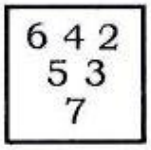
Instructions : In Questions No. 30 to 33, find the correct mirror image of the given figure, when mirror is placed on right side of the figure.

30. Question-Image

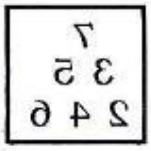


Answer-Image

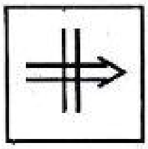
(1) 

(2) 

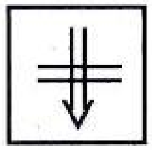
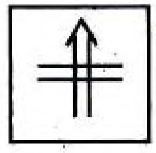
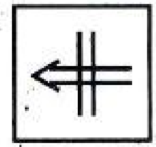
(3) 

(4) 

31. Question-Image



Answer-Image

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

Sol. **(4)**

32. PRAYER

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

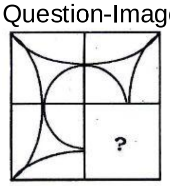
Sol. **(2)**

33. 12698

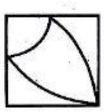
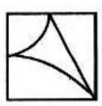
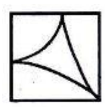
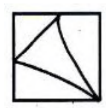
(1)  (2)  (3)  (4) 12968

Sol. **(3)**

34. Which of the answer-figures will complete the matrix figure ?
Question-Image



Answer-Image

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

Sol. **(3)**

35. How many numbers from 1 to 50 are there which are prime ?
(1) 10 (2) 20 (3) 15 (4) 18

Sol. **(3)**

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

Sol. **(2)**
Non leap year (1 odd day)

Instruction : In each of the Question Ns. 37 to 42, three alternatives 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

Sol. **(2)**
Not capital of any state.

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

Sol. **(2)**
VIBGYOR (not present)

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

Sol. **(4)**
31 days

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

Sol. **(1)**
Fruit

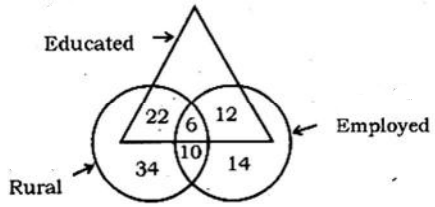
41. (1) Rectangle (2) Square (3) Triangle (4) Rhombus

Sol. **(3)**
Triangle is odd one because it is three sided polygon & rest are four sided polygon.

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

Sol. **(1)**
23 is prime number & rest are composite number.

43. How many educated people are employed ?

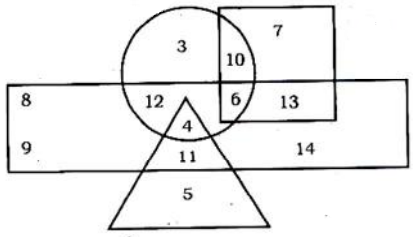


(1) 18 (2) 26 (3) 24 (4) 20

Sol. **(1)**
12 + 6 = 8

Questions (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

Sol. **(3)**

45. How many the following are neither civil servant nor educated but are urban and not a male ?
(1) 2 (2) 3 (3) 6 (4) 10

Sol. **(2)**

46. How many among the following are female, urban resident and also a civil servant ?
(1) 6 (2) 7 (3) 10 (4) 14

Sol. **(3)**

47. How many among the following are educated male who hail from urban area ?
(1) 4 (2) 2 (3) 5 (4) 11

Sol. **(1)**

48. How many among the following are only a civil servant but neither male not urban oriented and uneducated ?
(1) 10 (2) 8 (3) 7 (4) 9

Sol. **(3)**

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

Sol. **(1)**

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

Sol. **(2)**

51. As kandla is related to Gujrat, in the same way Kochin is related to which of the following ?
(1) Karntaka (2) Goa (3) Chennai (4) Kerala

Sol. **(4)**
Kandla is related to Gujarat.
Kochin is related to 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

Sol. **(4)**
New Delhi is capital of India
So Islamabad is capital of Pakistan.

53. As Rupee to India, in the same way Yen is related to which of the following ?
(1) Turkey (2) Bangladesh (3) Japan (4) Pakistan

Sol. **(3)**
Rupee is currency of India
Yen is current of Japan.

54. If A > B , B > C and C > D, then which of the following conclusion is definitely wrong ?
(1) A > C (2) A > D (3) B > D (4) D > A

Sol. **(4)**
Wrong conclusion is D > A

Questions (55 - 59)

Instructions : In each of the questions No. 55 to 59. Choose the correct alternative assuming α stands for '=' β stands for '>' ; γ for '<' and δ for '$\neq$'.

55. If $6x \ \alpha \ 5y$ and $2y \ \beta \ 3z$, then
(1) $2x \ \beta \ 3z$ (2) $4x \ \beta \ 3z$ (3) $2x \ \gamma \ z$ (4) $4x \ \alpha \ 3z$

Sol. **(2)**
$6x = 5y$ and $2y > 3z$

$\frac{6x}{5} = y$ and $y > \frac{3}{2}z$.

so, $\frac{6x}{5} > \frac{3}{2}z$

from here $4x > 5z$

If $4x > 5z$ then $4x$ is also greater than $3z$.

$4x > 3z$

$4x \ \beta \ 3z$.

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) $y \ \beta \ z$

Sol. **(4)**
$ax < by$, $bx = cz$. $b^2 = ac$

$\frac{b}{c} = \frac{z}{x}$, $\frac{b}{c} = \frac{a}{b}$

from here $\frac{z}{x} = \frac{a}{b}$

$ax = bz$

Now $ax < by$

$\therefore bz < by$

$z < y$ $\Rightarrow y \ \beta \ z$

57. If $baxy \ \alpha \ c^2z$, $bx \ \beta \ ay$ and $b^2 \ \alpha \ ac$, then
(1) $ax^2 \ \beta \ cz$ (2) $a^2x^2 \ \beta \ cz$ (3) $b^2x \ \beta \ c^2z$ (4) $bx^2 \ \beta \ c^2z$

Sol. **(1)**
$abxy = c^2 z$ .....(1)
$bx > ay$ .....(2)
$b^2 = ac$ .....(3)
from equation (1)

$ay = \frac{c^2z}{bx}$

Put in equation (2)

$bx > \frac{c^2z}{bx}$

$b^2 x^2 > c^2z$
From euqaiton (3)
$acx^2 > c^2z$
$ax^2 > cz \Rightarrow ax^2 \ \beta \ cz$

58. If bcy γ ax, cy α bz and a^2 γ bc, then
(1) cx α abz (2) cx γ abz (3) cx δ abz (4) c^2x γ a^2z

Sol. **(3)**
bcy < ax .....(1)
cy = bz .....(2)
a^2 < bc .....(3)
from equation (1) & (2)
b^2 z < ax .....(4)
multiply equation (3) & (4)
a^2b^2z < abcx
abz < cx
so abz # cx $\Rightarrow$ cx δ abz

59. If a^2x α byz, czx α b^2y and c^2z α axy, then
(1) abc α xyz (2) abc β xyz (3) abc δ xyz (4) abc γ xyz

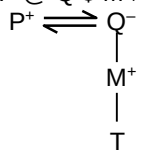
Sol. **(1)**
$a^2x = byz$, $czx = b^2y$, $c^2z = axy$
$a^2x = byz$
$b^2y = czx$
$c^2z = axy$
after multiplying all equation
$a^2b^2c^2 xyz = abc\ x^2 y^2 z^2$
so abc = xyz
abc α xyz

Question (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 $\neq$ 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 $\neq$ T, then what relationship is of P with T ?
(1) Maternal grandfather (2) Maternal grandmother
(3) Paternal grandfather (4) Paternal grandmother

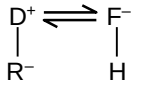
Sol. **(3)**
P @ Q $ M $\neq$ T



P is grandfather of T.

61. Which of the following expressions indicates that 'R is the sister of H' ?
(1) H $ D @ F $\neq$ R (2) R % D @ F $ H (3) R $ D @ F $\neq$ H (4) H % D @ F $ R

Sol. **(2)**
From option (2)
R % D @ F $ H



So R is 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

Sol. **(3)**
G $ M @ K

D^+
|
$M^+ \rightleftharpoons K^-$

K is daughter in law of G.

63. Which of the following expression indicates H is the brother of N ?
(1) $H \neq R \$ D \$ N$ (2) $N \% F @ D \$ H \neq R$
(3) N % F @ D $ H (4) N % F @ D % H

Sol. **(2)**
From option (2)
$N \% F @ D \$ H \neq R$

$F^+ \rightleftharpoons D^-$
| |
N^- H^+
|
R

So H is brother of N.

64. If $2x + y = 35$ and $3x + 4y = 65$, then $\frac{x}{y}$ =
(1) 30 (2) 2 (3) 5 (4) 3

Sol. **(4)**
$2x + y = 35$ ....(1)
$3x + 4y = 65$ .....(2)
subtract 4 times of equation (1) from equation (2)
$(3x + 44) – 4 (2x + y) = 65 – 4 \times 35$
$–5x = –75$
$x = 15$
Put value of x in equation (1)
$2(15) + y = 35$
$y = 5$
So $\frac{x}{y} = \frac{15}{5} = 3$

65. If $4P = (47)^2 – (43)^2$, then P = ?
(1) 360 (2) 90 (3) 4^2 (4) None of these

Sol. **(2)**
$4p = (47)^2 – (43)^2$
$4P = (47 + 43) (47–43)$
$4P = 90 \times 4$
$P = 90$

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

Sol. **(3)**
$$\frac{(3.572)^3 + (2.428)^3}{(3.572)^2 – 3.572 \times 2.428 + (2.428)^2}$$
$\therefore a^3 + b^3 = (a + b) (a^2–ab + b^2)$

$$\frac{(3.572+2.428)+\left[(3.572)^2-(3.572)(2.428)+(2.428)^2\right]}{\left[(3.572)^2-3.572\times 2.428+(2.428)^2\right]} = 6$$

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) $5\sqrt{3}$

Sol. **(4)**

Surface area of cube = 6 × (side)^2 = 150

Side = 5

length of diagonals = $\sqrt{3}$ × side = $5\sqrt{3}$

68. The averge 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

Sol. **(4)**

Let third number is x so

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

38 + x = 60

x = 22.

69. Of which number is 10608049 a square ?

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

Sol. **(4)**

$\sqrt{10608049} = 3257$.

70. Identify the missing term (?) :

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

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

Sol. **(4)**

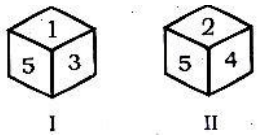
6 × 7 = 42 and 6 + 7 = 13

13 × 3 = 39 and 13 + 3 = 16

4 × x = 28 and 4 + x = 11

so x = 7.

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



I II

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

Sol. **(3)**

5 1 3

5 2 4

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

Sol. **(4)**
Volume of solid cube = $(3)^3 = 27$
Volume of smaller cube = $(1)^3 = 1$
No. of smaller cube = $\frac{27}{1} = 27$

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

Sol. **(4)**

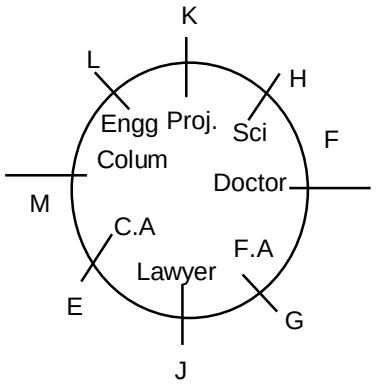
74. If 1 + 4 = 9,2 + 8 = 18 and 3 + 6 = 15, then 7 + 8 =
(1) 32 (2) 41 (3) 23 (4) 30

Sol. **(3)**
2^{nd} no. × 2 + 1^{st} no.

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

Sol. **(2)**



76. Who amongst the following is the Professor ?
(1) F (2) L (3) M (4) K

Sol. **(4)**

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 in the group?
(1) Chartered Accountant - H (2) Doctor - M
(3) Engineer-J (4) Financial Analyst- L

Sol. **(3)**
Profession - Names (sits opposite)

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

Sol. **(2)**

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. **(1)**

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

Sol. **(2)**
3 + 8 +1 + 6 = 18 (divisible by a)

81. The average of first five multiples of 3 is
(1) 3 (2) 9 (3) 12 (4) 15

Sol. **(2)**

$3,6,9,12,15 \Rightarrow \text{mean} = \frac{3+6+9+12+15}{5}$

= 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) $-\frac{4y}{3}$

Sol. **(4)**

$(3)^{4y} = \frac{1}{3^{3x}}$

$4y = -3x$

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

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

Sol. **(2)**
$10a^2 + ab = 30ab - 10b^2$
$10a^2 + 10b^2 - 29ab = 0$

$10\left(\frac{a}{b}\right)^2 + 10 - 29\left(\frac{a}{b}\right) = 0$

Let $= \frac{a}{b} = x$

$10x^2 - 29x + 10 = 0$
$10x^2 - 25x - 4x + 10 = 0$
$5x(2x - 5) - 2(2x - 5) = 0$
$(5x - 2)(2x - 5) = 0$

$X = \frac{2}{5}, \frac{5}{2}$

84. If $\sqrt{5+\sqrt[3]{x}}$ =3, then the value of x is
(1) 125 (2) 64 (3) 27 (4) 9

Sol. (2)
5 + $\sqrt[3]{x}$ = 9
$\sqrt[3]{x}$ = 4
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 is 403. If one number is 93, then the other is
(1) 134 (2) 128 (3) 124 (4) None of these

Sol. **(3)**
HCF = x
LCM = 12x
13x = 403
x = 31
HCF × LCM = 93 × y
x × 12x = 93 × y
y = 124

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

Sol. **(1)**
Let the two integer are x, x + 3
$(x + 3)^3 – x^3 = 117$
$x^3 + 9x^2 + 27x + 27 – x^3 = 117$
$9x^2 + 27x – 90 = 0$
$x^2 + 3x – 10 = 0$
(x + 5) (x – 2) = 0
x = –5, 2
So, the number are 2, 2 + 3 = 5
So there sum = 2 + 5 = 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

Sol. **(4)**
7,5,0,2
Thousand place can be filled in 3 ways
Hundred place can be filled in 3 ways
Ten place can be filled in 2 ways
Unit place can be filled in 1 ways
∴ Total ways = 3 × 3 × 2 × 1 = 18

88. The greatest four digit even number that can be formed using the digits 7 , 0 , 6 , 5 without repeating the digits is
(1) 6570 (2) 7560 (3) 7650 (4) 7065

Sol. **(3)**
Greatest four digit number using 7,0,6,5 in 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

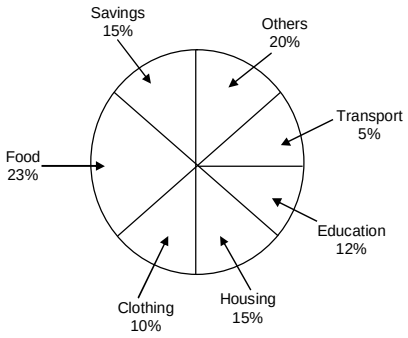
Sol. **(1)**

Average speed = $\frac{2\times 30\times 20}{30+20}=\frac{1200}{50}=24$

Questions (90 – 94)

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

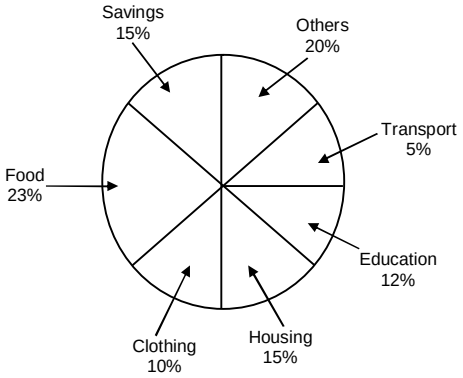
Per cent of money spent by the family on various items during 1999.



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

(1) 2,000 (2) 10,580 (3) 23,000 (4) 2300

Sol. **(2)**



Amount spent on food = 23% of 46,000 = $\frac{23}{100}\times 46{,}000$ = 10,580

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

Sol. **(1)**

Amount spent on clothing and housing = (10 + 15)% of 46,000 = $\frac{23}{100}\times 46{,}000$ = 11,500

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

Sol. **(3)**

Amount spent on saving = 15% of 46,000 = $\frac{15}{100} \times 46{,}000 = 6{,}900$

93. According to the pie-chart , the maximum amount was spent on which item?
(1) Food (2) Housing (3) Clothing (4) Others

Sol. **(1)**
Maximum amount spent on food i.e, 23% of total expenditure.

94. The ratio of the total 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

Sol. **(4)**

Ratio of amount spent on housing to education = $\frac{15\% \text{ of } 46000}{12\% \text{ of } 46000} = \frac{15}{12} = \frac{5}{4}$

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

Sol. **(1)**
Let three numbers be a, b and c
a : b = 2 : 3
b : c : 5 : 8
$\therefore$ a : b : c = 10 : 15 : 24
10x + 15x + 24x = 98
x = 2
Second Number = 15 × 2 = 30

Questions (96 -100)
Instruction : In each of the following questions, there is a certain relationship between two given numbers on left side of (: :) and one number is given on the right sides (: :) while another number is to 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

Sol. **(2)**
21 : 3 : : 574 : 2
21 ÷ 7 = 3
574 ÷ 7 = 82

97. 42 : 20 : : 64 : ?
(1) 31 (2) 32 (3) 33 (4) 34

Sol. **(1)**
42 : 20 : : 64 : 2
(42 ÷ 2) – 1 = 20
(64 ÷ 2) – 1 = 31

98. 3 : 11 : : 7 : ?
(1) 22 (2) 29 (3) 18 (4) 51

Sol. **(4)**
3 : 11 : 7 : ?
$3^2 + 2 = 11$
$7^2 + 2 = 51$

99. 42 : 56 :: 72 : ?

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

Sol. **(2)**

42 : 56 : : 72 : ?

42 = 6 × 7

56 = 7 × 8

72 = 8 × 9

90 = 9 × 10

100. 9 : 80 : : 100 : ?

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

Sol. **(4)**

9 : 80 : : 100 : ?

$9^2 - 1 = 80$

$100^2 - 1 = 9999$