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State Code

31

UTTAR  
PRADESH

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# Answers & Solutions

for

## NTSE (Stage-I) 2019-20

### INSTRUCTIONS TO CANDIDATES

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

1. Use blue/black ballpoint pen only. There is no negative marking.
2. Part I : MAT : 1 - 100 questions  
Part II : SAT : 101 - 200 questions
3. This test booklet contains 200 questions of one mark each. All the questions are compulsory.
4. Answer each question by darkening the one correct alternative among the four choices on the OMR SHEET with blue/black ballpoint pen.

Example :

Q. No.	Alternatives
Correct way : 1	① ② ● ④
Q. No.	Alternatives
Wrong way : 1	⊗ ⊕ ⊖ ④

Student must darkening the right oval only after ensuring correct answer on OMR Sheet.

5. Students are not allowed to scratch / alter / change out an answer once marked on OMR Sheet, by using white fluid / eraser / blade / tearing / wearing or in any other form.
6. Separate sheet has been provided for rough work in this test booklet.
7. Please handover the OMR Sheet to the invigilator before leaving the Examination Hall.
8. Darken completely the ovals of your answer on OMR Sheet in the time limit allotted for that particular paper.
9. Your OMR Sheet will be evaluated through electronic scanning process. Incomplete and incorrect entries may render your OMR Sheet invalid.
10. Use of electronic gadgets, calculator, mobile etc, is strictly prohibited.

## PART-I : MENTAL ABILITY TEST (MAT)

**Direction-** In question no. 1 to 12 each question has four terms. Each terms are alike in some way. One term is different from these 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) R81 (2) L19  
(3) W25 (4) M16

**Answer (2)**

**Sol.** L19. ( $\because$  All have property Alphabet (Along with reverse position No.)<sup>2</sup>)

2. (1) CJM (2) PGW  
(3) RBT (4) SFH

**Answer (4)**

**Sol.** SFH

C	J	M	P	G	W	R	B	T	S	F	H
+7	+3	+7	+3	+7	+3	+13	+2				

3. (1) Z8R (2) Q13D  
(3) M22K (4) T14F

**Answer (3)**

**Sol.** M22K, Position of M-position of K  $\neq$  22

4. (1) BDG (2) HJM  
(3) QSV (4) KMH

**Answer (4)**

**Sol.** KMH, Other follows +2 then +3.

It doesn't follow

5. (1) Lion (2) Deer  
(3) Wolf (4) Fox

**Answer (2)**

**Sol.** Deer, Herbivorous rest are carnivores

6. (1) Labour (2) Doctor  
(3) Student (4) Tailor

**Answer (3)**

**Sol.** Student, Rest are paid jobs

7. (1) Deputy Chief Minister  
(2) Governor  
(3) Prime Minister  
(4) Chief Minister

**Answer (3)**

**Sol.** P.M, Deputy chief minister, chief minister, Governor belongs to state.

8. (1) Kanpur (2) Lucknow  
(3) Meerut (4) Mirzapur

**Answer (2)**

**Sol.** Lucknow, State capital (rest are city)

9. (1) 13, 7 (2) 24, 19  
(3) 36, 27 (4) 45, 29

**Answer (2 or 3)**

**Sol.** 24, 19, Rest are having property  $a \times b + (a + b)$

e.g 13, 7

$$7 = 1 \times 3 + (1 + 3)$$

Another option 3 may be also correct if choose coprime concept

10. (1) 1980 (2) 1924  
(3) 1946 (4) 1996

**Answer (3)**

**Sol.** 1946, Rest are leap year

11. (1) 133 (2) 147  
(3) 182 (4) 234

**Answer (4)**

**Sol.** Rest are divisible by 7

12. (1) 32.5 (2) 43.5  
(3) 58.5 (4) 73.5

**Answer (1)**

**Sol.** Twice of 32.5 is not divisible by 3

**Direction-** Question no. 13 to 24 are based on number/letter series. In each series missing term is indicated by Blank Space (-). Find out the missing term out of the four alternatives given below and write its alternative number against the correct question number on your answer sheet-

13. 1\_44\_6114\_661\_446\_

- (1) 61416 (2) 16416  
(3) 41416 (4) 64616

**Answer (2)**

**Sol.** 1\_144661144661\_14466\_

14. \_A\_CCA\_BC\_AABC\_

- (1) ABACC (2) ABACB  
(3) CABCA (4) AABCC

**Answer (1)**

**Sol.** AABCC / AABCC / AABCC

15. 3, 8, \_, 68, \_, 608, 1823  
 (1) 25, 199 (2) 29, 205  
 (3) 23, 203 (4) 24, 136

**Answer (3)**

**Sol.**  $3 \times 3 - 1 = 8, 8 \times 3 - 1 = 23, 68 \times 3 - 1 = 203$

16. 9, 64, \_, 216, 49, \_, 81  
 (1) 20, 72 (2) 25, 512  
 (3) 30, 64 (4) 32, 63

**Answer (2)**

**Sol.** 9 64 25 216 49 512 81  
 $3^2$   $4^3$   $5^2$   $6^3$   $7^2$   $8^3$   $9^2$

17.  $\frac{B}{5}, \frac{D}{12}, \frac{H}{24}, \frac{J}{13}, \frac{L}{36}, \frac{P}{48}$   
 (1)  $\frac{E}{15}, \frac{N}{18}$  (2)  $\frac{F}{18}, \frac{O}{16}$   
 (3)  $\frac{F}{9}, \frac{N}{17}$  (4)  $\frac{G}{9}, \frac{M}{17}$

**Answer (3)**

**Sol.** Alphabet increasing by +2, number having property +4 / +12 in alternate order

18. 121, 144, 169, 196, \_  
 (1) 223 (2) 225  
 (3) 227 (4) 229

**Answer (2)**

**Sol.** 121 144 169 196 225  
 $(11)^2$   $(12)^2$   $(13)^2$   $(14)^2$   $(15)^2$

19. 216, 343, 512, 729, \_, 1331  
 (1) 1000 (2) 894  
 (3) 819 (4) 1211

**Answer (1)**

**Sol.** 216 343 512 729 1000 1331  
 $(6)^3$   $(7)^3$   $(8)^3$   $(9)^3$   $(10)^3$   $(11)^3$

20. 78Z, 6C, 15E, \_, 30J, 26M  
 (1) 24H (2) 21G  
 (3) 18I (4) 16H

**Answer (4)**

**Sol.**  $Z+2 \rightarrow C$   $C+2 \rightarrow E$   $E+2 \rightarrow H$   $H+2 \rightarrow J$   
 $26 \times 3 = 78$   $3 \times 2 = 6$   $5 \times 3 = 15$   $8 \times 2 = 16$

21. F \_UR \_OU \_FO \_RF \_UR  
 (1) OFRUO (2) FUOOR  
 (3) FROUO (4) ROUFO

**Answer (1)**

**Sol.** FOURFOURFOURFOUR

22. 0, 2, 6, \_, 20, 30, \_  
 (1) 8 (2) 10  
 (3) 12 (4) 16

**Answer (3)**

**Sol.**  $\frac{0}{+2}$   $\frac{2}{+4}$   $\frac{6}{+6}$   $\frac{12}{+8}$   $\frac{20}{+10}$   $\frac{30}{+12}$

23. 9, 10, 8, 11, \_, 12, 6, \_, 5  
 (1) 7, 13 (2) 6, 13  
 (3) 7, 12 (4) 8, 12

**Answer (1)**

**Sol.**  $\frac{9}{+1}$   $\frac{10}{+1}$   $\frac{8}{+1}$   $\frac{11}{+1}$   $\frac{7}{+1}$   $\frac{12}{+1}$   $\frac{6}{+1}$   $\frac{13}{+1}$   $\frac{5}{+1}$

24. CD, XW, \_, VU, GH, \_, IJ, RQ  
 (1) FE, TS (2) DE, UT  
 (3) FG, ST (4) EF, TS

**Answer (4)**

**Sol.** C – X  
 D – W  
 E – V  
 F – U  
 G – T  
 H – S

25. In a certain code language if HUNDRED is written as NUHDDER, what will be code of KITCHEN in same language?

- (1) HENTIKC (2) TIKCNEH  
 (3) ITKHCNE (4) TKICNEH

**Answer (2)**

**Sol.**

H	U	N	D	R	E	D	K	I	T	C	H	E	N
<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>
N	U	H	D	D	E	R	T	I	K	C	N	E	H

26. In a certain code language if POSTMAN is written as OPRTLBM, what will be code of BROTHER in same language?

- (1) ARNTGDQ (2) CSNSIRE  
 (3) QAPTEIS (4) ASNTGFQ

**Answer (4)**

**Sol.**

P	O	S	T	M	A	N
↓ <sup>-1</sup>	↓ <sup>+1</sup>	↓ <sup>-1</sup>	↓	↓ <sup>-1</sup>	↓ <sup>+1</sup>	↓ <sup>-1</sup>
O	P	R	T	L	B	M
↓ <sup>-1</sup>	↓ <sup>+1</sup>	↓ <sup>-1</sup>	↓	↓ <sup>-1</sup>	↓ <sup>+1</sup>	↓ <sup>-1</sup>
A	S	N	T	G	F	Q

27. In a certain code language if BLOCK is written as 43, what will be code of HOUSE in same language?

- (1) 68 (2) 61  
(3) 67 (4) 63

**Answer (1)**

**Sol.** BLOCK  $\rightarrow 2+12+15+3+11=43$

HOUSE =  $8+15+21+19+5=68$

28. In a certain code language if BOUND is written as 112, what will be code of WHITE in same language?

- (1) 132 (2) 103  
(3) 130 (4) 123

**Answer (3)**

**Sol.** BOUND  $\rightarrow 2+15+21+14+4=112$

WHITE =  $23+8+9+20+5=130$

29. In a certain code language if ELEPHANT is written as LEPEAHTN, what will be code of QUESTION in same language?

- (1) UQSEITNO (2) SEUQNOTI  
(3) UQESTINO (4) EUQITSON

**Answer (1)**

**Sol.**

E	L	E	P	H	A	N	T
X	X	X	X	X	X	X	X
L	E	P	E	A	H	T	N
Q	U	E	S	T	I	O	N
X	X	X	X	X	X	X	X
U	Q	S	E	I	T	N	O

30. In a certain code language if DRIVER is written as RDERVI, what will be code of WINDOW in same language?

- (1) WIWOND (2) WIDNOW  
(3) WWOIDN (4) WOWDIN

**Answer (3)**

**Sol.**

D	R	I	V	E	R
X	X	X	X	X	X
R	D	E	R	V	I
W	I	N	D	O	W
X	X	X	X	X	X
W	W	O	I	D	N

31. In a certain code language if FROG is written as 2116, what will be code of NEST in same language?

- (1) 3262 (2) 3364  
(3) 3436 (4) 4363

**Answer (2)**

**Sol.** (Sum of position)<sup>2</sup> = 3364

32. In a certain code language if COVER is written as EMXCT, what will be code of BIRTH in same language?

- (1) DJTSJ (2) CGSSI  
(3) AGSQI (4) DGTRJ

**Answer (4)**

**Sol.** (C + 2 = E) (O - 2 = M) (V + 2 = X) (E - 2 = C) (R + 2 = T)

33. In a certain code language if XDRL is written as 12296, what will be code of NHTV in same language?

- (1) 72511 (2) 1481022  
(3) 741011 (4) 7856

**Answer (3)**

**Sol.**

Position of X	Position of D
2	2
Position of R	Position of L
2	2

34. In a certain code language if HOCKEY is written as YOKCEH, what will be code of PENCIL in same language?

- (1) LECNIP (2) LICNEP  
(3) NCEILP (4) LICNPE

**Answer (1)**

**Sol.** H  $\rightarrow$  H  
O  $\rightarrow$  O  
C  $\rightarrow$  C  
K  $\rightarrow$  K  
E  $\rightarrow$  E  
Y  $\rightarrow$  Y

35. In a certain code language if RUBBER is written as BERRUB, what will be code of BUTTER in same language?

- (1) TTBUR (2) TERBUT  
(3) TUTREB (4) UBTRE

**Answer (2)**

**Sol.** RUBBER = BERRUB BUTTER = TERBUT

36. In a certain code language if SHARP is written as 58034, what will be code of RASH in same language?

- (1) 3058 (2) 3045  
(3) 3854 (4) 5384

**Answer (1)**

**Sol.** From SHARP, R = 3, A = 0, S = 5 AND H = 4

**Direction-** In question no. 37 to 48 the equations have become wrong because of the wrong order of signs. Choose the correct order in signs from the four options given below so as to make the equations correct. Write the alternative number of the correct option on the answer sheet against the corresponding question number-

37.  $2 + 40 - 92 = 8 \times 20$

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

**Answer (1)**

**Sol.**  $2 \times 40 = 92 + 8 - 20$

38.  $34 - 6 = 18 \div 66 + 3$

- (1)  $= \div + -$                       (2)  $\div + - =$   
 (3)  $+ - = \div$                       (4)  $+ \div = -$

**Answer (3)**

**Sol.**  $34 + 6 - 18 = 66 \div 3$

39.  $2 - 21 \times 7 = 17 \div 11$

- (1)  $x - = \div$                       (2)  $x = - \div$   
 (3)  $= - x \div$                       (4)  $x \div = -$

**Answer (4)**

**Sol.**  $2 \times 21 \div 7 = 17 - 11$

40.  $7 \times 3 = 4 - 6 + 1$

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

**Answer (2)**

**Sol.**  $7 + 3 - 4 = 6 \times 1$

41.  $63 = 7 \div 44 + 6 - 41$

- (1)  $\div + = -$                       (2)  $= + \div -$   
 (3)  $\div - = +$                       (4)  $\div = + -$

**Answer (4)**

**Sol.**  $63 \div 7 = 44 + 6 - 41$

42.  $69 \times 25 = 10 + 6 - 9$

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

**Answer (1)**

**Sol.**  $69 - 25 + 10 = 6 \times 9$

43.  $41 - 32 + 10 = 9 + 54$

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

**Answer (2)**

**Sol.**  $41 + 32 - 10 = 9 + 54$

44.  $15 = 5 + 3 \div 17 \times 8$

- (1)  $x + = \div$                       (2)  $+ x \div =$   
 (3)  $x \div = +$                       (4)  $+ = \div x$

**Answer (3)**

**Sol.**  $15 \times 5 \div 3 = 17 + 8$

45.  $38 + 2 - 46 = 33 \times 3$

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

**Answer (3)**

**Sol.**  $38 \times 2 = 46 + 33 - 3$

46.  $15 = 7 \times 2 - 5 + 4$

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

**Answer (4)**

**Sol.**  $15 + 7 - 2 = 5 \times 4$

47.  $24 - 6 + 9 \div 2 = 7$

- (1)  $\div = + -$                       (2)  $+ = \div -$   
 (3)  $+ = - \div$                       (4)  $+ - = \div$

**Answer (1)**

**Sol.**  $24 \div 6 = 9 + 247$

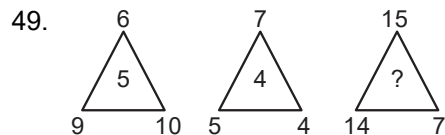
48.  $5 = 8 - 29 + 4 \times 15$

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

**Answer (3)**

**Sol.**  $5 \times 8 = 29 - 4 + 15$

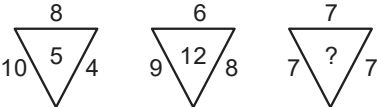
**Direction-** In question no. 49 to 58 numbers are placed in figure on the basis of some rules. One place is vacant which is indicated as (?). Find out the correct alternative for the vacant place and write its number against the proper question number on your answer sheet-



- (1) 3                                      (2) 6  
 (3) 8                                      (4) 10

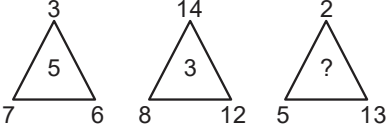
**Answer (2)**

**Sol.**  $\sqrt{(6 + 9 + 10)} \Rightarrow \sqrt{(\text{sum of digits})}$

50.   
 (1) 19 (2) 13  
 (3) 7 (4) 4

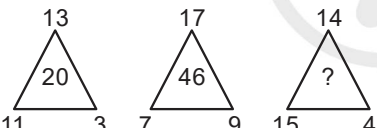
**Answer (3)**

**Sol.**  $\frac{10 \times 4}{8} = 5$

51.   
 (1) 4 (2) 6  
 (3) 8 (4) 10


**Answer (3)**

**Sol.**  $\frac{7 + 6 - 3}{2}$

52.   
 (1) 20 (2) 57  
 (3) 28 (4) 46

**Answer (4)**

**Sol.**  $(11 \times 3) - 13$

53.   
 (1) 49 (2) 64  
 (3) 89 (4) 120

**Answer (2)**

**Sol.**  $(1 \times 2 \times 3)^2$

54. 

9	8	73	6	4	26	7	3	?
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 (1) 25 (2) 52  
 (3) 21 (4) 12

**Answer (1)**

**Sol.** Product + difference

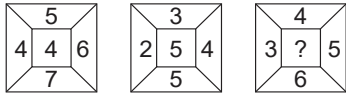
55. 

45	5	3	36	9	2	50	2	?
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 (1) 4 (2) 7  
 (3) 5 (4) 8

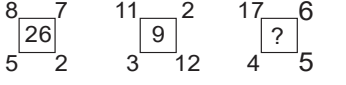
**Answer (3)**

**Sol.**  $\left(\frac{45}{5}\right)^2$

56.   
 (1) 6 (2) 7  
 (3) 8 (4) 9

**Answer (4)**

**Sol.** Sum of digit of  $(6 \times 7 - 5 \times 4) = 4$

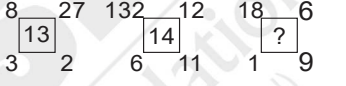
57.   
 (1) 18 (2) 28  
 (3) 38 (4) 48

**Answer (3)**

**Sol.**  $8 \times 5 - 7 \times 2 = 26$

$11 \times 3 - 2 \times 12 = 9$

$17 \times 4 - 6 \times 5 = 38$

58.   
 (1) 15 (2) 12  
 (3) 10 (4) 8

**Answer (4)**

**Sol.**  $\frac{8}{2} + \frac{27}{3} = 13$

$\frac{132}{11} + \frac{12}{6} + 14$

$\frac{18}{9} + \frac{6}{1} = 8$

**Direction-** Question 59 to 63 are based on the following information. Read carefully the information and find out the correct alternative for each question-  
*Ramesh likes to study Hindi, English and Maths.*  
*Suresh like to study Science, English and Hindi.*  
*Ahmad like to study English, Maths and Geography.*  
*Bobby likes to study Maths, Science and Hindi.*  
*Gopal like to study only Hindi.*

59. Which subject is liked by most of the boys

- (1) Science (2) English  
 (3) Hindi (4) Maths

**Answer (3)**

**Sol.**

Ramesh	Hindi	English	Math	Science	
Suresh	Hindi	English		Science	
Ahmad		English	Math		Goa
Babby	Hindi		Math	Science	
Gopal	Hindi				



60. How many boys like English?  
 (1) One (2) Two  
 (3) Three (4) Five

**Answer (3)**

61. How many boys like Science?  
 (1) One (2) Two  
 (3) Three (4) Five

**Answer (2)**


62. Which subject is liked by least of the boys?  
 (1) Geography (2) English  
 (3) Science (4) Maths

**Answer (1)**


63. How many boys like Maths?  
 (1) Four (2) Three  
 (3) Two (4) One

**Answer (2)**

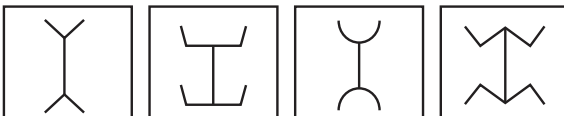
**Direction-** In question no. 64 to 68 each question has four terms. Three terms (figure) are alike in some way. One term (figure) is different from three others. Find out the correct term which is different from three others and write its alternative number on your answer sheet against the proper question number-

64.   
 (1) (2) (3) (4)

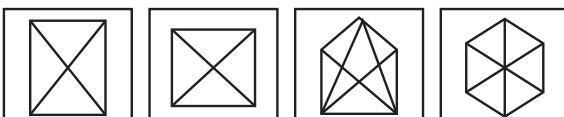
**Answer (4)**

65.   
 (1) (2) (3) (4)

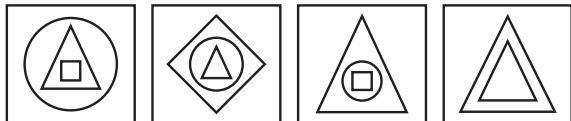
**Answer (4)**

66.   
 (1) (2) (3) (4)

**Answer (2)**

67.   
 (1) (2) (3) (4)

**Answer (3)**

68.   
 (1) (2) (3) (4)

**Answer (4)**

**Direction-** In question 69 to 84 there are four terms in each question. The relation that exist between the terms left to the symbol :: is the same between the terms right to the symbol ::. Out of the four terms one term is missing in each question. The missing term is one of the four alternatives given below each question. Find out the correct alternative and write its number on your answer sheet against the proper question -

69. RSTU : YXWV :: GHIJ : ?  
 (1) NMLK (2) MLKJ  
 (3) NLMK (4) MKJL

**Answer (1)**

**Sol.** RSTU VWXY –  
 Reversing the letter – YXWV  
 GHIJ KLMN  
 Reversing the letters – NMLK

70.  $\frac{16}{3} : 4096 :: \frac{22}{2} : ?$   
 (1) 448 (2) 484  
 (3) 243 (4) 231

**Answer (2)**

**Sol.**  $16^3 = 4096$   
 $22^2 = 484$

71. DGK : 462 :: NIF : ?  
 (1) 648 (2) 630  
 (3) 540 (4) 756

**Answer (4)**

**Sol.** DGK : 462  
 $4711, (\text{Sum of position of D.G.K}) = 4 \times 6 - 2$   
 $\text{NIF} (14 + 9 + 6) = 7 \times 5 - 6 = 29$

72. Cold : Hot :: Life : ?  
 (1) Age (2) Death  
 (3) Pleasure (4) Health

**Answer (2)**

**Sol.** Opposite of cold is hot opposite of life is death

73. Lock : Key :: Needle : ?  
 (1) Cloth (2) Iron  
 (3) Tailor (4) Thread

**Answer (4)**

**Sol.** Lock is related to key, Needle is related to thread.

74. Cricket : Run :: Hockey : ?

- (1) Field (2) Goal  
(3) Ball (4) Player

**Answer (2)**

**Sol.** Cricket is related to run Hockey is related to goal

75. MAN : REHTAF :: WOMAN : ?

- (1) RAHTOM (2) RETHAM  
(3) REHTAM (4) REHTOM

**Answer (4)**

**Sol.** Man- Father (Rearranging the letter REHTAF)

Women - Mother (Rearranging the letter REHTOM)

76. Ice : Water :: Water : ?

- (1) Steam (2) River  
(3) Rain (4) Sea

**Answer (1)**

**Sol.** Ice Heats to form Water, Water heats to form steam

77.  $\frac{2}{6} : 36 :: \frac{3}{2} : ?$

- (1) 9 (2) 8  
(3) 6 (4) 5

**Answer (2)**

**Sol.**  $\frac{2}{6} : 6^2 = 36, \frac{3}{2} : 2^3 = 8$

78. Brick : Soil :: Bread : ?

- (1) Fire (2) Cook  
(3) Wheat (4) Flour

**Answer (4)**

**Sol.** Brick is made of soil,  
Bread is made of flour.

79. 491 : 7 :: 534 : ?

- (1) 6 (2) 9  
(3) 5 (4) 8

**Answer (1)**

**Sol.**  $\frac{\text{Sum of digit}}{2}$

80.

**Answer (2)**

81.

**Answer (1)**

82.

**Answer (1)**

83.

**Answer (1)**

84.

**Answer (2)**

**Direction-** For question 85 to 95 four sets of circles has been given below. Three circles of sets have some relation with each other. Questions given below have three words each of which are also related to each other in some way. This relation between words to similar to that in one of the sets of circles. Find it out from the four options given below each question and write its serial number against corresponding question number on your answer sheet-

Set-1 Set-2 Set-3 Set-4



85. Hospital Doctor Nurse  
 (1) Set-4 (2) Set-1  
 (3) Set-2 (4) Set-3

**Answer (3)**

86. Advocate Female Male  
 (1) Set-4 (2) Set-1  
 (3) Set-3 (4) Set-2

**Answer (4)**

87. City Market Shop  
 (1) Set-1 (2) Set-4  
 (3) Set-3 (4) Set-2

**Answer (1)**

88. Minute Second Gram  
 (1) Set-1 (2) Set-2  
 (3) Set-3 (4) Set-4

**Answer (4)**

89. Cricket Hockey Football  
 (1) Set-2 (2) Set-3  
 (3) Set-1 (4) Set-4

**Answer (2)**

90. Furniture Chair Table  
 (1) Set-1 (2) Set-4  
 (3) Set-3 (4) Set-2

**Answer (4)**

91. Train Car Bicycle  
 (1) Set-1 (2) Set-2  
 (3) Set-3 (4) Set-4

**Answer (3)**

92. Garden Plant Leave  
 (1) Set-3 (2) Set-1  
 (3) Set-4 (4) Set-2

**Answer (2)**

93. Sky Stars Road  
 (1) Set-4 (2) Set-3  
 (3) Set-2 (4) Set-1

**Answer (1)**

94. River Fish Cat  
 (1) Set-3 (2) Set-4  
 (3) Set-1 (4) Set-2

**Answer (2)**

95. Pond Water Frog  
 (1) Set-3 (2) Set-2  
 (3) Set-1 (4) Set-4

**Answer (3)**

**Direction-** Question no. 96 to 100 are based on following statement. Read the statement carefully and find out correct alternative given for the question and write correct alternative number on your answer sheet against the corresponding question-

*Sam's age is one fourth of Ali's age. Sam is eleven years elder to Rahul but Deepak is five years younger to Rahul then-*

96. Who is eldest?  
 (1) Ali (2) Sam  
 (3) Deepak (4) Rahul

**Answer (1)**

**Sol.** Let som's Ali Rahul Deepak's age be S, A, R, D

$$\therefore \text{ATQ } S = \frac{A}{4} \dots(i)$$

$$S = 11 + R \dots(ii)$$

$$R - 5 = D \dots(iii)$$

Sequence of ages:  $A > S > R > D$

97. Who is youngest?  
 (1) Ali (2) Sam  
 (3) Deepak (4) Rahul

**Answer (3)**

98. If Deepak's age is nine years, what is the age of Ali?  
 (1) 85 yrs (2) 90 yrs  
 (3) 97 yrs (4) 100 yrs

**Answer (4)**

99. What is the difference between the age of Sam and Deepak?  
 (1) 16 yrs (2) 9 yrs  
 (3) 11 yrs (4) 5 yrs

**Answer (1)**

100. If Deepak's age is eight years, how many years is Ali elder to Deepak?  
 (1) 92 yrs (2) 88 yrs  
 (3) 80 yrs (4) 78 yrs

**Answer (2)**

## PART-II : SCHOLASTIC APTITUDE TEST (SAT)

101. Unit of momentum is

- (1) meter/second      (2) Newton x meter  
(3) kg-meter/second      (4)  $\text{kg}^{-1}$  meter second<sup>-1</sup>

**Answer (3)**

102. Which one of the following physical quantity is constant in simple harmonic motion?

- (1) Restoring force      (2) Kinetic energy  
(3) Potential energy      (4) Total energy

**Answer (4)**

103. A ray of light passes from glass ( $\mu = \frac{3}{2}$ ) to water

( $\mu = \frac{4}{3}$ ). The value of critical angle will be-

- (1)  $\sin^{-1}\left(\frac{1}{2}\right)$       (2)  $\sin^{-1}\left(\sqrt{\frac{8}{9}}\right)$   
(3)  $\sin^{-1}\left(\frac{8}{9}\right)$       (4)  $\sin^{-1}\left(\frac{5}{7}\right)$

**Answer (3)**

**Sol.** For critical angle

$$\sin \theta_c = \frac{\mu_{\text{rarer}}}{\mu_{\text{denser}}}$$

$$\sin \theta_c = \frac{\mu_{\text{water}}}{\mu_{\text{glass}}}$$

$$\sin \theta_c = \frac{\left(\frac{4}{3}\right)}{\left(\frac{3}{2}\right)}$$

$$\sin \theta_c = \frac{8}{9}$$

$$\theta_c = \sin^{-1}\left(\frac{8}{9}\right)$$

104. The value of acceleration due to gravity (g) on the earth will be maximum at-

- (1) Surface      (2) Poles  
(3) Equator      (4) Center

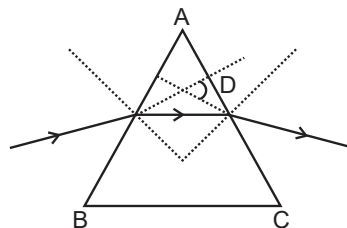
**Answer (2)**

105. Which one of the following is an example of Biomass Energy source.

- (1) Nuclear Energy      (2) Sun Energy  
(3) Gobar Gas      (4) Wind Energy

**Answer (3)**

106. The refraction of light by a prism is shown in the following figure. Then Angle  $\angle D$  is-



- (1) Angle of prism      (2) Angle of refraction  
(3) Angle of emergent      (4) Angle of deviation

**Answer (4)**

107. The unit of power of a lens is dioptre. Then one dioptre (1 dioptre) is equal to-

- (1)  $100 \text{ cm}^{-1}$       (2)  $1 \text{ meter}^{-1}$   
(3) 1 metre      (4) 100 cm

**Answer (2)**

108. If F be the focal length of a convex lens, then the nature of image of an object placed at a distance of  $2F$  will be-

- (1) Real, inverted and same size  
(2) Virtual, erect and small  
(3) Real, erect and same size  
(4) Virtual, inverted and same size

**Answer (1)**

109. The power of a plane mirror is-

- (1) Zero (0)      (2) +1  
(3) -1      (4) Infinity ( $\infty$ )

**Answer (1)**

110. The resistance of a wire is  $4\Omega$ . If length of wire is made double and area of cross section is made half, then the new resistance will be-

- (1)  $1\Omega$  (ohm)      (2)  $16\Omega$  (ohm)  
(3)  $4\Omega$  (ohm)      (4)  $12\Omega$  (ohm)

**Answer (2)**

**Sol.**  $R = \frac{\rho l}{A}$ ,

$$R' = \frac{\rho(2l)}{\left(\frac{A}{2}\right)} = 4 \frac{\rho l}{A}$$

$$R' = 4R$$

Given  $R = 4\Omega$

$$\therefore R' = 4 \times 4 = 16\Omega$$

111. Which one of the following alternating current is supplied in our house hold circuits-

- (1) 110 V and 50 Hz (2) 220 V and 60 Hz  
(3) 110 V and 60 Hz (4) 220 V and 50 Hz

**Answer (4)**

112. How much time will be taken by a 100 watt bulb to consume one unit of energy-

- (1) 1 hour (2) 10 hour  
(3) 100 hour (4) 1000 hour

**Answer (2)**

**Sol.**  $E = P \times t$

$$1 \text{ kwh} = 100 \times t$$

$$1000 \text{ wh} = 100t$$

$$t = \frac{1000}{100}$$

$$t = 10 \text{ hr}$$

113. Which one of the following is not a conventional source of energy-

- (1) Coal (2) Petroleum  
(3) Hydro (4) Solar energy

**Answer (4)**

114. Which of the following element is more electro positive?

- (1) Br (2) F  
(3) Cl (4) I

**Answer (4)**

**Sol.** Order of Electronegativity

$$F > Cl > Br > I$$

115. The name of metal which decomposes water in cold is:

- (1) Cu (2) Pt  
(3) Ag (4) Na

**Answer (4)**

**Sol.** Na is more reactive metal

116. On heating camphor in a porcelain dish it got mixed in air without melting. This phenomenon is known as:

- (1) Condensation (2) Sublimation  
(3) Suspension (4) Evaporation

**Answer (2)**

**Sol.** Sublimation

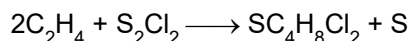


117. Ethylene and Sulphur monochloride on heating gives:

- (1) Chloroethane (2) Ethylene chloride  
(3) Mustard Gas (4) Ethylene glycol

**Answer (3)**

**Sol.** Mustard gas



(Mustard Gas)

118. The  $H^+$  ion concentration of a solution is  $2 \times 10^{-8}$  mol  $L^{-1}$ . The PH value of the solution is-

$$(\log_{10} 2 = 0.3010)$$

- (1) 7.699 (2) 7.599  
(3) 7.799 (4) 7.899

**Answer (1)**

**Sol.**  $[H^+] = 2 \times 10^{-8}$

$$-\log[H^+] = -\log(2 \times 10^{-8})$$

$$pH = 8 - \log(2)$$

$$pH = 8 - 0.301$$

$$pH = 7.699$$

119. Which of the following elements exhibit variable valency?

- (1) Normal element  
(2) Typical element  
(3) Transitional element  
(4) None of these

**Answer (3)**

**Sol.** Transitional Elements

Transitional elements exhibits variable valency

120. Which one is addition reaction:

- (1)  $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$   
(2)  $2KBr + Cl_2 \rightarrow 2KCl + Br_2$   
(3)  $2H_2 + O_2 \rightarrow 2H_2O$   
(4)  $2HgO \rightarrow 2Hg + O_2$

**Answer (3)**

**Sol.**  $2H_2 + O_2 \longrightarrow 2H_2O$

121. Which compound has both covalent as well as co-ordinate bond?

- (1)  $H_2S$  (2)  $CO_2$   
(3)  $H_2O$  (4)  $SO_2$

**Answer (4)**

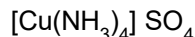
**Sol.**  $SO_2$

122. Complex salt is-

- (1) Zinc Sulphate
- (2) Sodium Hydrogen Sulphate
- (3) Iron Ammonium Sulphate
- (4) Tetraammine Copper (II) Sulphate

**Answer (4)**

**Sol.** Tetraammine Copper (II) Sulphate



123. Calamine is the ore of metal:

- (1) Copper
- (2) Aluminium
- (3) Zinc
- (4) Iron

**Answer (3)**

**Sol.** Zinc

Calamine is a ore of zinc ( $\text{ZnCO}_3$ )

124. Acid used in Lead Batteries is:

- (1) HCl
- (2)  $\text{H}_2\text{SO}_4$
- (3)  $\text{HNO}_3$
- (4)  $\text{H}_2\text{CO}_3$

**Answer (2)**

**Sol.**  $\text{H}_2\text{SO}_4$

Sulphuric acid is used in lead storage batteries

125. Which type of ores are concentrated by Froth floatation process:

- (1) Oxide ores
- (2) Sulphide ores
- (3) Carbonate ores
- (4) Nitrate ores

**Answer (2)**

**Sol.** Sulphide ores form froth in froth floatation process

126. Which of the following is amphoteric oxide:

- (1)  $\text{Na}_2\text{O}$
- (2)  $\text{SO}_2$
- (3)  $\text{Al}_2\text{O}_3$
- (4)  $\text{CaO}$

**Answer (3)**

**Sol.**  $\text{Al}_2\text{O}_3$

$\text{Al}_2\text{O}_3$  is amphoteric oxide that can behave as acidic as well as basic oxide.

127. In human body temperature control centre is-

- (1) Epithalamus
- (2) Hypothalamus
- (3) Thalamus
- (4) Medula oblongata

**Answer (2)**

**Sol.** Hypothalamus

128. Which factor is responsible for Green House Effect-

- (1)  $\text{H}_2\text{O}$
- (2)  $\text{CO}$
- (3)  $\text{SO}_2$
- (4)  $\text{CO}_2$

**Answer (4)**

**Sol.**  $\text{CO}_2$

129. Which one of the following element is essential for synthesis of Thyroxin Hormones-

- (1) Zinc
- (2) Iodine
- (3) Boron
- (4) Nitrogen

**Answer (2)**

130. Smallest unit of classification is-

- (1) Species
- (2) Class
- (3) Order
- (4) Kingdom

**Answer (1)**

**Sol.** Species

131. Which of the following is not a part of the female reproductive system in human beings-

- (1) Ovary
- (2) Uterus
- (3) Fallopian tube
- (4) Vas deferens

**Answer (4)**

**Sol.** Vas deferens

132. Most powerful digestive enzyme occurs in which cell organelles-

- (1) Mitochondria
- (2) Chloroplast
- (3) Golgibody
- (4) Lysosome

**Answer (4)**

**Sol.** Lysosome

133. Causative agent of Kala azar (Black fever) is:

- (1) Bacteria
- (2) Virus
- (3) Protozoan
- (4) Fungi

**Answer (3)**

**Sol.** Protozoan

134. Unisexual flowers occur in which of the following plants-

- (1) Mustard
- (2) Tomato
- (3) Pea
- (4) Watermelon

**Answer (4)**

**Sol.** Watermelon

135. Biotic components of ecosystem are-

- (1) Producers
- (2) Consumers
- (3) Decomposers
- (4) All of above

**Answer (4)**

**Sol.** All of the above

136. Which one of the following substance is changed into amino acid after digestion-

- (1) Protein                      (2) Carbohydrate  
(3) Fat                            (4) Nucleic acid

**Answer (1)**

**Sol.** Protein

137. Source of Penicillin antibiotic is-

- (1) Bacteria                      (2) Fungi  
(3) Virus                            (4) Algae

**Answer (2)**

**Sol.** Fungi

138. Testosterone Hormone is produced in-

- (1) Leyding cell                (2) Kupffer cell  
(3) Granulosa cell            (4) None of above

**Answer (1)**

**Sol.** Leyding Cell

139. Number of sex chromosomes in human beings are-

- (1) 23                                (2) 46  
(3) 1                                  (4) 2

**Answer (4)**

**Sol.** 2

140. Which of the following is known as the 'suicide bag' of the cell?

- (1) Plastid                        (2) Mitochondria  
(3) Ribosome                    (4) Lysosome

**Answer (4)**

**Sol.** Lysosome

141. The Harappan Civilization was discovered in the year

- (1) 1910                            (2) 1921  
(3) 1935                            (4) 1942

**Answer (2)**

**Sol.** 1921

142. The First Literary Source is -

- (1) Rigveda                        (2) Samveda  
(3) Yajurveda                    (4) Atharvaveda

**Answer (1)**

**Sol.** Rigveda

143. During whose reign Megasthenes visited to India?

- (1) Ashoka  
(2) Harsh Vardhan  
(3) Chandragupta Maurya  
(4) Kumar Gupta

**Answer (3)**

**Sol.** Chandragupta Maurya

144. Which dynasty was ruling over North India at the time of Alexander's invasion?

- (1) Nanda                            (2) Maurya  
(3) Shunga                        (4) Kanva

**Answer (1)**

**Sol.** Nanda

145. The Name of Shershah in childhood was-

- (1) Hasan                            (2) Farid  
(3) Sher Khan                    (4) None of the above

**Answer (2)**

**Sol.** Farid

146. Which sultan of Delhi has also been called 'A mixture of opposites'?

- (1) Balban  
(2) Alauddin Khilji  
(3) Muhammad Tughlaq  
(4) Ibrahim Lodi

**Answer (3)**

**Sol.** Muhammad Tughlaq

147. The Emperor was called 'Kalandar'-

- (1) Babar                            (2) Humayun  
(3) Akbar                            (4) Shahjahan

**Answer (1)**

**Sol.** Babar

148. Famous 'Peacock Throne' was taken away out of India by-

- (1) Ahmad Shah Abdali  
(2) Taimur  
(3) Dalhousie  
(4) Nadir Shah

**Answer (4)**

**Sol.** Nadir Shah

149. 'Subsidiary Alliance' was implemented during period of-

- (1) Lord Cornwallis            (2) Lord Wellesley  
(3) Sir John Shore            (4) Lord Auckland

**Answer (2)**

**Sol.** Lord Wellesley

150. Which one of the following writings is Not related to Mahatma Gandhi-

- (1) My Experiments with truth  
(2) Harijan  
(3) Das Capital  
(4) Hind Swaraj

**Answer (3)**

**Sol.** Das Capital



151. Name the founder of 'Gadar Party' -

- (1) Lala Hardayal
- (2) Subhash Chandra Bose
- (3) Madam Cama
- (4) Madan Lal Dhingra

**Answer (1)**

**Sol.** Lal Hardayal

152. Who Among the following was not known as Moderate in the Indian National Movement?

- (1) Bal Gangadhar Tilak
- (2) Dadabhai Naoroji
- (3) M.G. Ranade
- (4) Gopal Krishna Gokhale

**Answer (1)**

**Sol.** Bal Gangadhar Tilak

153. The Himalayan mountain range is an example of

- (1) Block mountain
- (2) Folding mountain
- (3) Volcanic mountain
- (4) Residual mountain

**Answer (2)**

**Sol.** Folding mountain

154. The forest of Ganga-Brahmputra-delta is known as

- (1) Evergreen Forest
- (2) Monsoon Forest
- (3) Sundar Ban
- (4) Deciduous Forest

**Answer (3)**

**Sol.** Sundar Ban

155. How many districts are in Uttar Pradesh?

- (1) 70
- (2) 75
- (3) 80
- (4) 85

**Answer (2)**

**Sol.** 75

156. In which continent the Sahara desert is situated-

- (1) South America
- (2) Africa
- (3) Asia
- (4) North America

**Answer (2)**

**Sol.** Africa

157. The Blue Revolution is related with

- (1) Food Grain Production
- (2) Fish Production
- (3) Milk Production
- (4) Oil seed Production

**Answer (2)**

**Sol.** Fish production

158. The Oil and Natural Gas Commission (ONGC) was set up in

- (1) 1956
- (2) 1957
- (3) 1959
- (4) 1961

**Answer (1)**

**Sol.** 1956

159. What is the name of Mid Latitude grass land in South America?

- (1) Prairie
- (2) Pampas
- (3) Veld
- (4) Steppes

**Answer (2)**

**Sol.** Pampas

160. Where Thar Desert is located?

- (1) Pakistan
- (2) China
- (3) India
- (4) United State of America

**Answer (3)**

**Sol.** India

161. Where Gobind Sagar reservoir is situated?

- (1) Uttar Pradesh
- (2) Haryana
- (3) Himachal Pradesh
- (4) Punjab

**Answer (3)**

**Sol.** Himachal Pradesh

162. When Tourism day is celebrated?

- (1) 5 January
- (2) 10 December
- (3) 5 June
- (4) 27 September

**Answer (4)**

**Sol.** 27 September

163. According to census 2011 the population of U.P. is

- (1) 18.88 Crores
- (2) 19.98 Crores
- (3) 24.70 Crores
- (4) 30.00 Crores

**Answer (2)**

**Sol.** 19.98 Crores

164. I.M.F was established by the recommendations of which committee?

- (1) Bretton woods committee
- (2) Goswami committee
- (3) Narsingham committee
- (4) None of them

**Answer (1)**

**Sol.** Bretton woods committee



165. In which year India devalued its currency for the first time?

- (1) 1949                      (2) 1966  
 (3) 1991                      (4) None of them

**Answer (2)**

**Sol.** 1966

166. The least Population State in India is

- (1) Sikkim                      (2) Mizoram  
 (3) Uttar Pradesh              (4) Bihar

**Answer (1)**

**Sol.** Sikkim

167. Where is situated the Headquarters of World Bank?

- (1) Texas                      (2) Canada  
 (3) Washington              (4) Geneva

**Answer (3)**

**Sol.** Washington

168. Who has first developed the theory of Rent?

- (1) Recardo                      (2) Adam Smith  
 (3) Marshall                      (4) None of them

**Answer (1)**

**Sol.** Recardo

169. Which Canal is largest in the world?

- (1) Panama Canal              (2) Ram Ganga Canal  
 (3) Kra Canal                      (4) Suez Canal

**Answer (4)**

**Sol.** Suez Canal

170. 'Chipko Movement' was basically against

- (1) Water Pollution              (2) Noise Pollution  
 (3) Soil Pollution              (4) Deforestation

**Answer (4)**

**Sol.** Deforestation

171. The President's Rule in a state means that the state is ruled by-

- (1) The President  
 (2) The Chief Minister  
 (3) The Governor of the State  
 (4) The Prime Minister

**Answer (3)**

**Sol.** The Governor of the State

172. In which year "The Right to Information Act" was passed

- (1) 2001                      (2) 2003  
 (3) 2005                      (4) 2007

**Answer (3)**

**Sol.** 2005

173. The Constitution of India primarily did not include in its preamble

- (1) Sovereign                      (2) Socialist  
 (3) Democratic                      (4) Republic

**Answer (2)**

**Sol.** Socialist

174. Article-370 was associated with

- (1) Uttar Pradesh              (2) Nagaland  
 (3) Jammu & Kashmir              (4) Telangana

**Answer (3)**

**Sol.** Jammu & Kashmir

175. Who presided over the first meeting of the Indian Constituent Assembly?

- (1) Sachchidanand Sinha  
 (2) Dr. Rajendra Prasad  
 (3) Dr. B.R. Ambedkar  
 (4) H.V. Kamath

**Answer (1)**

**Sol.** Sachchidanand Sinha

176. Who appoints the Chairman of Union Public Service Commission?

- (1) President  
 (2) Prime Minister  
 (3) Chief Justice of India  
 (4) Vice President

**Answer (1)**

**Sol.** President

177. Which of the following appointment is not made by the President of India?

- (1) Speaker of the Lok Sabha  
 (2) Chief Justice of India  
 (3) Chief of Army  
 (4) Prime Minister

**Answer (1)**

**Sol.** Speaker of the Lok Sabha

178. The first female speaker of Lok Sabha is

- (1) Vijay Laxmi Pandit
- (2) Sucheta Kriplani
- (3) Tarkeshwari Sinha
- (4) Meira Kumar

**Answer (4)**

**Sol.** Meira Kumar

179. The state in which Panchayati Raj was introduced first-

- (1) Uttar Pradesh      (2) Bihar
- (3) Rajasthan          (4) Gujrat

**Answer (3)**

**Sol.** Rajasthan

180. Who was the first Muslim President in India?

- (1) Fakhruddin Ali Ahmed
- (2) Dr. Zakir Hussain
- (3) Salman Khursheed
- (4) Dr. Abdul Kalam Azad

**Answer (2)**

**Sol.** Dr. Zakir Hussain

181. Which of the following statement is true?

- (1)  $\left(\frac{1}{2}\right)^{\frac{1}{2}} = \left(\frac{1}{3}\right)^{\frac{1}{3}}$
- (2)  $\left(\frac{1}{2}\right)^{\frac{1}{2}} < \left(\frac{1}{3}\right)^{\frac{1}{3}}$
- (3)  $\left(\frac{1}{2}\right)^{\frac{1}{2}} > \left(\frac{1}{3}\right)^{\frac{1}{3}}$
- (4)  $\left(\frac{1}{2}\right)^{\frac{1}{2}}$  and  $\left(\frac{1}{3}\right)^{\frac{1}{3}}$  are rational numbers

**Answer (3)**

**Sol.**  $\left(\frac{1}{2}\right)^{\frac{3}{6}}, \left(\frac{1}{3}\right)^{\frac{2}{6}}, \left(\frac{1}{8}\right)^{\frac{1}{6}} > \left(\frac{1}{9}\right)^{\frac{1}{6}}$

182. The mean of 15 observations written in some order is 50. If the mean of first eight observations and last eight observations are 48 and 53 respectively then the eighth observation is

- (1) 35                      (2) 80
- (3) 72                      (4) 58

**Answer (4)**

**Sol.**  $x_1 + x_2 + x_3 + x_4 + \dots + x_8 = 384$

$$x_8 + x_9 + x_{10} + \dots + x_{15} = 424$$

$$x_1 + x_2 + x_3 + \dots + x_{15} = 750$$

$$x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + \dots + x_{15} = 750$$

$$384 - x_8 + 424 = 750$$

Eight observation is 58

183. The point on the y-axis, which is equidistant from points A(6,5) and B(-4,3) is

- (1) (9, 0)                      (2) (0, 9)
- (3) (0, 4)                      (4) (0, 3)

**Answer (2)**

**Sol.**  $\sqrt{36+16} = \sqrt{16+36}$

184. If,  $(\sec\theta - \tan\theta) = k$ , where  $k \neq 0$  then the value of  $(\sec\theta + \tan\theta)$  is-

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

**Answer (4)**

185. The value of k for which the system of linear equation  $x+2y=5$  and  $3x+ky = 15$  has no solution, is:

- (1) 6                              (2) -6
- (3)  $\frac{3}{2}$                               (4)  $\frac{2}{3}$

**Answer**

**Sol.**  $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

$$\frac{1}{3} = \frac{2}{K} \neq \frac{1}{3}$$

186. If  $x=1$  is a common root of the equations  $ax^2+ax+3=0$  and  $x^2+x+b=0$  then the value of ab is:

- (1) 3                              (2) 3.5
- (3) 6                              (4) -3

**Answer (1)**

**Sol.**  $a + a + 3 = 0$

$$2a = -3$$

$$a = -\frac{3}{2}$$

$$1 + 1 + b = 0$$

$$b = -2$$

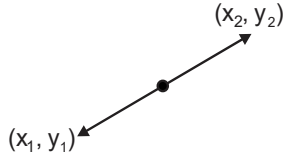
$$ab = -\frac{3}{2}(-2) = 3$$

187. If points  $(a, 0)$ ,  $(0, b)$  and  $(1, 1)$  are collinear, then the value of  $\left(\frac{1}{a} + \frac{1}{b}\right)$  is:

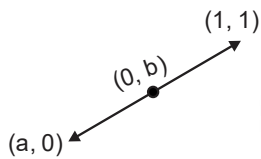
- (1) 1                                      (2) 2  
(3) 0                                      (4) -1

**Answer (1)**

**Sol.**



$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$



$$\frac{b - 0}{0 - a} = \frac{1 - b}{1}$$

$$b = ab - a$$

$$a + b = ab$$

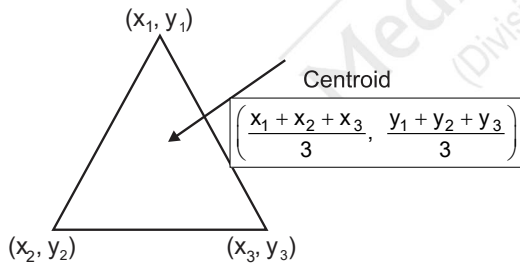
$$\frac{a}{ab} + \frac{b}{ab} = 1, \frac{1}{b} + \frac{1}{a} = 1$$

188. If the centroid of the triangle formed by points  $(a, b)$ ,  $(b, c)$  and  $(c, a)$  is at the origin, then  $a^3 + b^3 + c^3$  is equal to:

- (1)  $abc$                                       (2) 0  
(3)  $a+b+c$                                       (4)  $3abc$

**Answer (4)**

**Sol.**



$$a + b + c = 0$$

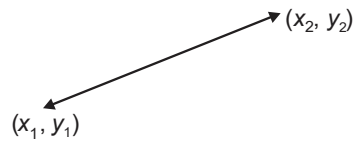
$$\therefore a^3 + b^3 + c^3 = 3abc$$

189. The distance between the point  $(\cos\theta, \sin\theta)$  and  $(\sin\theta, -\cos\theta)$  is:

- (1)  $\sqrt{3}$                                       (2)  $\sqrt{2}$   
(3) 2    (4) 1

**Answer (2)**

**Sol.**



$$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(\sin\theta - \cos\theta)^2 + (-\cos\theta - \sin\theta)^2}$$

$$= \sqrt{(\sin\theta - \cos\theta)^2 + (\sin\theta + \cos\theta)^2}$$

$$= \sqrt{2}$$

190. If 35% of income of A is equal to 25% of income of B then the ratio of incomes of A and B is:

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

**Answer (2)**

**Sol.** 35% of A = 25% of B

$$\frac{35}{100} \times A = \frac{25}{100} \times B$$

$$\frac{7}{20} A = \frac{B}{4}$$

$$\frac{A}{B} = \frac{20}{4 \times 7}$$

$$A : B = 20 : 28 = 5 : 7$$

191. If the ratio of volumes of two cubes is 27 : 64 then the ratio of their surface area is:

- (1) 3 : 4  
(2) 4 : 3  
(3) 9 : 16  
(4) 16 : 9

**Answer (3)**

$$\text{Sol. } \frac{a_1^3}{a_2^3} = \frac{27}{64}$$

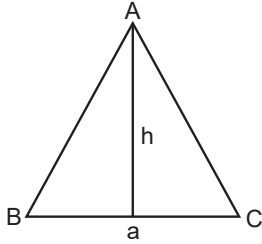
$$\frac{a_1}{a_2} = \frac{3}{4}, \frac{S_1}{S_2} = \frac{6a_1^2}{6a_2^2} = \frac{9}{16}$$

192. If the base of a triangle is decreased by 30% and its height is increased by 25% then the percentage decrease in area of triangle is:

- (1) 20%                      (2) 15%  
(3) 22.5%                  (4) 12.5%

**Answer (4)**

**Sol.**



$$\Delta = \frac{1}{2} ah$$

$$a' = a - \frac{3a}{10} = \frac{7a}{10}$$

$$h' = h + \frac{h}{4} = \frac{5h}{4}$$

$$\Delta' = \frac{1}{2} \times \frac{7a}{10} \times \frac{5h}{4}$$

$$\Delta' = \frac{35}{80} ab = \frac{35}{40} \Delta = 12.5$$

193. The equation of the base of an equilateral triangle is  $x+y-2=0$ . If one of its vertex is  $(2, -1)$  then area of triangle is

- (1)  $\frac{1}{2\sqrt{3}}$  sq. unit      (2)  $\frac{\sqrt{3}}{12}$  sq. unit  
(3)  $\frac{2}{3}$  sq. unit            (4)  $\frac{3\sqrt{3}}{4}$  sq. unit

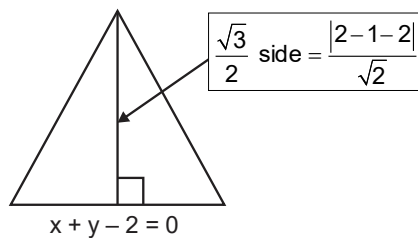
**Answer (1)**

**Sol.** Distance of line

$$ax + by + c = 0$$

From  $(x_1, y_1)$

$$d = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}}$$



$$\frac{\sqrt{3}}{2} \text{ side} = \frac{1}{\sqrt{2}}, \text{ side} = \frac{2}{\sqrt{2} \times \sqrt{3}} = \frac{\sqrt{2}}{\sqrt{3}}$$

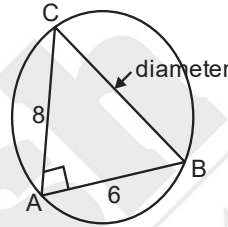
$$\text{Area} = \frac{\sqrt{3}}{4} \times (\text{side})^2, \frac{\sqrt{3}}{4} \times \frac{2}{3} = \frac{\sqrt{3}}{2 \times \sqrt{3} \times \sqrt{3}} = \frac{1}{2\sqrt{3}}$$

194. The lengths of chords AB and AC of a circle are 6 cm and 8 cm respectively. If  $\angle BAC=90^\circ$  then the radius of the circle is:

- (1) 2.5 cm                      (2) 3 cm  
(3) 4 cm                        (4) 5 cm

**Answer (4)**

**Sol.**



$$\text{Diameter} = \sqrt{8^2 + 6^2} = 10$$

$$\text{Radius} = 5$$

195. If  $\cos 43^\circ = \frac{x}{\sqrt{x^2 + y^2}}$ , then the value of  $\tan 47^\circ$  is

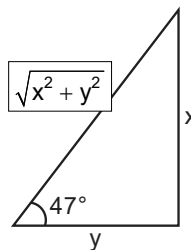
- (1)  $\frac{y}{x}$                               (2)  $\frac{y}{\sqrt{x^2 + y^2}}$   
(3)  $\frac{x}{y}$                               (4)  $\frac{x}{\sqrt{x^2 + y^2}}$

**Answer (3)**

$$\text{Sol. } \cos 43^\circ = \frac{x}{\sqrt{x^2 + y^2}}$$

$$\sin(90^\circ - 43^\circ) = \frac{x}{\sqrt{x^2 + y^2}}$$

$$\sin 47^\circ = \frac{x}{\sqrt{x^2 + y^2}}$$



$$\tan 47^\circ = \frac{x}{y}$$

196. If the quadratic equations  $2x^2+4x+(a+5)=0$  have equal roots and  $(a+4)x^2+ax-3b=0$  have distinct real roots then which of the following is true:

- (1)  $a = -3, b < \frac{3}{4}$       (2)  $a = 3, b > \frac{3}{4}$   
 (3)  $a = -3, b > \frac{3}{4}$       (4)  $a = 3, b < \frac{3}{4}$

**Answer**

**Sol.** (i) Deleted, No option is match

$$D = 0$$

$$16 - 8(a + 5) = 0$$

$$a + 5 = 2$$

$$a = -3$$

(ii)  $D > 0$

$$a^2 + 12b(a + 4) > 0$$

$$a + 12b > 0$$

$$b > -\frac{9}{12}$$

$$b > -\frac{3}{4}$$

197. The value of  $\tan 1^\circ \tan 2^\circ \dots \dots \tan 89^\circ$  is

- (1) 0      (2) 1  
 (3)  $\frac{1}{\sqrt{3}}$       (4) Not defined

**Answer (2)**

**Sol.**  $\tan \theta \tan (90 - \theta) = 1$

198. The digit at the unit place in  $(3157)^{2020}$  is

- (1) 1      (2) 3  
 (3) 7      (4) 9

**Answer (1)**

**Sol.** Unit digit = 1

199. A metallic cuboid of dimension  $9\text{cm} \times 11\text{cm} \times 12\text{cm}$  is melted and recasted into spherical balls of diameter 0.3 cm. The number of balls will be

- (1) 84000      (2) 10500  
 (3) 78000      (4) 86000

**Answer (1)**

**Sol.**  $V_1 = 9 \times 11 \times 12, V_2 = \frac{4}{3} \pi (0.3/2)^3 = \frac{4\pi(0.3)^3}{3 \times 8}$

$$= \frac{\pi(0.3)^3}{6}$$

$$\text{No. of ball} = \frac{V_1}{V_2}$$

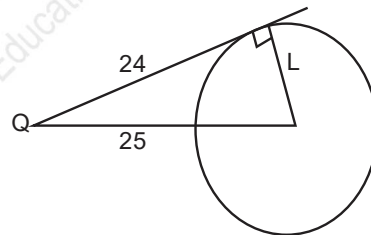
$$= \frac{7128}{\frac{22}{7} \times 0.027} = \frac{7128}{0.085} = \frac{7128000}{85} = 84000$$

200. The length of tangent drawn from a point Q to a circle is 24 cm and distance from Q from the centre of circle is 25 cm. The radius of circle is

- (1) 7 cm      (2) 12 cm  
 (3) 15 cm      (4) 24.5 cm

**Answer (1)**

**Sol.**



$$L = \sqrt{25^2 - 24^2}$$

$$= \sqrt{25 + 24}$$

$$= \sqrt{49} = 7\text{cm}$$

