

PRELIMINARY INTERVIEW BOARD
TERRITORIAL ARMY COMMISSION : JULY 2017
PAPER: 1 REASONING & ELEMENTARY MATHEMATICS



Max Marks : 100

Max Time : 2 Hours
Roll No _____

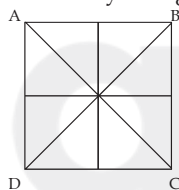
(Please read the instructions carefully)

INSTRUCTIONS

- 1. Paper 1 has two parts- Part I and Part II.
 - (a) Part I - Reasoning (50 Marks).
 - (b) Part II - Elementary Mathematics (50 Marks).
- 2. Each section carries 50 objectives type of questions.
- 3. There will be four possible answers to every question. Candidates are required to fill correct answer in the OMR sheet with Black ball pen only.
- 4. For each correct answer, 1 mark will be granted and 0.5 mark will be deducted for every wrong answer.
- 5. If a candidate gives more than one answer, it will be treated as a wrong answer and half mark will be deducted. There will be no penalty for questions left unanswered.
- 6. Candidates should not mark in the question paper. They can use blank pages provided in the question paper for rough work.
- 7. To be eligible to qualify, candidate must obtain minimum 40% marks each in section I & II separately and a minimum of 50% aggregate in total.

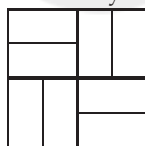
PART - I REASONING

Q 1. How many triangles are there in the given figure?



- (a) 16 (b) 14 (c) 8 (d) 12

Q 2. How many rectangles are there in the given figure?



- (a) 24 (b) 16 (c) 21 (d) 14

Q 3. In a row of girls, Kamla is 9th from the left and Veena is 16th from the right. If they interchange their positions, Kamla becomes 25th from the left. How many girls are there in the row?

- (a) 34 (b) 40 (c) 36 (d) 41

Q 4. Five students are standing one behind the other in the play ground facing the instructor. Malini is behind Anjana, but in front of Gayatri. Meena is in front of Sheena, but behind Gayatri. What is the position of Meena?

- (a) **Second from Last** (b) Extreme First (c) Extreme Last (d) Second from first

Q 5. Sita is elder than Swapna. Lavanya is elder than Swapna but younger than Sita. Suvarna is younger than both Hari and Swapna. Swapna is elder than Hari. Who is the youngest?

- (a) Sita (b) Lavanya (c) **Suvarna** (d) Hari

Q 6. C is A's father's nephew. D is A's Cousin but not brother of C. How is D related to C?

- (a) Father (b) **Sister** (c) Mother (d) Aunt

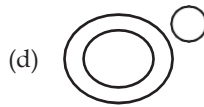
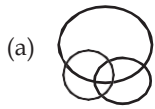
Q 7. Deepak said to Nitin, "That Boy playing football is the younger of the two brothers of the daughter of my father's wife" How is the boy playing football related to Deepak?

- (a) Son (b) Nephew (c) **Brother** (d) Cousin

Q 8. Which diagram depicts relationship between Nitrogen, Ice, Air?

- (a)  (b)  (c)  (d) 
- 1

Q 9. Which diagram depicts relationship between Bus, Car, Vehicle?



Q 10. If CUSTOM is written as UCTSMO then how PARENT will be written in the same code?

- (a) ERAPTN (b) TNERAP (c) RAPTNE (d) **APERTN**

Q 11. If CAT is coded as 3120, what code number can be given to NAVIN?

- (a) **14122914** (b) 49274654 (c) 73957614 (d) 43245654

Q 12. If in a certain code EDITION is written as 3891965, then how TIDE will be written in that code?

- (a) 3819 (b) **1983** (c) 1839 (d) 1586

Q 13. If FADE is coded as 3854 then how can GAGE be coded?

- (a) 1824 (b) 2834 (c) **2824** (d) 2814

Directions: In each of the following questions, four words are given, out of which three are alike in some manner and the fourth one is different. Choose the odd one.

Q 14. (a) Wood (b) Cork (c) **Stone** (d) Paper

Q 15. (a) Commander (b) Commodore (c) Admiral (d) **Brigadier**

Directions: In each of the following questions, certain pairs of words are given, out of which the words in all pairs except one, bear a certain common relationship. Choose the pair in which the words are differently related

Q 16. (a) Steel : Utensils (b) Bronze : Statue (c) Duralumin : Aircraft (d) **Iron : Rails**

Q 17. (a) **Tongue : Taste** (b) Eye : Blind (c) Ear : Deaf (d) Leg : Lame

Directions: In each of the following questions, four numbers are given, out of which three are alike in some manner while the fourth one is different. Choose the one different from the rest.

Q 18. (a) 25631 (b) **33442** (c) 34424 (d) 52163

Q 19. (a) 2468 (b) **2648** (c) 4826 (d) 6482

Q 20. (a) 3:12 (b) 4:20 (c) 6:42 (d) **7:63**

Directions: In each of the following questions, a number series is given with one term missing. Choosing the correct alternative that will continue the same pattern.

Q 21. 3, 20, 63, 144, 275, ____
(a) 554 (b) 548 (c) **468** (d) 354

Q 22. 8, 12, 18, 27, ____
(a) 36 (b) 44 (c) $37\frac{1}{2}$ (d) $40\frac{1}{2}$

Q 23. 8, 29, 113, 449, ____
(a) 673 (b) 984 (c) 1484 (d) **1793**

Q 24. $\frac{2}{3}, \frac{4}{7}, ?, \frac{11}{21}, \frac{16}{31}$
(a) $\frac{5}{9}$ (b) $\frac{6}{11}$ (c) $\frac{7}{13}$ (d) $\frac{9}{11}$

Directions: In each of the following questions, various terms of an alphabet series are given with one missing term as shown by (?) choose the missing term out of the given alternatives.

Q 25. N5V, K7T, ?, E14P, B19N
(a) H9R (b) H10Q (c) **H10R** (d) I10R

Q 26. J2Z, K4X, I7V, ?, H16R, M22P
(a) I11T (b) L11S (c) L12T (d) **L11T**

Q 27. C4X, F9U, I16R, ?
(a) K25P (b) L259 (c) **L25O** (d) L27P

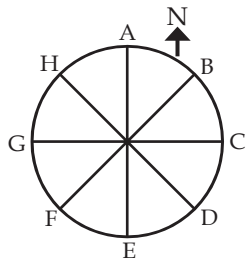
Directions: In each of the following questions, various terms of an alphabet series are given with one missing term as shown by (?) - choose the missing term out of the given alternatives.

Q 28. AB, DEF, HIJK, ?, STUVWX
(a) LMNO (b) LMNOP (c) **MNOPQ** (d) QRSTU

Q 29. AYBZC, DWEXF, GUHVI, JSKTL, ?
(a) MQORN (b) **MQNRO** (c) NQMOR (d) QMONR

- Q 30. I am facing in Southern Direction I turn Right and walk 20 m. Then I turn right and walk 10 m. Then again I turn left and walk 10 m. Then again I turn right and walk 20 m. Once again I turn right and walk 60 m. In which direction I am from (starting) Initial point?
 (a) North (b) North West (c) East (d) **North East**

- Q 31. Eight people A, B, C, D, E, F, G and H placed as shown in the diagram. All are facing in the outward direction. If all of them move anticlockwise to three place then.



- (a) **B is facing West** (b) E is facing East (c) H is facing North West (d) A is facing South

- Q 32. On what dates of March, 2013 did Wednesdays fall?

- (a) **6, 13, 20, 27** (b) 5, 12, 19, 26 (c) 4, 11, 18, 25 (d) 7, 14, 21, 28

- Q 33. A watch which gains uniformly is 4 minute slow at 9 A.M. on Sunday, and is 4 minutes 15 sec. fast at 9 P.M. on next Friday. When was it correct?

- (a) 2 A.M. Thursday (b) 6 P.M. Wednesday (c) **1 A.M. Wednesday** (d) 6 P.M.

- Q 34. The minute hand of a clock overtakes the hour hand at interval of 64 minutes of correct time. How much a day does the clock gain or lose?

- (a) $43\frac{9}{11}$ minutes loss (b) $32\frac{8}{11}$ minute gain
 (c) $33\frac{9}{11}$ minute gain (d) $32\frac{8}{11}$ minute loss

Directions: Each of the following questions is based on the following alphabet series

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

- Q 35. Which letter is sixteenth to the right of the letter which is fourth to the left of I?

- (a) S (b) T (c) **U** (d) V

- Q 36. Which letter is exactly midway between G and Q in the given alphabet?

- (a) K (b) **L** (c) M (d) N

- Q 37. Which letter is midway between the eighteenth letter from the left end and tenth letter from the right end of the given alphabet?

- (a) **No letter** (b) K (c) Q (d) R

- Q 38. Statements

- (a) All teachers are experienced. (b) Some teachers are spinsters.

Conclusions

- (I) Some experienced are spinsters (II) Some spinsters are experienced.

- (a) Only conclusion I or II follow (b) Either conclusion I or II follow
 (c) **Both conclusion I and II follow** (d) Only conclusion I follows

- Q 39. Statements

- (a) Some cats are dogs. (b) No dog is a toy.

Conclusions

- (I) Some dogs are cats. (II) Some toys are cats.
 (III) Some cats are not toys. (IV) All toys are cats.

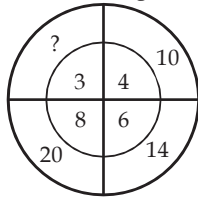
- (a) Only conclusion I and III follow (b) Only conclusion II and III follow
 (c) Only conclusion I and II follow (d) **Only conclusion I follows**

- Q 40. Find Missing Term.

2	9	11	7
8	5	13	-3
7	?	10	(-4)
6	4	10	?

- (a) 3 and 2 (b) (-3) and 2 (c) **3 and (-2)** (d) (-3) and (-2)

Q 41. Find Missing number.



- (a) 19 (b) 18 (c) 24 (d) 12

Q 42. Find the Missing Term.

67	91	45
78	90	36
?	81	27

- (a) 95 (b) 98 (c) 105 (d) 111

Q 43. Find Missing Term.

7	9	8
2	4	3
5	7	6
16	32	?

- (a) 17 (b) 23 (c) 47 (d) 73

Directions: In each of the following questions, a letter number series is given with one or more terms missing as shown by (?). Choose the missing term out of the given alternatives.

Q 44. $\sqrt{AFI} : 13 :: \sqrt{ADD} = ?$

- (a) 12 (b) 22 (c) 21 (d) 24

Q 45. RUST : 9687 :: TSUR

- (a) 7896 (b) 7869 (c) 7689 (d) 6789

Directions: In the following questions you have to identify the correct response from the given premises stated according to following symbols.

Q 46. If \div means $+$, $-$ means \div , \times means $-$ and $+$ means \times

then $\frac{(36 \times 4) - 8 \times 4}{4 + 8 \times 2 + 16 \div 1}$

- (a) 0 (b) 8 (c) 12 (d) 16

Q 47. If \rightarrow stands for 'additions', \leftarrow stands for 'subtraction', \uparrow stands for 'division', \downarrow stands for 'multiplication', $=$ stands for 'equal to', then which of the following alternatives is correct?

- (a) $7 \leftarrow 43 \uparrow 6 \downarrow 1 = 4$ (b) $3 \downarrow 6 \uparrow 2 \rightarrow 3 \leftarrow 6 = 4$
 (c) $5 \rightarrow 7 \leftarrow 3 \uparrow 2 = 4$ (d) $2 \downarrow 5 \leftarrow 6 \rightarrow 2 = 6$

Directions: In each of the following questions, various terms of an alphabet series are given with one or more terms missing as shown by - choose the missing terms out of the given alternatives.

Q 48. a c b _ c e _ f _

- (a) dde (b) cde (c) dee (d) ddg

Q 49. r t x _ s x _ z _ txy _ _ yz

- (a) y y r x s (b) y y s x r (c) y y r s x (d) y y x r s

Q 50. Unscramble the letters to frame a meaningful word. Then find out the correct numerical position of the letters.

B C U S M E L R N A
 1 2 3 4 5 6 7 8 9 10

- (a) 2 1 3 4 6 8 9 7 5 10 (b) 6 1 4 3 2 5 8 7 9 10
 (c) 3 1 5 7 10 4 2 6 9 8 (d) 3 9 4 2 8 10 5 1 7 6

Part – II : Elementary Mathematics

Q 51. The value of

$$\frac{\cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$$

- (a) $\frac{64}{\sqrt{3}}$ (b) $\frac{55}{12}$ (c) $\frac{67}{12}$ (d) $\frac{67}{10}$

Q 52. The expression $\frac{\tan 57^\circ + \cot 37^\circ}{\tan 33^\circ + \cot 53^\circ}$ is equal to

- (a) $\tan 30^\circ \cot 57^\circ$ (b) $\tan 57^\circ \cot 37^\circ$ (c) $\tan 33^\circ \cot 53^\circ$ (d) $\tan 33^\circ \cot 37^\circ$

Q 53. If $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = 3$ then the value of $\sin^4 \theta$ is

- (a) $\frac{16}{25}$ (b) $\frac{2}{3}$ (c) $\frac{1}{9}$ (d) $\frac{2}{9}$

Q 54. If $\sin - \cos = \theta \frac{7}{13}$ and $0^\circ < \theta < 90^\circ$ then the value of $\sin \theta + \cos \theta$ is

- (a) $\frac{17}{13}$ (b) $\frac{13}{17}$ (c) $\frac{1}{13}$ (d) $\frac{1}{17}$

Q 55. If $a^2 \sec^2 x - b^2 \tan^2 x = c^2$ then the value of $\sec^2 x + \tan^2 x$ is equal to (assume $b^2 \neq a^2$)

- (a) $\frac{b^2 - a^2 + 2c^2}{b^2 + a^2}$ (b) $\frac{b^2 + a^2 - 2c^2}{b^2 - a^2}$ (c) $\frac{b^2 - a^2 - 2c^2}{b^2 + a^2}$ (d) $\frac{b^2 - a^2}{b^2 + a^2 + 2c^2}$

Q 56. If $x + \frac{1}{x} = 5$, then $\frac{2x}{x^3 + \frac{1}{x^3}}$ is equal to

- (a) 5 (b) $\frac{3x^2 + 5x + 3}{2xy}$ (c) 3 (d) $\frac{1}{3}$

Q 57. The simplified value of $(1 - \frac{1}{x^2 - y^2}) \div (\frac{1}{x - y} - 3xy)$ is

- (a) $\frac{1}{x^2 - y^2}$ (b) $\frac{1}{x^2 + y^2}$ (c) $\frac{1}{x - y}$ (d) $\frac{1}{x + y}$

Q 58. Find the value of

$$\frac{1}{5} + 999 \frac{494}{495} \times 99$$

- (a) 90000 (b) 99000 (c) 90900 (d) 99990

Q 59. If $x = 11$, then the value of $x^5 - 12x^4 - 12x^3 - 12x^2 + 12x - 1$ is

- (a) 11 (b) 10 (c) 12 (d) -10

Q 60. If $p = 101$, then the value of $\sqrt[3]{p(p^2 - 3p + 3) - 1}$ is

- (a) 100 (b) 101 (c) (d) 1000

Q 61. If $a^{\frac{1}{3}} = 11$ then the value of $a^2 - 331a$ is

- (a) 1331331 (b) 1331000 (c) 1334331 (d) 1330030

Q 62. If $11\sqrt{n} = \sqrt{112} + \sqrt{343}$ then the value of n is

- (a) 3 (b) 11 (c) 13 (d) 7

Q 63. If $x + y = \sqrt{3}$ and $x - y = \sqrt{2}$, then the value of $8xy(x^2 + y^2)$ is

- (a) 6 (b) $\sqrt{6}$ (c) 5 (d) $\sqrt{5}$

Q 64. If $2^x = 3^y = 6^z$ then $(\frac{1}{x} + \frac{1}{y} + \frac{1}{z})$ is equal to

- (a) 0 (b) 1 (c) $\frac{3}{2}$ (d) $-\frac{1}{2}$

Q 65. If $x = 3 + \sqrt[3]{2}$ then $x^2 + \frac{1}{x^2}$ is equal to

- (a) 36 (b) 30 (c) 32 (d) 34

Q 66. The distance between two parallel chords of length 8 cm each in a circle of diameter 10 cm is

- (a) 6 cm (b) 7cm (c) 8 cm (d) 5.5 cm

- Q 67. ABCD is a rhombus. A straight line through C cuts AD produced at P and AB produced at Q. If $DP = \frac{1}{2} AB$ then the ratio of the length of BQ and AB is
 (a) 2:1 (b) 1:2 (c) 1:1 (d) 3:1
- Q 68. If the sides of a triangle are in the ratio $3 : 1\frac{1}{4} : 3\frac{1}{4}$ then the triangle is
 (a) Right triangle (b) Isosceles triangle (c) Obtuse triangle (d) Acute triangle
- Q 69. An equilateral triangle of side 6 cm is inscribed in a circle. Then radius of the circle is:
 (a) $2\sqrt{3}$ cm (b) $3\sqrt{2}$ cm (c) $4\sqrt{3}$ cm (d) $\sqrt{3}$ cm
- Q 70. If the difference between compound interest and simple interest on a certain sum of money for 2 years at 8% per annum is Rs. 768/- then the sum invested is:
 (a) 1,00,000/- (b) 1,10,000/- (c) 1,20,000/- (d) 1,70,000/-
- Q 71. On what sum of money will the difference between simple interest and compound interest for 2 years at 5% per annum be equal to Rs. 63/-
 (a) Rs. 24600/- (b) Rs. 24800/- (c) Rs. 25200/- (d) Rs. 25500/-
- Q 72. A sells an article to B making a profit of $\frac{1}{5}$ of his outlay. B sells it to C, gaining 20%. If C sells it for Rs. 600 and incurs a loss of $\frac{1}{6}$ of his outlay, the cost price of A is
 (a) Rs. 600 (b) Rs. 500 (c) Rs. 720 (d) Rs. 800
- Q 73. Ramesh bought 10 cycles for Rs. 500 each. He spent Rs. 2,000 on the repair of all cycles. He sold five of them for Rs. 750 each and the remaining for Rs. 550 each. Then the total gain or loss % is
 (a) Gain of $8\frac{1}{3}\%$ (b) Loss of $8\frac{1}{3}\%$ (c) Gain of $7\frac{2}{3}\%$ (d) Loss of $7\frac{1}{7}\%$
- Q 74. A can finish a piece of work in 18 days and B can do the same work in half of the time taken by A. Then working together what part of the same work they can finish in a day.
 (a) $\frac{1}{6}$ (b) $\frac{2}{5}$ (c) $\frac{1}{9}$ (d) $\frac{2}{7}$
- Q 75. The rate of working of A and B are in the ratio 2:3. The number of days taken by them to finish the work is in the ratio
 (a) 2:3 (b) 4:9 (c) 3:2 (d) 9:4
- Q 76. The ratio of the number of boys and girls in the school is 3:2. If 20% of the boys and 25% of the girls are scholarship holders, the percentage of the school students who are not scholarship holders is
 (a) 56 (b) 78 (c) 70 (d) 80
- Q 77. A train passes two bridges of lengths 800 m and 400 m in 100 seconds and 60 seconds respectively. The length of the Train is
 (a) 80 m (b) 90 m (c) 200 m (d) 150 m
- Q 78. In an examination, 52% students failed in Hindi and 42% in English. If 17% failed in both the subjects, what percentage of students passed in both the subjects?
 (a) 38% (b) 33% (c) 23% (d) 18%
- Q 79. The batting average for 40 innings of a cricket player is 50 runs. His highest score exceeds his lowest score by 172 runs. If these two innings are excluded, the average of the remaining 38 innings is 48 runs. The highest score of the player is
 (a) 165 (b) 170 (c) 172 (d) 174
- Q 80. A discount of series of 15%, 20% and 30% is equal to a single discount of
 (a) 50% (b) 47.6% (c) 52.8% (d) 52.4%
- Q 81. A dishonest dealer defrauds to the extent of $x\%$ in buying as well as selling his goods by using faulty weight. What will be the gain percent on his outlay?
 (a) $2x\%$ (b) $(\frac{10}{x} + x^2)\%$ (c) $(2x + \frac{x^2}{100})\%$ (d) $(x + \frac{x^2}{100})\%$
- Q 82. A and B started a business in the partnership by investing in the ratio of 7:9. After 3 months A withdraw $\frac{2}{3}$ of its investment and after 4 months from the beginning B withdraw $33\frac{1}{3}\%$ of its investment. If the total earned profit is Rs. 10201/- at the end of 9 months, find the share of each in the profit.
 (a) Rs 3535/- and Rs 6666/- (b) Rs 3055/- and Rs. 5555/-
 (c) Rs 4503/- and Rs 1345/- (d) Rs 3545/- and Rs. 3333/-
- Q 83. The mean marks of 20 students is 15. On checking it was found that two marks were wrongly copied as 3 and 6. If wrong marks obtained are replaced by correct values 8 and 4, then the correct mean is
 (a) 15 (b) 15.15 (c) 15.35 (d) 16
- Q 84. Three circle of diameter 10 cm each are bound together by rubber band, the length of the rubber band is.
 (a) 30 (b) $30 + 10\pi$ (c) 10π (d) $60 + 20\pi$

- Q 85. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into sea in a minute?
 (a) 4,00,000 m³ (b) 40,00,000 m³ (c) 40,000 m³ (d) **4,000 m³**
- Q 86. If the radius of the base and the height of a right circular cylinder is increased by 10% each then the volume of the cylinder increases by:
 (a) 3.31% (b) 14.5% (c) **33.1%** (d) 19.5%
- Q 87. The amount of concrete required to build a concrete cylindrical pillar whose base has a perimeter 8.8 metre and curved surface area 17.6 sq. metre is (Take $\pi = \frac{22}{7}$)
 (a) 8.325 m³ (b) 9.725 m³ (c) 10.5 m³ (d) **12.32 m³**
- Q 88. Some bricks are arranged in an area measuring 20 m³. If the length, breadth and height of each brick is 25 cm, 12.5 cm and 8 cm respectively, then the number of bricks are:
 (a) 6000 (b) **8000** (c) 4000 (d) 10000
- Q 89. The length, breadth and height of a room is 5m, 4m and 3m respectively. Find the length of the largest bamboo that can be kept.
 (a) 5 m (b) 60m (c) 7 m (d) **5√2 m**
- Q 90. A solid metallic spherical ball of diameter 6cm is melted and re-casted into a cone with diameter of the base as 12 cm. The height of the cone is
 (a) 6 cm (b) 2 cm (c) 4 cm (d) **3 cm**
- Q 91. If the ratio of the diameter of two right circular cones of equal height be 3:4, then the ratio of their valume will be
 (a) 3:4 (b) **9:16** (c) 16:9 (d) 27:64
- Q 92. What is the value of $\log_2(\log_3 81)$?
 (a) **2** (b) 3 (c) 4 (d) 9
- Q 93. Find the value of $\frac{0.355 \times 0.5555 \times 2.025}{0.225 \times 1.775 \times 0.2222}$ is equal to
 (a) 5.4 (b) 4.58 (c) **4.5** (d) 5.45
- Q 94. $(0.01024)^{1/5}$ is equal to
 (a) **0.4** (b) 4.0 (c) 0.04 (d) 0.00004
- Q 95. The value of $(243)^{0.16} \times (243)^{0.04}$ is equal to
 (a) 0.16 (b) **3** (c) $\frac{1}{3}$ (d) 0.04
- Q 96. If a and b are two positive integer such that $a^2 - b^2 = 19$ then value of a is
 (a) 19 (b) 20 (c) 9 (d) **10**
- Q 97. $\sqrt{(798)^2 + 0.404 \times 0.798} + (0.202)^2 + 1$ is equal to
 (a) 0 (b) **2** (c) 1 (d) 0.404
- Q 98. The sum of three consecutive odd natural numbers is 147. Then the middle number is
 (a) 47 (b) 48 (c) **49** (d) 51
- Q 99. A student was asked to find $\frac{5}{16}$ of a number. By mistake he found $\frac{5}{6}$ of that number and his answer was 250 more than the correct answer. Find the given number
 (a) 300 (b) **480** (c) 450 (d) 500
- Q 100. The HCF and LCM of two numbers are 12 and 336 respectively. If one number is 84, then the other number is
 (a) **48** (b) 36 (c) 72 (d) 96