

**NATIONAL TALENT SERVICE EXAM (NTSE)  
MODEL QUESTION PAPER**

**MENTAL ABILITY TEST**

**PART – 1**

**Directions:** In the following questions (1 – 10) there are five groups of letters in each. Four of these groups are alike in same way while one is different. Find the one that is different and will be your answer as well.

**Q1.**

- |           |           |
|-----------|-----------|
| (a) asibu | (b) oarse |
| (c) oinak | (d) zamol |
| (e) yaixe |           |

**Ans.** (d) as each contains 2 consonants and 3 vowel but d does not.

**Q2.**

- |         |         |
|---------|---------|
| (a) MNM | (b) HJR |
| (c) VWD | (d) BCX |
| (e) KLO |         |

**Ans.** (b) as in others first two letters are serially pronounced but (b) is not in order.

**Q3.**

- |         |         |
|---------|---------|
| (a) ira | (b) aam |
| (c) kas | (d) utr |
| (e) btd |         |

**Ans.** (e) as all other four gives a sense of words by arranging the letters as air, man ask and True but (e) does not as such.

**Q4.**

- |         |         |
|---------|---------|
| (a) yxz | (b) cbd |
| (c) nmr | (d) wvx |
| (e) pqo |         |

**Ans.** (e) as in other four we find the middle letter in the initial letter in order like xyz, bcd, etc

**Q5.**

- |          |          |
|----------|----------|
| (a) AiiR | (b) MooX |
| (c) VxxZ | (d) DecY |
| (e) DffH |          |

**Ans.** (d) as other four there are some letters repeated twice in the middle which is a deviation in (d).

**Q6.**

- (a) cot (b) pot  
(c) but (d) hut  
(e) mat

**Ans.** (e) pronunciation changed.

**Q7.**

- (a) AabD (b) eEcf  
(c) pPrs (d) nNxz  
(e) dDRs

**Ans.** (a) as the first letter is capital.

**Q8.**

- (a) ability (b) capability  
(c) probability (d) surety  
(e) flexibility

**Ans.** (d) as in others 'li' is absent to give a right sense but (d) has already a sense.

**Q9.**

- (a) doe (b) man  
(c) xaz (d) poq  
(e) oep

**Ans.** (c) as in all others two consecutive alphabets occur at the ends as de,mn, pq, and op.

**Q10.**

- (a) ACE (b) PKR  
(c) NPR (d) GIK  
(e) PRT

**Ans.** (b) as in all others in each alphabet there is a difference of one space.

**Directions:** In each of following questions, there are four or five alternatives given. Find the correct one for each question.

**Q11. Two numbers are in the ratio 5:6 and if 4 is subtracted from each, they are reduced to 2:3, then the highest number is**

- (a) 4 (b) 12  
(c) 8 (d) 10

**Ans.** (c) the highest number be  $6x$  and the least number be  $5x$ .

Sol: As the problem  $\frac{5x - 4}{6x - 4} = 2:3$

$$15x - 12 = 12x - 8$$
$$\text{or } 3x = 4$$

$$\text{or } 15x - 12x = -8 + 12$$
$$\text{or } x = 4/3$$

So largest number is  $6x = 6 \times 4/3 = 8$

**Q12. A square and a triangle have equal areas. If the ratio side of square and the height of triangle is  $\frac{2}{3}$  find the ratio of base to height.**

- (a)  $\frac{2}{3}$  (b)  $\frac{4}{3}$   
 (c)  $\frac{4}{5}$  (d)  $\frac{9}{8}$   
 (e) None of these

**Ans.** As the problem  
 $a^2 = \frac{1}{2}hb$

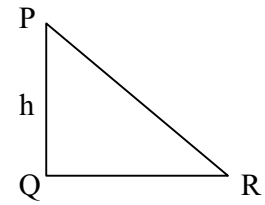
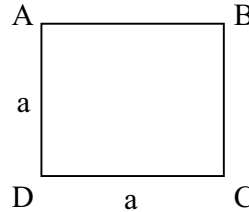
$$\frac{a}{h} = \frac{2}{3} \text{ or } a = \frac{2}{3}h$$

$$h = \frac{3}{2}b$$

From equation (i)

$$\frac{1}{2}hb = a^2$$

$$\frac{1}{2}hb = \left(\frac{2}{3}h\right)^2 = \frac{4}{9}h^2 \text{ or } h/b = \frac{1/2 \cdot 4/9}{1} = \frac{1/2 \cdot 4}{9} = \frac{2}{9} = \frac{2}{9}$$



**Q13. How many prime numbers lie between 115 – 122.**

- (a) 2 (b) 3  
 (c) 4 (d) 5  
 (e) 6

**Ans.** 115, 116, 117, 118, 119, 120, 121, 122.

**Q14. Ram is 5 times as old as Shyam. If their difference of age is 8 years, how old is Ram?**

- (a) 8 years (b) 10 years  
 (c) 12 years (d) 5 years  
 (e) None of these

**Ans.** (b) 10 years

Sol: Suppose Shyam's age =  $x$

So Ram's age =  $5x$

As per the problem

$$5x - x = 8 \text{ or } 4x = 8 \text{ or } x = 2$$

So Ram's age =  $5x = 5 \cdot 2 = 10$  years

**Q15. A runs faster than E but not so fast as B and B runs faster than C but not as fast as D, who runs faster?**

- (a) A (b) B  
 (c) C (d) E

**Ans.** (d)

**Q16. The pages of a book are numbered for 1 to 100 manually. How many times will be it be essential to write the number 5?**

- (a) 20 (b) 19  
 (c) 18 (d) 9  
 (e) 10

**Ans.** (b)

**Q17. A person climbs up a pole of 88 mt high, in every minute he climbs 12 mt but slips down 8 mt. So how much time he will take to reach at the top?**

- (a) 19 (b) 29  
(c) 28 (d) 22  
(e) 14

**Ans.** It is clear that in the last step, he does not slip as he reaches on the top so actual distance which cover for slipping zone will be  $88 - 12 = 76$ , actual distance covered in a minute is  $12 - 8 = 4$ . So the time taken will be  $76/4 = 19$

**Q18. How many square of side 5 cm can be adjusted in a rectangular box of size 25 × 15 × 10 cm**

- (a) 30 (b) 60  
(c) 50 (d) 40  
(e) None of these

**Ans.** Volume of square = 53  
Volume of given rectangle =  $25 \times 15 \times 10$  cm  
As per the question =  $\frac{25 \times 15 \times 10}{5 \times 5 \times 5} = 30$

**Q19. The sum of 3 positive numbers in AP is 189. The sum of their squares is 11915. Find their product.**

- (a) 7930 (b) 8970  
(c) 9703 (d) 7960  
(e) None of these

**Ans.** Let the numbers in AP series be  
 $a - d, a, a + d$   
So  $a - d + a + a + d = 189$  or  $3a = 189$   
or  $a = 63$

As per second part of the problem  
 $(a - d)^2 + (a)^2 + (a + d)^2 = 4023$  or  $3a^2 + 3d^2 = 4023$   
or  $3 \times (63)^2 + 3d^2 = 4023$   
or  $2d^2 = 11915 - 3 \times 63 \times 63$   
 $= 11915 - 11907$   
 $= 08$   
or  $d^2 = 4$  or  $d = 2$

So their product is  $(a - d) \times a \times (a + d)$   
 $= (63 - 2) \times 63 \times (63 + 2)$   
 $= 61 \times 65$   
 $= 130 \times 61$   
 $= 7930$

**Q20. Find the number whose square root is twice of its cubic root.**

- (a) 128 (b) 64  
(c) 16 (d) 4  
(e) None of these

**Ans.** Let the number be  $x$   
 As per the problem  $2\sqrt{x} = 2\sqrt[3]{x}$   
 or  $x^{1/2} = 2x^{1/3}$

Raising both sides by 6 times

$$(x^{1/2})^6 = 2^6(x^{1/3})^6$$

$$x^{1/2 \cdot 6} = 2^6 x^{1/3 \cdot 6}$$

$$\text{or } x^3 = 64 x^2$$

$$\text{or } x = 64$$

**Q21.** There are 24 birds on a tree. A hunter fired a gun and 20 fall down on ground. So how many birds left on the tree?

- (a) 4 (b) 7  
 (c) 24 (d) None of these

**Ans.** None of these as its clear from the general ideology.

**Q22.** A is four times as efficient as B & A can complete a work in 90 days less time than B. Find in how many days both can complete the work.

- (a) 30 (b) 20  
 (c) 40 (d) 50

**Ans.** Let the given work be done by B in  $x$  days

As per the problem  $x - 90 = \frac{x}{4}$  or  $4x - x = 90$  or  $x = 30$  days.

Since A is 3 times as efficient as B.

**Q23.** I am the eldest child of my parents. There is a gap of 6 years between the ages of my brother and sister including myself. If my mother was 22 years, when I was born? What was age at the birth of her youngest child?

- (a) 30 (b) 28  
 (c) 16 (d) 25  
 (e) None of these.

**Ans.** (c)

**Q24.** The calendar of the year 1982 can next be used for the year?

- (a) 1984 (b) 1990  
 (c) 1985 (d) 1988  
 (e) None of these

**Ans.** (d) 1988

**Q25.** Two successive discount of 20% and 25% equivalent to what amount of a single discount?

- (a) 25% (b) 10%  
 (c) 15% (d) 5%  
 (e) 20%

**Ans.** Let the amount be = Rs. 100  
 After 20% of discount, actual amount payable  

$$= 100 - \frac{20}{100} \times 100 = 80$$

In second case the discount is 25%

So the total single discount will be =  $\frac{25}{100} \times 80 = 20\%$

**Q26.** If x persons can complete work in t hours, in how many hours y persons can complete it?

- (a)  $\frac{yt}{x}$  (b)  $\frac{yx}{t}$   
 (c)  $\frac{tr}{y}$  (d)  $\frac{tx}{y}$   
 (e) None of these

**Ans.** x person can complete in t hours  
 1 person can complete in  $t \times x$  hrs  
 y person can complete in  $\frac{t \times x}{y} = \frac{tx}{y}$

**Q27.** Mohan spent 25% of his monthly earning on magazines. Out of the balance amount he spent 75% on the hostel and college fees. If he had Rs. 120 at the end of the month, find how much money he has received from his father in that month?

- (a) Rs. 1000 (b) Rs. 1260  
 (c) Rs. 640 (d) Rs. 850  
 (e) None of these

**Ans.** Let the monthly income be = x  
 Expenditure on magazine =  $25x = \frac{1}{4}x$   
 So balance amount =  $x - \frac{x}{4} = \frac{3}{4}x$   
 And hostel and college expense =  $\frac{3}{4}x \times \frac{75}{100} = \frac{9x}{16}$   
 So balance amount he had =  $\frac{3}{4}x - \frac{9x}{16}$   

$$= \frac{12x - 9x}{16} = \frac{3x}{16}$$

As per the problem =  $\frac{3x}{16} = 240$

$$\text{or } 3x = 240 \times 16 \text{ or } x = \frac{240 \times 16}{3} = \text{Rs. } 640$$

**Q28.** A, B and C are partners and invests in a business such that A spends  $\frac{1}{4}$ <sup>th</sup> of the total. B spends  $\frac{1}{5}$ <sup>th</sup> less than C. If C's investment is  $\frac{1}{3}$ , find the ratio of their profits on a amount of 4300.

- (a) 15:20:8 (b) 20:15:8  
 (c) 8:15:20 (d) 25:5:8  
 (e) None of these

**Ans.** Let the total capital be = x

$$A's \text{ share} = 1/4x = x/4$$

$$C's \text{ share} = 1/3 x = x/3$$

$$B's \text{ share} = x/3 - x/5 = \frac{5x - 3x}{15} = \frac{2x}{15}$$

So their ratio of investment is

$$\frac{x}{4} : \frac{x}{3} : \frac{2x}{15} = \frac{x}{4} \times 60, \frac{x}{3} \times 60, \frac{2x}{15} \times 60$$

$$15x : 20x : 8x$$

Profit will be distributed as per proportion of their investment.

$$\text{So } 15x + 20x + 8x = 4300$$

$$\text{Or } 43x = 4300$$

$$\text{Or } x = 4300/43 = 100$$

$$A's \text{ profit} = 1500$$

$$B's \text{ profit} = 2000$$

$$C's \text{ profit} = 800$$

$$A:B:C = 1500:2000:800 = 150:200:80$$

**Q29.** In a cage, there are rabbits and parrots and the number of heads are 28 and feet are 72. Find the number of parrots and rabbits.

(a) 20, 8

(b) 8, 20

(c) 14, 14

(d) 12, 16

(e) None of these

**Ans.** Let there be x parrots and y rabbits

As per the problem,

$$\text{Total number of heads} = 28 = x + y \quad \text{(i)}$$

$$\begin{aligned} \text{Total number of legs} &= 72 = 2x + 4y \\ &= x + 2y = 36 \quad \text{(ii)} \end{aligned}$$

Solving equation (i) and equation (ii)

$$x + y = 28$$

$$x + 2y = 36$$

$$y = 8$$

$$\text{and } x + y = 28 \text{ or } x = 28 - 8 = 20$$

So there are 20 parrots and 8 rabbits.

**Q30.** Some students are divided into two groups A & B. If 10 students are sent from A to B, the number in each is the same. But if 20 students are sent from B to A, the number in A is double the number in B. Find the number of students in each group A & B.

(a) 100, 80

(b) 80, 100

(c) 110, 70

(d) 70, 110

(e) None of these

**Ans.** Let the number in A and B be a & b respectively

As per the question  $a - 10 = b + 10$

$$a - b = 20$$

(i)

$$\text{and } a + 20 = 2(b - 20)$$

$$a - 2b = -20$$

(ii)

Solving  $A = 100$ ;  $B = 80$

**DIRECTIONS:** In each of the following questions, a series of numbers is given followed by a blank space with a (?) question mark on it. The number to fill in the blank is given has one of the alternative among the five given under each question. Find the correct alternative in each case.

**Q31. 3, 18, 43, 78, 123, ?**

(a) 169

(b) 178

(c) 163

(d) 153

(e) 157

**Ans.** The Arithmetic mean difference between the two consecutive numbers is increasing 10 as 15 25 35 45. So the numbers will be  $123 + 55 = 178$

**Q32. 1, 5, 13, 29, 61, 125, ?**

(a) 252

(b) 258

(c) 255

(d) 253

(e) None of these

**Ans.** The mean difference between the consecutive numbers are

1      5      13      29      61      125      ?

4      8      16      32      64      128

So  $125 + 128 = 253$

**Q33. 49, 343, 64, ?, 81, 729**

(a) 1024

(b) 512

(c) 778

(d) 182

(e) None of these

**Ans.** The first and second terms are square cube of 7, 5<sup>th</sup> and 6<sup>th</sup> terms are square and cube of 9. So third and fourth terms are square and cubes of 8.  $8^3 = 512$

**Q34. 55296, ?, 288, 36, 9.**

(a) 3456

(b) 3436

(c) 4638

(d) 3638

(e) None of these.

**Ans.**  $9/36 \quad 36/288 \quad 288/x \quad x/55296$

$\frac{1}{4} \quad \frac{1}{8} \quad \frac{1}{12} \quad \frac{1}{16}$  like this.

So  $288/x = 1/12$  or  $x = 3456$

**Q35. 30, 56, 90, 132, 182, ?**

(a) 3627

(b) 3234

(c) 1206

(d) 2412

(e) None of these.

**Ans.** (a)

**DIRECTIONS:** The six faces of a cube are painted in a manner that no two adjacent faces have the same colour. The three colour used in the painting are red, blue and green. The cube is then cut into 64 equal cubical parts. Answer the following questions.

**Q36. How many cubes in all have three sides painted?**

- (a) 24
- (b) 16
- (c) 10
- (d) 8
- (e) None of these

**Ans.** (d)

**Q37. How many cubes have only two sides painted?**

- (a) 16
- (b) 24
- (c) 8
- (d) 6
- (e) None of these.

**Ans.** (b)

**Q38. How many cubes have one and two sides painted but the third side is not painted.**

- (a) 28
- (b) 24
- (c) 48
- (d) 64
- (e) None of these

**Ans.** (c)

**Q39. How many cubes are there whose only one side is painted?**

- (a) 24
- (b) 4
- (c) 48
- (d) 64
- (e) None of these

**Ans.** (a)

**Q40. How many cubes are there which has no sides painted?**

- (a) 8
- (b) 64
- (c) 36
- (d) 48
- (e) 16

**Ans.** (a)

**DIRECTIONS:** The following questions are based on letter series from which some of the letters are missing. The missing letters are given in the proper sequence as are of the alternative among the five given under each question. Find the correct alternative for each case.

**Q41. aab – aaa – bba –**

- (a) bab
- (b) abb
- (c) baa
- (d) bba
- (e) None of these

**Ans.** (c)

**Q42. abba – baaabba – bbaaa**

- (a) aaa
- (b) aba
- (c) bba
- (d) abab
- (e) None of these

**Ans.** (a)

**Q43. – abaaaba – a – a**

- (a) aab
- (b) abb
- (c) aba
- (d) bba
- (e) None of these

**Ans.** (a)

**Q44. b – a – aab – ab – –**

- (a) abaaa
- (b) ababa
- (c) aabba
- (d) bbaba
- (e) babab

**Ans.** (a)

**Q45. p – x – pt – – – txppt**

- (a) ptxptx
- (b) pxtptx
- (c) ptptxt
- (d) xptxpt
- (e) tpxppx

**Ans.** (e)

**DIRECTIONS:** In each of the following question apply the interchanging of the codes to choose correct alternative.

**Q46. If PRESS = RESSP**

Then SMLE = ?

- (a) SMLE
- (b) SMILE
- (c) SLME
- (d) SLMIE
- (e) None of these

**Ans.** (b)

**Q47. If STUPID = STUPID then CYCLES?**

- (a) CYESCL
- (b) CYLECS
- (c) CYELCS
- (d) CYECSL
- (e) CYLCES

**Ans.** (e)

**Q48. If ROTUND = RONDTU, then PATATO = ?**

- (a) POTOTA
- (b) POTOAT
- (c) PATOO
- (d) POOTAT
- (e) POOATT

**Ans.** (a)