Question Booklet and Answer Key

For Recruitment Test

Held on 21.02.2015 (Evening)

Post: TGT Paper-II

(Mathematics)

'A' Series

1. The vector spaces formed by the solution space of the set of equations $x_1 + x_2 + x_3 = 0$, $3x_1 + 2x_2 = 0$ and $x_2 - x_3 = 0$ has dimension :

1) 0 2) 1 3) 2 4) 3

2. The inequality $| z - 2 | < | z - 4 |$ represents the half plane :

1) Re (z) ≥ 3 2) Re (z) = 3 3) Re (z) ≤ 3 4) none of these

3. If span of S = {(1, 1, 0), (2, 1, 3)} over $\mathbb{R}$ is contained in $\mathbb{R}^3$, then which one of the following vectors is not in the span of S ?

1) (0, 0, 0) 2) (3, 2, 3) 3) (1, 2, 3) 4) (4/3, 1, 1)

4. The smallest +ve integer n for which $\left(\frac{1+i}{1-i}\right)^n = 1$ is :

1) 8 2) 16 3) 12 4) none of these

5. If two zeros of a polynomial, $2x^4 - 3x^3 - 3x^2 + 6x - 2$, are $\sqrt{2}$ and $\frac{1}{2}$ then other two zeros are :

1) $-\sqrt{2}$ and -1 2) $-\sqrt{2}$ and $-\frac{1}{2}$ 3) $-\sqrt{2}$ and 1 4) none of these

6. Let $T : \mathbb{R}^2 \to \mathbb{R}^3$ be a linear transformation given by $T(x_1, x_2) = (x_1 + x_2, x_1 - x_2, x_2)$, then rank of T is :

1) 0 2) 2 3) 1 4) 3

7. A survey shows that 63% of the Americans like cheese and 76% like apples. If x% of the Americans like both cheese and apples, then :

1) $x = 39$ 2) $39 \le x \le 63$ 3) $x = 63$ 4) none of these

8. If V and U are vector spaces of dimensions 4 and 6 respectively, then dim hom(V, U) is :

1) 4 2) 6 3) 10 4) 24

9. Equations of the straight lines touching both $x^2 + y^2 = 2a^2$ and $y^2 = 8ax$ are :

1) $x \pm y \pm 2a = 0$ 2) $x - y \pm 2a = 0$ 3) $x \pm y + 2a = 0$ 4) None of these

10. Let G be a group of order 15. Then the number of sylow subgroups of G of order 3 is :

1) 0 2) 1 3) 3 4) 5

11. If x, y, z are in AP with common difference d and rank of the matrix $\begin{bmatrix} 4 & 5 & x \\ 5 & 6 & y \\ 6 & k & z \end{bmatrix}$ is 2, then values of d and k are :

1) $d = x/4;\ k = 7$ 2) d is arbitrary; $k = 7$ 3) $d = 5;\ k = 5$ 4)none of these

12. The system of equations $k\cdot x + y + z = 1,\ x + k\cdot y + z = k$ and $x + y + k\cdot z = k^3$ does not have a common solution if k is equal to :

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

13. For which value of λ does the line $y = x + \lambda$ touch the ellipse $9x^2 + 16y = 144$?

1) $\lambda = \pm 5$ 2) $\lambda = 5$ 3) $\lambda = -5$ 4) $\lambda = 1$

14. The minimal polynomial of the 3×3 real matrix $\begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & b \end{bmatrix}$ is :

1) $(x - a)(x - b)$ 2) $(x - a)^2 (x - b)$ 3) $(x - a)(x - b)^2$ 4) none of these

15. Equation of a parabola with vertex at origin, symmetric about y-axis and passes through a point $(2, -3)$ is :

1) $y^2 = \frac{9}{2}x$ 2) $x^2 = -\frac{4}{3}y$ 3) $x^2 + y^2 = 13$ 4) none of these

16. If $f(x) = \begin{cases} 1, & \text{if } x \text{ is a rational number} \\ 0, & \text{if } x \text{ is an irrational number} \end{cases}$; then what is the value of $fof(\sqrt{3})$?

1) 0 2) 1 3) both 0 and 1 4) none of these

17. How many elements of order 2 are there in a group of order 4?

1) 1 2) 2 3) 3 4) can't say

18. Which of the following matrix is not diagonalizable?

1) $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ 2) $\begin{bmatrix} 1 & 0 \\ 3 & 2 \end{bmatrix}$ 3) $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ 4) $\begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix}$

19. The least upper bound of any subset of the set of rational numbers is always :

1) a rational number 2) a real number 3) a positive number 4) an irrational number

20. Value of $\lim_{n\to\infty} \frac{1}{n}[1 + 2^{\frac{1}{2}} + 3^{\frac{1}{3}} + \cdots + n^{\frac{1}{n}}]$ is equal to :

1) 0 2) e 3) 1 4) $1/e$

21. How many proper normal subgroups are possible for a group of order 112?

1) 0 2) 5 3) 10 4) 16

22. Let $G = \mathbb{Z}_4 \times \mathbb{Z}_6$ be a group and H be a subgroup of G generated by (0, 1). Then order of G/H is :

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

23. Every group G is isomorphic to a permutation group; this statement is :

1) Cayley's theorem 2) Lagrange's theorem 3) Liouville's theorem 4) none of these

24. Every group of prime order is :

1) a field 2) abelian 3) cyclic 4) none of these

25. Let $T : \mathbb{R}^4 \to \mathbb{R}^4$ be defined as $T(x, y, z, t) = (x + y + 5t,\ x + 2y + t, -z + 2t, 5x + y + 2z)$. Then dimension of the eigen space of T is :

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

26. The order of 2 in the field $\mathbb{Z}_{29}$ is :

1) 2 2) 14 3) 28 4) 29

27. Let R be a commutative ring with unity of characteristic 3. For $a, b \in$ R, $(a+b)^6$ is equal to :

1) $a^6 + b^6$ 2) $a^6 - a^3b^3 + b^6$ 3) $a^6 + a^3b^3 + b^6$ 4) none of these

28. Let $f(x) = x^2 + 1$, $g(x) = x^3 + x^2 + 1$ and $h(x) = x^4 + x^2 + 1$ then :

1) $f(x)$ and $g(x)$ are irreducible over $\mathbb{Z}_2$ 2) $g(x)$ and $h(x)$ are irreducible over $\mathbb{Z}_2$

3) $f(x)$ and $h(x)$ are irreducible over $\mathbb{Z}_2$ 4) $f(x)$, $g(x)$ and $h(x)$ are irreducible over $\mathbb{Z}_2$

29. Let F be a field of order 2^n. Then :

1) Char F = 0 2) Char F = a prime number 3) Char F = 2 4) none of these

30. If $\mathbb{Z}[i]$ is the ring of Gaussian integers, then the quotient $\mathbb{Z}[i]/\langle 3-i \rangle$ is isomorphic to :

1) $\mathbb{Z}$ 2) $\mathbb{Z}/3\mathbb{Z}$ 3) $\mathbb{Z}/4\mathbb{Z}$ 4) $\mathbb{Z}/10\mathbb{Z}$

31. The ring $\mathbb{Z}[\sqrt{-11}]$ is a :

1) Euclidean Domain 2) PID but not Euclidean Domain

3) UFD but not PID 4) not a UFD

32. The order of normalizer of $\sigma = (12)(34)$ in S_6 is :

1) 8 2) 16 3) 24 4) 4

33. Let A be a square matrix of order n, then nullity of A is :

1) $n -$ rank A 2) rank A $- n$ 3) $n +$ rank A 4) none of these

34. If $n(A) = 115$, $n(B) = 326$, $n(A - B) = 47$, then the value of $n(A \cup B)$ equal to :

1) 373 2) 165 3) 370 4) 394

35. Let T : $\mathbb{R}^3 \to \mathbb{R}^2$ be a linear transformation given by $T(x_1, x_2, x_3) = (x_1 + x_2, x_1 - x_3)$, then dimension of null space of T is :

1) 0 2) 1 3) 2 4) 3

36. If $X = \{4^n - 3n - 1 : n \in \mathbb{N}\}$ and $Y = \{9(n-1) : n \in \mathbb{N}\}$ then $X \cup Y$ is equal to :

1) X 2) Y 3) N 4) none of these

37. Which one of the following functions $f: \mathbb{R} \to \mathbb{R}$ is injective ?

1) $f(x) = |x|$ 2) $f(x) = x^2$ 3) $f(x) = 16$ 4) $f(x) = -x$

38. Points $(a + 5, a - 4)$, $(a - 2, a + 3)$ and (a, a) are not collinear only when a is :

1) 3 2) 4 3) any real number 4) 5

39. Matrix A = $\begin{bmatrix} -1 & 3 & 5 \\ 1 & -3 & -5 \\ -1 & 3 & 5 \end{bmatrix}$ is :

1) involutory 2) nilpotent 3) idempotent 4) none of these

40. The point where the line $y = x + 1$ is a tangent to the curve $y^2 = 4x$ is :

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

41. If $f(x) = e^x$ then $f^{-1}(e)$ is equal to :

1) 1 2) e 3) 0 4) $1/e$

42. The unit normal vector to the level surface $x^2 + y - z = 4$ at the point $(-3, 1, 6)$ is :

1) $(-6\,i + j - k)$ 2) $\frac{1}{\sqrt{38}}(-6\,i + j - k)$ 3) $\frac{1}{\sqrt{38}}(-9\,i + j - k)$ 4) none of these

43. The function $y = f(x)$ has a (relative) minimum where :

1) $f(x) = 0$ and $f'(x) < 0$
2) $f'(x) = 0$ and $f''(x) < 0$
3) $f(x) = 0$ and $f'(x) > 0$
4) $f'(x) = 0$ and $f''(x) > 0$

44. Derivative of y^x with respect to x is :

1) y^x 2) $\log y$ 3) $y^x \log y$ 4) $x\, y^{x-1}$

45. $\vec{\nabla} \cdot (\vec{\nabla} \times \vec{V})$ will be equal to :

1) 0 2) $\vec{\nabla} \cdot (\vec{\nabla} \cdot \vec{V})$ 3) $\nabla^2 \vec{V}$ 4) none of these

46. How many epimorphisms are possible from $\mathbb{Z}_{12}$ to $\mathbb{Z}_6$?

1) 0 2) 6 3) 4 4) 2

47. For any real number x the value of $\lim_{n\to\infty} \frac{x^n}{n!}$ is equal to :

1) 1 2) 0 3) e 4) none of these

48. Value of the $\lim_{n\to\infty} (n)^{\frac{1}{n}}$ is :

1) 1 2) e 3) $1/e$ 4) 0

49. The sequence $< x_n > = 1 + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{n}$ is :

1) convergent 2) monotonically decreasing

3) not convergent 4) none of these

50. The series $\sum \frac{\sqrt{n}}{n^2+1}$ is :

1) convergent 2) divergent 3) not convergent 4) none of these

51. The series $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} \ldots$ is convergent for :

1) all real x 2) $|x| < 1$ 3) $|x| \le 1$ 4) $-1 < x \le 1$

52. The limit, $\lim_{x\to 0}[x]$; where $[x]$ is the greatest integer less than or equal to x is :

1) positive 2) zero 3) not unique 4) negative

53. Let $\{x_n\}$ be a sequence of positive terms, such that $\lim_{n\to\infty} \frac{x_{n+1}}{x_n}$ exists, then :

1) $\lim_{n\to\infty}(x_n)^{\frac{1}{n}}$ exists
2) $\lim_{n\to\infty}(x_n)^{\frac{1}{n}}$ may exist
3) $\lim_{n\to\infty}(x_n)^{\frac{1}{n}}$ does not exist
4) none of these

54. The domain for the convergence of the series $1 + x + x^2 + x^3 + \ldots$ is :

1) $[-1, 1]$
2) $(-1, 1]$
3) $(-1, 1)$
4) none of these

55. The function $f(x) = -2x^3 - 9x^2 - 12x + 1$ is increasing in the interval :

1) $(-\infty, -2) \cup (-1, \infty)$
2) $(-2, 1)$
3) $(1, 2)$
4) $(-2, -1)$

56. The function $f(x) = |x + 2|$ is not differentiable at :

1) $x = 2$
2) $x = -2$
3) $x = \pm 2$
4) $x = 0$

57. The value of $\lim_{x\to\infty}[\sqrt{x^2+1} - x]$ is :

1) ∞
2) 1
3) 0
4) does not exist

58. If $f(x) = \sqrt{x^2 - 4}$ in [2, 4] satisfies the Lagrange's mean value theorem, then there exists some $c \in (2, 4)$. What is the value of that c?

1) 12
2) 6
3) $\sqrt{2}$
4) $\sqrt{6}$

59. Which of the following functions is not uniformly continuous in $[2, \infty]$?

1) $\frac{1}{x}$
2) e^x
3) $\frac{1}{x^2}$
4) $\sin x$

60. Let $X = (0, 1) \cup (2, 3)$ and f be a continuous function on X such that the derivative $f'(x) = 0$ for all x. Then range of f has :

1) uncountable number of points
2) countably finite number of points
3) at most 2 points
4) at most 1 point

61. The value of $\lim_{x\to a} \frac{\sin(a-x)}{a\,(a-x)}$ is :

1) a 2) $\sin a$ 3) $1/a$ 4) does not exist

62. If f: $[a, b] \to \mathbb{R}$ is strictly increasing, then :

1) f^{-1} does not exist 2) f^{-1} is strictly decreasing

3) f^{-1} is not monotonic 4) f^{-1} exists on Img.f

63. Let $f(x) = ax + b$ be a monotonic function on $\mathbb{R}$ and satisfies condition $f(x) = f^{-1}(x)$, then values of a and b are :

1) $a = 2$; $b = -1$ 2) $a = -1$, $b \in \mathbb{R}$ 3) $a = 1$, $b \in \mathbb{R}$ 4) $a = 1$, $b = -1$

64. The function $f(x) = \frac{|x|}{x}$; $x \neq 0$ may be made continuous at origin if :

1) $f(0) = 0$ 2) $f(0) = -1$

3) $f(0) = \infty$ 4) cannot be made continuous for any value of $f(0)$

65. Range of the function $f(x) = x^2 + x - 6$ is :

1) $[-6{\cdot}25, \infty)$ 2) $(-6{\cdot}25, \infty)$ 3) $(6{\cdot}25, \infty)$ 4) $(-\infty, 6{\cdot}25)$

66. Which of the following series is absolutely convergent?

1) $\sum \frac{(-1)^n}{n}$ 2) $\sum \frac{1}{\sqrt{n}}$ 3) $\sum \frac{1}{\log(n+1)}$ 4) $\sum \frac{(-1)^n}{n^{3/2}}$

67. If f: A $\to$ B, g: B $\to$ C are two functions such that $g \circ f$: A $\to$ C is onto then :

1) g: B $\to$ C is onto 2) f: A $\to$ B is onto 3) both f and g are onto 4) none of these

68. The value of k for which the function $f(x) = \begin{cases} \frac{1-\cos 4x}{8x^2}, & x \neq 0 \\ k, & x = 0 \end{cases}$ is continuous at $x = 0$ is :

1) 0 2) 1 3) infinity 4) none of these

69. The set of points where $f(x) = |\sin x|$ is not differentiable is :

1) empty 2) $\{0\}$ 3) $\{k \cdot \pi/2 : k \in \mathbb{Z}\}$ 4) $\{k \cdot \pi : k \in \mathbb{Z}\}$

70. Area enclosed by the curve $r = 2a\cos\theta$, $0 \leq \theta \leq \frac{\pi}{2}$ is :

1) πa^2 2) $2\pi a^2$ 3) $\frac{\pi a^2}{2}$ 4) none of these

71. Integral $\int_0^\infty \frac{dx}{\sqrt{x}\, e^{\sqrt{x}}}$ is equal to :

1) 1 2) -2 3) 2 4) $2/e$

72. If $f(x) = \int_0^{x^2} \sqrt{\sin t + \cos t}\ dt$, then derivative of $f(x)$ $w.r.t.$ x is :

1) $2x\sqrt{\sin x^2 + \cos x^2}$ 2) $\sqrt{\sin x^2 + \cos x^2}$ 3) $x\sqrt{\sin x^2 + \cos x^2}$ 4) none of these

73. Let $I = \int_0^{\pi/6} \sin^2 t \cos^2 t\ dt$, then :

1) $I = \frac{\pi}{48}$ 2) $I < \frac{\pi}{48}$ 3) $I > \frac{\pi}{48}$ 4) none of these

74. The perimeter of the curve $r = 2\cos\theta$ is :

1) $\pi/2$ 2) π 3) $3\pi/2$ 4) 2π

75. Which of the following is correct?

1) $\int_0^\infty e^{-x} dx$ is not convergent
2) $\int_0^\infty e^{-x^2} dx$ is not convergent
3) $\int_{-\infty}^0 e^x dx$ is convergent
4) $\int_0^\infty e^{-x^2} dx$ is divergent

76. Consider the function f defined on $[-1, 1]$ as $f(x) = \begin{cases} k, & x \neq 0 \\ 0, & x = 0 \end{cases}$ then :

1) f is not Riemann integrable
2) f is Riemann integrable
3) $\int_0^1 f(x)dx = 0$
4) $\int_0^1 f(x)dx = 3k$

77. The integral $\int_0^1 x^{m-1}(1-x)^{n-1}dx$ exists :

1) when $m > 0, n < 0$ 2) when $m < 0, n < 0$ 3) when $m > 0, n > 0$ 4) when $m = n = 0$

78. Radius of convergence of the power series $\sum \frac{x^n}{n}$ is :

1) 1 2) 2 3) 3 4) none of these

79. Which one of the following series is uniformly convergent for all real x?

1) $\sum \frac{\sin nx}{n}$ 2) $\sum \frac{\sin nx}{n^{2/3}}$ 3) $\sum \frac{\sin nx}{n^{1/4}}$ 4) none of these

80. If $f(x, y) = \begin{cases} xy \sin\left(\frac{1}{x}\right), & x \neq 0 \\ 0 & , x = 0 \end{cases}$ then :

1) $f_x(0, 0) = 1 = f_y(0, 0)$ 2) $f_x(0, 0) = 0 = f_y(0, 0)$

3) $f_x(0, 0) \neq f_x(0, 0)$ 4) none of these

81. If $f(x, y) = \frac{xy}{\sqrt{x^2+y^2}}$, $(x, y) \neq 0$ and $f(x, y) = 0$ for $(x, y) = (0, 0)$ then :

1) $f(x, y)$ is discontinuous at (0, 0) 2) $f(x, y)$ is continuous at (0, 0)

3) $f_x(0, 0) = 1$ 4) $f_y(0, 0) = 1$

82. What is the positive value of m for which the coefficient of x^2 in $(1 + x)^m$ is 6 ?

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

83. Value of the integral $\int \tan x \, dx$ is :

1) $\sec^2 x + c$ 2) $\cot x + c$ 3) $-\log|\cos x| + c$ 4) none of these

84. If $y = 3$ when $x = 3$, and $\frac{dy}{dx} = \frac{2x}{y^2}$, then value of y at $x = 1$ will be :

1) 1 2) $\sqrt[3]{12}$ 3) $\sqrt[3]{9}$ 4) $\sqrt[3]{3}$

85. A bag has 8 red balls and 5 white balls. Three balls are drawn at random. Find the probability that the balls drawn are two red and one white.

1) $\frac{C_2^8 \times C_1^5}{C_3^{13}}$ 2) $\frac{C_2^8 + C_1^5}{C_3^{13}}$ 3) $\frac{C_3^8 \times C_3^5}{C_3^{13}}$ 4) none of these

86. If slope of the tangent to a curve $y = f(x)$ at any point (x, y) is given by the equation $\frac{dy}{dx} = (x-1)(x-2)^2(x-3)^3(x-4)^4$ then y will have a local maxima at :

1) $x = 1$ and 3 2) $x = 1$ 3) $x = 2$ and 4 4) $x = 1, 2, 3$ and 4

87. Value of the integral $\int_C (xdx + xy\,dy)$ over a line C from (1, 0) to (0, 1) is :

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

88. Value of the integral $\iint_C x^2y^2$ over the domain $C = \{(x, y) : x \geq 0, y \geq 0, x^2 + y^2 \leq 1\}$ is :

1) $\frac{\pi}{96}$ 2) $\frac{\pi}{24}$ 3) $\frac{\pi}{16}$ 4) $\frac{\pi}{4}$

89. If $f(x, y, z) = 3x^2y - y^3z^2$, then the grad f at $(1, -2, -1)$ is :

1) $-12\hat{\imath} - 9\hat{\jmath} - 16\hat{k}$ 2) $12\hat{\imath} - 9\hat{\jmath} + 16\hat{k}$ 3) $12\hat{\imath} + 9\hat{\jmath} + 16\hat{k}$ 4) none of these

90. The directional derivative of $f(x, y, z) = xy^2 + yz^3$ at point $(2, -1, 1)$ in the direction of the vector $\hat{\imath} + 2\hat{\jmath} + 2\hat{k}$ is :

1) $\frac{13}{3}$ 2) $\frac{11}{3}$ 3) $\frac{3}{11}$ 4) none of these

91. Divergence of the 3-dimensional radial vector field $\vec{r}$ is :

1) $3\hat{\imath}$ 2) 3 3) $3\hat{\imath} + \hat{\jmath} + \hat{k}$ 4) 1

92. The vector field $\vec{F} = x\hat{\imath} - y\hat{\jmath}$ is :

1) divergence free but not irrotational
2) irrotational but not divergence free
3) divergence free and irrotational
4) neither divergence free nor irrotational

93. Stoke's theorem connects :

1) line integral and surface integral
2) surface integral and volume integral
3) line integral and volume integral
4) none of these

94. Area of a triangle formed by the tips of the vectors $\vec{a}$, $\vec{b}$ and $\vec{c}$ is :

1) $\frac{1}{2}(\vec{a}-\vec{b})\cdot(\vec{a}-\vec{c})$
2) $\frac{1}{2}|(\vec{a}-\vec{b})\times(\vec{a}-\vec{c})|$
3) $\frac{1}{2}|(\vec{a}\times\vec{b}\times\vec{c})|$
4) none of these

95. An integrating factor of $x\frac{dy}{dx} + (3x+1)y = xe^{-2x}$ is :

1) xe^{3x}
2) $3xe^{x}$
3) xe^{x}
4) x^3e^{x}

96. General solution of the differential equation $4x^2y'' - 8xy' + 9y = 0$ is :

1) $c_1 e^{5x/2} + c_2 e^{-3x/2}$
2) $c_1 e^{3x/2} + c_2 e^{-3x/2}$
3) $(c_1 + c_2 \log x)\, x^{3/2}$
4) none of these

97. Solution of the differential equation $y'' + 4y = 0$ subject to $y(0) = 1$, $y'(0) = 2$ is :

1) $\sin 2x + 1$
2) $\cos 2x + 2x$
3) $\cos 2x - \sin 2x$
4) $\cos 2x + \sin 2x$

98. If $\phi(x, y) = 0$ is a singular solution, then $\phi(x, y)$ is a factor of :

1) p-discriminant only
2) c-discriminant only
3) both p and c-discriminants
4) none of these

99. For a complex number z, the minimum value of $|z| + |z - \cos\alpha - i\sin\alpha|$ is :

1) 2
2) 1
3) 0
4) 3

100. Let z be a complex number such that $|z| = 4$ and $\arg(z) = \frac{5\pi}{6}$, then z is :

1) $-\sqrt{3} + i$
2) $2\sqrt{3} + 2i$
3) $2\sqrt{3} - 2i$
4) $-2\sqrt{3} + 2i$

Key for TGT, Paper-II: Mathematics (21.2.2015(Evening) T-2/6
'A' Series

Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.
1	1	26	3	51	4	76	2
2	4	27	1	52	3	77	3
3	3	28	2	53	1	78	1
4	4	29	3	54	3	79	1
5	3	30	4	55	4	80	2
6	2	31	2	56	2	81	2
7	2	32	2	57	3	82	4
8	4	33	1	58	4	83	3
9	3	34	1	59	2	84	4
10	2	35	2	60	3	85	1
11	1	36	2	61	3	86	2
12	4	37	4	62	4	87	3
13	1	38	3	63	2	88	1
14	1	39	3	64	4	89	1
15	2	40	4	65	1	90	4
16	2	41	1	66	4	91	2
17	4	42	2	67	1	92	3
18	1	43	4	68	2	93	1
19	2	44	3	69	4	94	2
20	3	45	1	70	3	95	1
21	1	46	4	71	3	96	3
22	4	47	2	72	1	97	4
23	1	48	1	73	2	98	3
24	3	49	3	74	4	99	2
25	4	50	1	75	3	100	4