Code No.	T – 2128

Entrance Examination for Admission to the P.G. Courses in the Teaching Departments, 2024

CSS

STATISTICS/APPLIED STATISTICS AND DATA ANALYTICS

General Instructions

1. The Question Paper is having 100 Objective Questions, each carrying one mark.
2. The answers are to be (✓) 'tick marked' **only** in the "**Response Sheet**" provided.
3. **Negative marking** : **0.25 marks** will be deducted for each wrong answer .

Time : 2 Hours **Max. Marks : 100**

To be filled in by the Candidate									
Register Number	in Figures								
	in words								

Choose appropriate answer from the options in the questions.

(100 × 1 = 100 marks)

1. If the sum of squares of deviations from the mean 10 of all the 20 observations in a data is 8000, what is the coefficient of variation?

   A. 50 B. 100

   C. 200 D. 40

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2. If A is an orthogonal matrix, which of the following is true?

   A. $A = A^T$ B. $A^T = 1$

   C. $AA^T = 1$ D. $A^T A = 1$

3. Which among the following matrices is invertible?

   A. $\begin{bmatrix} 1 & 2 & 2 \\ 1 & 2 & 2 \\ 1 & 2 & 2 \end{bmatrix}$ B. $\begin{bmatrix} 1 & 2 & 2 \\ 0 & 2 & 2 \\ 0 & 0 & 2 \end{bmatrix}$

   C. $\begin{bmatrix} 1 & 2 & 2 \\ 1 & 0 & 2 \\ 1 & 0 & 2 \end{bmatrix}$ D. $\begin{bmatrix} 1 & 0 & 0 \\ 1 & 2 & 2 \\ 1 & 2 & 2 \end{bmatrix}$

4. Let $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ -3 & -6 & -9 \end{bmatrix}$. Then rank of A is

A. 1 B. 2

C. 3 D. 0

5. If a person travels from Kochi to Cheimai in a car at a speed of 60km per hour and returns through the same route in the same car at a speed of 40km per hour, what is the average speed of the whole journey in km per hour?

A. 45 B. 50

C. 24 D. 48

6. If the average daily wage of workers in a company is Rs.690/- and the average daily wage for men workers and women workers are Rs. 850/- and Rs. 450/- respectively, what is the percentage men workers in the company?

A. 60% B. 40%

C. 150% D. 66.66%

7. Let $A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 1 \\ 3 & 4 & 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 2 & 3 & 1 \end{bmatrix}$. Which of the following exist?

A. AB B. $A + B$

C. BA D. $A^T + B$

8. If $A=\begin{bmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$. Then for $a \neq 0, b \neq 0, c \neq 0$, A^{-1} is given by

A. $\begin{bmatrix} \frac{1}{a} & 0 & 0 \\ 0 & \frac{1}{b} & 0 \\ 0 & 0 & \frac{1}{c} \end{bmatrix}$

B. $\begin{bmatrix} -a & 0 & 0 \\ 0 & -b & 0 \\ 0 & 0 & -c \end{bmatrix}$

C. $\begin{bmatrix} bc & 0 & 0 \\ 0 & ca & 0 \\ 0 & 0 & ab \end{bmatrix}$

D. $\begin{bmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$

9. If A and B are two matrices such that $A^2 - B^2 = (A-B)(A+B)$, then :

A. Either A or B is a zero matrix

B. $A = B$

C. $AB = BA$

D. $A^2 = B^2$

10. Which of the following averages is known as the business man's average?

A. A.M.

B. G.M.

C. Median

D. Mode

11. The median of a data consisting of 101 observations is 60. Later it was found that the smallest observation in the data was 8 instead of 3. Then what is the correct median?

A. 55

B. 60

C. 65

D. None of these

12. Let $A = \begin{bmatrix} 1 & 3 & -5 \\ 3 & -1 & 2 \\ 1 & -2 & 1 \end{bmatrix}$. Then $|A|$ is

A. 25 B. 23

C. 19 D. 29

13. The distinct eigen values of the matrix $\begin{bmatrix} 4 & 2 \\ 3 & -1 \end{bmatrix}$ are

A. 2, –5 B. 3, 10

C. 5, –2 D. –3, –10

14. If a nursery school is to be started in a colony, which average can be used so that the total distance to be walked from the homes to the nursery school is minimum.

A. A.M. B. Median

C. Mode D. H. M.

15. What is the value of k such that the vectors $U = (1,1,0)$, $V = (1,3,2)$ and $W = (4,9,k)$ are linearly dependent?.

A. 1 B. 3

C. 5 D. 7

16. Consider the vectors $X = (1,2,3,4)$ and $Y = (6,k,-8,2)$. What is the value of k so that X and Y are orthogonal?.

A. 12 B. 9

C. 7 D. 5

17. What is the nature of skewness, if Mean = 20, Median = 23, Mode = 25, SD = 5?

A. positive B. negative

C. symmetric D. none of these

18. If $a_n = \frac{(-1)^n}{n^2}$; $n \in N$, then the limit infimum of $\{a_n\}$ is

A. 0 B. $-\infty$

C. -1 D. $\frac{-1}{n^2}$

19. $\lim_{n\to\infty} \frac{3+2\sqrt{n}}{\sqrt{n}}$

A. 3 B. 2

C. 1 D. 0

20. Let X_1 and X_2 are independently and identically distributed random variables following binomial distribution $B(1, \theta)$, Let $Y_i = 1 - X_i$, $i = 1,2$, then the distribution of $Y_1 + Y_2$ is,

A. $B(2, \theta)$ B. $B(1, \theta)$

C. $B(2, 1-\theta)$ D. $B(1, 1-\theta)$

21. If $\{a_n\}$ converges and $\{b_n\}$ diverges then what is the value of $\lim \frac{a_n}{b_n}$.

A. 0 B. ∞

C. 1 D. None of these

22. Which of the following sequence is not convergent?

A. $\left\{\frac{n}{n+1}\right\}$ B. $\left\{\frac{(-1)^n}{n}\right\}$

C. $\left\{\frac{1}{n}\right\}$ D. $\left\{\frac{1}{n!}\right\}$

23. In answering a question on multiple choice test a student either knows the answer or he guesses. Let P be the probability that he know the answer and $1-P$ be the probability that he guesses. Assume that a student who guesses the answer will be correct with probability ¼ where 4 is the number of multiple choice alternatives. What is the conditional probability that a student knew the answer to a question given that he answered it correctly?

A. $\frac{4P}{3P+1}$ B. $\frac{5P}{4P+1}$

C. $\frac{P}{3P+1}$ D. $\frac{P}{4P+1}$

24. Which of the following is not an example of a countable set?

A. Set of integers B. Set of rational numbers

C. Set of irrational numbers D. None of the above

25. Which measure of dispersion can be calculated in case of a data with open end intervals?

A. M.D. B. Q.D.

C. S.D. D. None of these

26. The mean and standard deviation of a data are 50 and 5 respectively. If a constant value 5 is subtracted from each value in the data, the coefficient of variation of the new set of values is

A. 10% B. 15%

C. 20% D. 12.5%

27. Who introduced the axiomatic definition of probability?

A. C. R. Rao B. Karl Pearson

C. A.N. Kolmogrov D. R. A. Fisher

28. Which of the following distributions has the mean larger than variance?

A. Binomial
B. Poisson
C. Geometric
D. Negative Binomial

29. The cdf of a r.v. X is $F(x) = 1 - \exp(-\lambda x); 0 < x < \infty$. What is the distribution of $Y = F(x)$?

A. Uniform
B. Exponential
C. Chi-square
D. Normal

30. Which of the following is a solution of the differential equation $dy / y = k\ dx$?

A. x^k
B. $c\ e^{kx}$
C. $\log x^k$
D. $c \log x^k$

31. The second and fourth central moments for a data are 56 and 4 respectively. What is its nature of kurtosis?

A. meso kurtic
B. leptokurtic
C. platy kurtic
D. symmetric

32. If a uniform distribution over $(0, \theta)$ has mean and variance equal, what is the value of θ?

A. 1
B. 2
C. 6
D. 12

33. The mean and variance of a binomial distribution are 12 and 6. What is its mode?

A. 12
B. 25
C. 24
D. 13

34. Which of the following distributions have lack of memory property?

A. Normal
B. Laplace
C. Cauchy
D. Exponential

35. Which distribution has mgf given by $M_x(t) = 3/(3-t)$?

A. Normal
B. Exponential
C. Binomial
D. Poisson

36. If a random variable X assumes only positive integral values with the probability mass function $P[X = x] = \frac{2}{3}\left(\frac{1}{3}\right)^{x-1}$, $x = 1,2,3,...;$ then $E(X)$ is :

A. 2/9
B. 2/3
C. 1
D. 3/2

37. If $X \sim N(0, 1)$, what is the distribution of $Y = X^2$?

A. Chi-square
B. F distribution
C. Students t
D. Weibull

38. X is normally distributed with zero mean and unit variance. The variance of X^2 is

A. 0
B. 1
C. 2
D. 4

39. If X and Y are independent Poisson random variables with parameters λ and μ, what is the conditional distribution of X given $X + Y$?

A. Binomial
B. Poisson
C. Geometric
D. Hyper geometric

40. If $X \sim B(n_1, p)$ and $Y \sim B(n_2, p)$ and are independent, then the conditional distribution of X given $X + Y$ follows which distribution?

A. Binomial
B. Poisson
C. Uniform
D. Hyper geometric

41. What are the conditions under which Binomial (n, p) tends to normal distribution?

A. $n \to \infty, p \to 0$ B. $n \to \infty, p \to 0.5$

C. $n \to \infty, p \to 1$ D. $n \to \infty, p \to \infty$

42. A random variable X has the following probability distribution

X	1	2	3	4	5	6	7
$P(x)$	k	2k	$2k$	$3k$	k^2	$2k^2$	$7k^2$ +k

Then what is the value of k?

A. 10 B. 20

C. $\frac{1}{20}$ D. $\frac{1}{10}$

43. There is 80% chance that a problem will be solved by Ravi. But the chance that the same problem will be solved by Rani is 60%. What is the probability that atleast one of them solves the problem?

A. 0.48 B. 0.92

C. 0.44 D. 0.70

44. In a survey among people in a city, it is revealed that 60% read newspaper A, 40% read newspaper B, and 30% read newspaper C. But 20% read both A and B, 30% read both A and C, 10% read both B and C. Also it is found that 15 % read all the three. Then what is the percentage of people who do not read any of these newspapers?

A. 0.15 B. 0.70

C. 0.30 D. 0.85

45. Which of the following is the correct relationship between arithmetic mean, geometric mean and harmonic mean?

A. $A.M = G.M = H.M$ B. $G.M \geq A.M \geq H.M$

C. $H.M \geq G.M \geq A.M$ D. $A.M \geq G.M \geq H.M$

46. The population of India is approximately equal to

A. 140 crore
B. 120 crore
C. 100 crore
D. 150 crore

47. The Cramer – Rao inequality is concerned with what aspect of estimators?

A. sufficiency
B. lower limit of variance of an unbiased estimator
C. consistency
D. upper limit of the variance of an estimator

48. If 25 observations are randomly drawn from a normal population with mean 120 and Variance 100, the standard error of the sample mean is

A. 4
B. 24
C. 20
D. 2

49. If the distribution is moderately asymmetrical

A. Mean = 3Median – 2Mode
B. Median = 3Mode – 2Mean
C. Mode = 3Median – 2Mean
D. Mode = 2Median – 3Mean

50. The general tendency of the time series data to increase or decrease during a long period of time is called

A. seasonal variation
B. secular trend
C. cyclic variation
D. irregular variation

51. Which of the following methods is not used for measuring seasonal fluctuations

A. moving average method
B. ratio to moving average method
C. link relative method
D. ratio to trend method

52. The Fisher's index number does not satisfy which of the following tests?

A. unit test
B. time reversal test
C. factor reversal test
D. circular test

53. Analysis of Variance is used to test

A. equality of means of two independent populations

B. equality of means of several independent populations

C. equality of variance of two populations

D. equality of variance of several independent populations

54. Which index number is used for constructing cost of living index?

A. Laspeyre's index

B. Paasche's index

C. Fisher's index

D. Marshall-Edgeworth's index

55. Time reversal and Factor reversal tests for an Index number are satisfied by:

A. Paasche's index number

B. Marshall-Edgeworth index number

C. Fisher's index number

D. Laspeyre's index number.

56. The consumer's risk corresponds to

A. Probability of type I error

B. Probability of type II error

C. Power of a test

D. None of these

57. If X and Y have the joint pdf $f(x, y) = \exp\{-(x+y)\};\ 0 < x, y < \infty$, which of the following holds true?

A. X and Y are independent

B. Both follows exponential with mean 1

C. Both have variance 1

D. All the above

58. A Chi-square test is used for which purpose?

A. testing equality of means

B. testing equality of variances

C. testing goodness of fit

D. testing randomness

59. The values of correlation between X_1, X_2 and X_3 are obtained as $r_{12} = 0.9$, $r_{13} = 0.6$ and $r_{23} = 0.8$. What is the partial correlation coefficient between X_1 and X_2 on X_3?

A. 0.54 B. 0.69

C. 0.72 D. 0.43

60. The ranks given by two judges in a beauty competition to 5 candidates are (1,2), (5,4), (3,5) , (2,1) and (4,5). Find the rank correlation coefficient between them.

A. 2/5 B. 3/5

C. 1/15 D. 14/15

61. Suppose a study was conducted among 50 science students to see whether they have studied French or German which gave the following data. 25 studied French, 20 studied German, 5 studied both. Find the number of students who studied neither language.

A. 5 B. 10

C. 15 D. 20

62. Suppose that the chance that doctor A will diagnose the disease correctly is 70%. The chance that the patient will die by his treatment after correct diagnosis is 30%. and the chance of death by wrong diagnosis is 60%. If a patient of doctor A dies, what is the probability that the disease was diagnosed correctly?

A. 3/7 B. 1/2

C. 7/9 D. 7/13

63. Who introduced the method of maximum likelihood estimation?

A. Karl Pearson B. R. A. Fisher

C. C. R. Rao D. Thomas Bayes

64. The time in minutes of anesthesia follows an exponential population with mean θ. Based on the following random observations (1.8, 2.5, 3.8, 6.2, 4.3, 6.1, 5.3, 7.6, 0.8, 8.2) from the above population, what is the mle of θ?

A. 4.66 B. 0.8

C. 8.2 D. 0.2146

65. Who is the Chairman of the National Statistical Commission at present?

A. Narendra Modi B. Dr. Rajeeva L. Karandikar

C. Dr. C. Rangarajan D. Dr. Bimal Kumar Roy

66. Let $(x_1, x_2,..., x_n)$ be a srs from $N(\mu, \sigma^2)$, then which is an unbiased estimator of σ^2?

A. $(1/n)\sum(x_i - \bar{x})^2$ B. $[n/(n-1)]\sum(x_i - \bar{x})^2$

C. $[1/(n-1)]\sum(x_i - \bar{x})^2$ D. $[(n-1)/n]\sum(x_i - \bar{x})^2$

67. A card is selected at random from an ordinary deck of 52 playing cards. Consider the following events *A* = [Heart] and *B* = [Face card]. Find $P(A \cup B)$

A. 25/52 B. 3/52

C. 13/52 D. 11/26

68. A point is chosen at random inside a rectangle measuring 3 by 5 inch. What is the probability that the point is atleast one inch from the edge?

A. 1/5 B. 8/15

C. 1/3 D. 3/5

69. A box contains two white sox and two blue sox. If two sox are drawn at random, what is the probability that they are a match (same colour)?

A. 1/2 B. 1/3

C. 1/4 D. 1/6

70. A factory uses 3 machines *X, Y, Z* to produce certain items. Suppose

(a) Machine *X* produces 50% of the items of which .3% are defective

(b) Machine *Y* produces 30% of the items of which 4 % are defective

(c) Machine *Z* produces 20% of the items of which 5 % are defective

Suppose a defective item is found among the output. Find the probability that it came from machine *Y*

A. 4/10 B. 12/36

C. 1/3 D. 12/37

71. Let $(x_1, x_2, ..., x_n)$ be a srs from a point binomial distribution with pdf $p^x(1-p)^{1-x}; x = 0,1.$ Then which of the following is a sufficient statistic for *p*?

A. $\sum x_i$ B. $\prod x_i$

C. $\sum \log x_i$ D. $1/\sum x_i$

72. If $(x_1, x_2, ..., x_n)$ is a srs from a log normal distribution with parameters (μ, σ^2), what is the estimator of μ by the method of moments?

A. $(1/n)\sum x_i$ B. $(1/n)\sum \log x_i$

C. $\exp\left[(1/n)\sum x_i\right]$ D. $(\prod x_i)^{1/n}$

73. A fair coin is tossed twice giving the equi probable space *S*. Let *X* and *Y* be random variables on *S* defined as follows.

(a) $X = 1$ if the first toss is head and $X = 0$ otherwise

(b) $Y = 1$ if both tosses are head and $Y = 0$ otherwise

Let $Z = X + Y$. Find variance of *Z*.

A. 7/16 B. 15/16

C. 9/16 D. 11/16

74. Let $X_1 \sim N(\mu = 2, \sigma^2 = 1)$ and $X_2 \sim N(\mu = 3, \sigma^2 = 2)$ and X_1 and X_2 are independent. Then the distribution of $3X_1 - 2X_2$ is :

A. $N(12, 17)$ B. $N(12, 1)$

C. $N(0, 1)$ D. $N(0,17)$

75. Let X_1, X_2, X_3, X_4 be independent and identically distributed random variables with mean 100 and standard deviation 4. Let $Y = \frac{X_1 + X_2 + X_3 + X_4}{4}$. Find standard deviation of Y.

A. 2 B. 4

C. 12 D. 16

76. Find the expected number of correct answers obtained by guessing in a 30 question true–false test.

A. 25 B. 15

C. 20 D. 10

77. The variable X and Y are connected by the equation $aX + bY + c = 0$. If the signs of a and b are different. What is the coefficient of correlation between them?

A. +1 B. 0

C. –1 D. 0.5

78. X and Y are two random variables with variances σ_x^2 and σ_y^2 respectively and r is the coefficient of correlation between them. If $U = X + kY$ and $V = X + \left[\frac{\sigma_x}{\sigma_y}\right] Y$. Find the value of k such that U and V are uncorrelated.

A. $\frac{\sigma_x}{\sigma_y}$ B. $-\frac{\sigma_x}{\sigma_y}$

C. $\frac{\sigma_y}{\sigma_x}$ D. $-\frac{\sigma_y}{\sigma_x}$

79. Given two lines of regression as $8x - 10y + 66 = 0$, $40x - 18y = 214$. What is the correlation coefficient between *x* and *y*

A. $\pm\frac{1}{5}$ B. $\pm\frac{2}{5}$

C. $\pm\frac{3}{5}$ D. $\pm\frac{4}{5}$

80. When the correlation coefficient r= ±1, then the two regression lines are

A. Perpendicular to each other B. Parallel to each other

C. Coincide D. Do not exist

81. The two lines of regression are given as $x + 2y - 5 = 0$ and $2x + 3y = 8$ then the mean value of *X* and *Y* respectively are

A. 1, 2 B. 2, 1

C. 3, 2 D. 1, 0

82. Let $X_1, X_2, ..., X_n$ be a random sample of size n from a population with p.d.f. $f(x, \theta) = \frac{1}{2}e^{-|x-\theta|}; -\infty < x < \infty$. Then what is the MLE of θ?

A. Mean$(X_1, X_2, ..., X_n)$ B. Median$(X_1, X_2, ..., X_n)$

C. Maximum$(X_1, X_2, ..., X_n)$ D. Minimum$(X_1, X_2, ..., X_n)$

83. Which test statistic is used for testing $H_0 : \mu = \mu_0$ against $H_1 = \mu = \mu_1(\mu_1 > \mu_0)$, when standard deviation σ is unknown in a normal population?

A. Normal B. Chi-square

C. F test D. Student's t

84. Mean and variance of binomial distribution are 8 and 4 respectively then $P(X=1)$ is

A. $\frac{1}{2^{12}}$ B. $\frac{1}{2^4}$

C. $\frac{1}{2^6}$ D. $\frac{1}{2^8}$

85. The mode of geometric distribution with pmf $f(x)=\frac{1}{2^x}$, $x=1, 2, \ldots$ is

A. 0 B. 1/2

C. 1 D. 2

86. The point of intersection of the two ogives corresponds to

A. mean B. median

C. mode D. S.D.

87. X and Y are two independent gamma random variables following Gamma(n_1) and Gamma(n_2). The distribution of $\frac{X}{Y}$ is,

A. $\text{Beta}_1(n_1, n_2)$ B. $F(n_1, n_2)$

C. $\text{Beta}_2(n_1, n_2)$ D. Gamma (n_1+n_2)

88. If $f(x, y)=4xy; 0<x<1; 0<y<1$, then $E(Y/X=x)$ is,

A. $\frac{1}{2}$ B. $\frac{1}{3}$

C. $\frac{3}{2}$ D. $\frac{2}{3}$

89. If $E(XY)=E(X)E(Y)$. Which of the following is need not be true?

A. X and Y are independent B. Cov (X, Y) = 0

C. Cor (X, Y) = 0 D. None of the above

90. If X follows uniform distribution over (0, θ), the mle of θ based on a srs (2.1, 3.5, 0.8, 5.3, 2.9, 4.6, 7.5, 1.8, 8.2, 3.1) is

A. 0.8 B. 8.2

C. 3.5 D. 3.98

91. Suppose that X is a Poisson random variable with $P(X=1)=P(X=3)$, Then $V(X)$ is

A. $\sqrt{6}$ B. 6

C. 2 D. 3

92. If $X_1, X_2,..., X_n$ be a random sample from $N(\mu, \sigma^2)$, where μ is known. Then the sufficient statistic for σ^2?

A. $\sum X_i$ B. $\sum (X_i - \overline{X})^2$

C. $\sum (X_i - \mu)^2$ D. $\sum X_i^2$

93. If T_1 and T_2 are two most efficient estimators with same variance S^2 and correlation between them is ρ. Then variance of $\frac{T_1+T_2}{2}$ is

A. S^2 B. ρS^2

C. $\frac{(1+\rho)}{4}S^2$ D. $\frac{(1+\rho)}{2}S^2$

94. Let (2,4,8,3,6,7) be a random sample from the population having the density function $f_\theta(x)=e^{-x+\theta}$; $\theta \le x \le \infty$. Then the mle of θ is

A. 5 B. 6

C. 8 D. 2

95. The number of runs in the series HTHHTHTTTHHTTHHHTHHT is

A. 11 B. 12

C. 10 D. 20

96. Assume that the daily sales of petrol follows normal distribution with mean 1000 liter per day and standard deviation 50. The hypothesis that the sales of petrol exceeds 1000 Liter per day is to be tested. If the average sales on 16 days is 1100 Liter per day what is your decision at 5% level of significance?

A. Significantly exceeds 1000 liter per day

B. No significant evidence

C. Significantly less than 1000 liter per day

D. Cannot be tested

97. The range of the multiple correlation coefficient is

A. (–1, 1)

B. (0, 1)

C. (–1, 0)

D. (0, 3)

98. The Kolmogrov - Smirnov test is used for testing

A. equality of means

B. equality of variances

C. independence of attributes

D. goodness of fit

99. In the context of sampling, which sampling procedure is appropriate for Exit polls?

A. Simple random sampling

B. Stratified sampling

C. Systematic sampling

D. Cluster sampling

100. In an agricultural experiment to test the mean yields of 4 varieties of crops, the land is of 3 types namely hilly, plain, muddy land. Which is the most suitable design for this?

A. CRD

B. RBD

C. LSD

D. Factorial

ANSWER SHEET

1	A	B	C	D	E	26	A	B	C	D	E	51	A	B	C	D	E	76	A	B	C	D	E
2	A	B	C	D	E	27	A	B	C	D	E	52	A	B	C	D	E	77	A	B	C	D	E
3	A	B	C	D	E	28	A	B	C	D	E	53	A	B	C	D	E	78	A	B	C	D	E
4	A	B	C	D	E	29	A	B	C	D	E	54	A	B	C	D	E	79	A	B	C	D	E
5	A	B	C	D	E	30	A	B	C	D	E	55	A	B	C	D	E	80	A	B	C	D	E
6	A	B	C	D	E	31	A	B	C	D	E	56	A	B	C	D	E	81	A	B	C	D	E
7	A	B	C	D	E	32	A	B	C	D	E	57	A	B	C	D	E	82	A	B	C	D	E
8	A	B	C	D	E	33	A	B	C	D	E	58	A	B	C	D	E	83	A	B	C	D	E
9	A	B	C	D	E	34	A	B	C	D	E	59	A	B	C	D	E	84	A	B	C	D	E
10	A	B	C	D	E	35	A	B	C	D	E	60	A	B	C	D	E	85	A	B	C	D	E
11	A	B	C	D	E	36	A	B	C	D	E	61	A	B	C	D	E	86	A	B	C	D	E
12	A	B	C	D	E	37	A	B	C	D	E	62	A	B	C	D	E	87	A	B	C	D	E
13	A	B	C	D	E	38	A	B	C	D	E	63	A	B	C	D	E	88	A	B	C	D	E
14	A	B	C	D	E	39	A	B	C	D	E	64	A	B	C	D	E	89	A	B	C	D	E
15	A	B	C	D	E	40	A	B	C	D	E	65	A	B	C	D	E	90	A	B	C	D	E
16	A	B	C	D	E	41	A	B	C	D	E	66	A	B	C	D	E	91	A	B	C	D	E
17	A	B	C	D	E	42	A	B	C	D	E	67	A	B	C	D	E	92	A	B	C	D	E
18	A	B	C	D	E	43	A	B	C	D	E	68	A	B	C	D	E	93	A	B	C	D	E
19	A	B	C	D	E	44	A	B	C	D	E	69	A	B	C	D	E	94	A	B	C	D	E
20	A	B	C	D	E	45	A	B	C	D	E	70	A	B	C	D	E	95	A	B	C	D	E
21	A	B	C	D	E	46	A	B	C	D	E	71	A	B	C	D	E	96	A	B	C	D	E
22	A	B	C	D	E	47	A	B	C	D	E	72	A	B	C	D	E	97	A	B	C	D	E
23	A	B	C	D	E	48	A	B	C	D	E	73	A	B	C	D	E	98	A	B	C	D	E
24	A	B	C	D	E	49	A	B	C	D	E	74	A	B	C	D	E	99	A	B	C	D	E
25	A	B	C	D	E	50	A	B	C	D	E	75	A	B	C	D	E	100	A	B	C	D	E

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