**ENTRANCE EXAMINATION FOR ADMISSION, MAY 2013.**

**M.Sc. (STATISTICS)**

**COURSE CODE : 375**

Register Number : 

*Signature of the Invigilator*
*(with date)*

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COURSE CODE : 375

**Time : 2 Hours** **Max : 400 Marks**

*Instructions to Candidates :*

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each of the question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you –1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. When there are a large number of values in an individual series, the preferred way of representing the series is through:

(A) Bar diagram (B) column chart

(C) line chart (D) scatter diagram

2. For a symmetrical distribution, median ± quartile deviation covers

(A) 25% of the observations (B) 50% of the observations

(C) 75% of the observations (D) 100% of the observations

3. If the coefficient of skewness based on moments is negative, then the third central moment,

(A) $\mu_3 > 0$ (B) $\mu_3 < 0$

(C) $\mu_3 = 0$ (D) $\mu_3$ does not exist.

4. If a random variable X has mean 3 and standard deviation 5, then the variance of a variable $y = 2X - 5$ is:

(A) 45 (B) 100 (C) 15 (D) 40

5. If $\rho$ is the correlation coefficient between X and Y, the correlation coefficient between aX+b and Y is:

(A) $a\rho$ (B) $a\rho + b$ (C) $a^2\rho$ (D) $\rho$

6. If the two lines of regression in a bivariate distribution are $X + 9Y = 7$ and $Y + 4X = 16$, then $\sigma_X : \sigma_Y$ is:

(A) 3 : 2 (B) 2 : 3 (C) 9 : 4 (D) 4 : 9

7. The arithmetic and geometric mean of two observations are 5 and 4 respectively. Then the observations are

(A) 2, 8 (B) 4, 1 (C) 6,4 (D) 3,7

8. If arithmetic mean and coefficient of variation of x are 20 and 20 respectively, what is the variance of y = 10 - 2 x?

(A) 64 (B) 16 (C) 36 (D) 84

9. If $P(A) = p_1$, $P(B) = p_2$ $P(A \cap B) = p_3$ with $p_1, p_2, p_3 > 0$ then $P(\bar{A} \cap \bar{B})$ is equal to

(A) $p_1 + p_2 - p_3$ (B) $1 - p_1 - p_2 + p_3$

(C) $p_1 - p_2 - p_3$ (D) $1 - p_1 - p_2 - p_3$

10. Given that P(A U B) = 5/6, P(A∩B) = 1/3 and $P(\bar{B})$ = ½. Then the events A and B are

(A) Dependent (B) Independent

(C) Mutually Exclusive (D) Conditional events

11. Let X be a random variable (r.v.) then y = 1/X is also a

(A) Random variable

(B) Random variable provided P(X =0) = 0

(C) Random variable provided P(X =0) = 1

(D) Not a Random variable

12. It is given that the function

F(x) = 0 ; x ≤ 3

= 1 ; x > 3

is not a distribution function because

(A) It is not bounded (B) $F(-\infty) \neq 0$

(C) $F(+\infty) \neq 1$ (D) Not Right continuous

13. A random variable X takes values 0, 1, 2, 3, ... with probability proportional to $(x+1)(\frac{1}{5})^x$.

Then P (X ≤ 1) is equal to

(A) 112/125 (B) 110/125 (C) 113/125 (D) 109/125

14. Let P(x) = x/5 ; x = 1, 2, 3, 4, 5

= 0 ; elsewhere

Then P (X = 1 or 2) is equal to

(A) 1/6 (B) 1/7 (C) 1/5 (D) 1/9

15. The cumulative distribution function of a random variable X is

$$F(x) = \begin{cases} 0 \\ \frac{1}{2} & 0 \leq x < 2 \\ \frac{5}{6} & 2 \leq x < 3 \\ 1 & x \geq 3 \end{cases}$$

then P (2) is equal to

(A) 1/3 (B) 1/4 (C) 1/7 (D) 1/6

16. Let F(x, y) be the joint p.d.f. of (X, Y). If a, b, c, d are any real numbers with $a < b$ and $c < d$, then $P[a < X \leq b, c < Y \leq d]$ is equal to

(A) $F(b, d) + F(a,c) - F(b, c) + F(a,d)$

(B) $F(b, d) + F(a,c) + F(b, c) + F(a,d)$

(C) $F(b, d) - F(a,c) - F(b, c) + F(a,d)$

(D) $F(b, d) + F(a,c) - F(b, c) - F(a,d)$

17. Let $X \sim$ Binomial (2, 1/2) and $Y = X^2$ then E(Y) is

(A) 2 (B) 3/2 (C) 4 (D) 1/9

18. A discrete r.v. X assumes three values -3, 0, 4 and $P(X = 0) = ½$ and $E(X) = 9/8$ then the value of $P(X = 4)$ is

(A) 1/8 (B) 2/8 (C) 3/8 (D) 1/2

19. If the number of levels of each factor in an experiment is same then the experiment is called as

(A) Simple factorial experiment (B) Incomplete factorial experiment

(C) Asymmetrical factorial experiment (D) Symmetrical factorial experiment

20. To compare several treatments, when the experimental units are homogeneous, the appropriate design to be used is

(A) Randomized Block Design (B) Latin Square Design

(C) Split Plot Design (D) Completely Randomized Design

21. If $\sigma_1^2$ is the error variance of design $D_1$ and $\sigma_2^2$ is the error variance of design $D_2$ utilizing the same experimental material, the efficiency of $D_1$ over $D_2$ is

(A) $\frac{\frac{1}{\sigma_1^2}}{\frac{1}{\sigma_2^2}}$ (B) $\frac{\frac{1}{\sigma_2^2}}{\frac{1}{\sigma_1^2}}$ (C) $\sigma_1^2\sigma_2^2$ (D) $\frac{1}{\sigma_1^2\sigma_2^2}$

22. The maximum possible number of orthogonal contrasts among $v$ treatments is

(A) $v$ (B) $v - 1$ (C) $v - 2$ (D) $v^2$

23. If all the effects of the same order are confounded with incomplete block differences, it is said to be

(A) Complete Confounding (B) Partial Confounding

(C) Balanced Confounding (D) Unbalanced Confounding

24. Which one of the samples given below is not a SRSWOR sample of size 5 from a population of size 100

(A) 21, 26, 76, 41, 28 (B) 23, 42, 74, 33, 54

(C) 17, 61, 47, 56, 47 (D) 19, 37, 63, 42, 26

25. A random sample of size 25 is drawn from a population with mean 50 and variance100. What is the standard deviation of the sample mean?

(A) 20 (B) 2 (C) 10 (D) 100

26. The ratio of the variances of SRSWOR and SRSWR sample means of size 10 drawn from a population of size 100 is:

(A) 9/10 (B) 10/9 (C) 11/10 (D) 10/11

27. The stratified random sampling is useful when

(A) The population is homogeneous (B) The population is heterogeneous

(C) The population size is less than 500 (D) The population size is more than 500

28. The Systematic sampling is very much useful for the selection of the sample from the population when

(A) The population is an infinite population

(B) The population is an exponential

(C) The population with a linear trend

(D) The population with a non-linear trend

29. A systematic sample mean of size $n = 20$ is drawn from a population of size 100 with values 101, 102, 103,..., 198, 199 and 200. What is the variance of the systematic sample mean?

(A) 20 (B) 2 (C) 10 (D) 100

30. CMI in Indian Statistical Systems is referred as

(A) Central Manufacturing Industries

(B) Census of Manual Industries

(C) Census of Manufacturing Industries

(D) Central Mechanics Information

31. NBFIS in the context of Forest Survey of India stands for

(A) National Basic Forest Inventory System

(B) National Bureau of Forest Index Survey

(C) National Bank of Forest Investment Stock

(D) Net Bounded Forest Inventory Stock

32. The Body working for Agricultural Statistics of India is

(A) Indian Agricultural Statistical Research Institute

(B) Indian Aquaculture Board of investigation

(C) International Agriculture Studies

(D) Indian Agro Products Processing Center

33. Below Poverty Line Survey is related to

(A) Agriculture Statistics (B) Industrial Statistics

(C) Economic Census (D) Forest Statistics

34. Gross Domestic Product will be calculated by using the data through

(A) Agriculture Statistics (B) Industrial Statistics

(C) Economic Census (D) Forest Statistics

35. A time series consists of

(A) Two components (B) Three components

(C) Four components (D) Five components

36. Index numbers reveal the state of

(A) Inflation (B) Deflation

(C) Both (A) and (B) (D) Neither (A) nor (B)

37. One of the limitations in the construction of index numbers is

(A) Choice of type of average (B) Choice of investigators

(C) Choice of variables to be studied (D) All the above

38. 3- sigma control limits of defectives having a given value of fraction defectives p' are

(A) $UCL = p' + \sqrt{\frac{3p'q'}{n}}, CL = p' \& \ LCL = p' - \sqrt{\frac{3p'q'}{n}}$

(B) $UCL = p' + \sqrt{\frac{3p'q'}{n}}, CL = p' \& \ LCL = p' - \frac{1}{3}\sqrt{\frac{p'q'}{n}}$

(C) $UCL = p' + \sqrt{\frac{3p'q'}{n}}, CL = p' \& \ LCL = p' - 3\sqrt{\frac{p'q'}{n}}$

(D) $UCL = p' + \sqrt{\frac{1}{n}}, CL = p' \& \ LCL = p' - 3\sqrt{\frac{p'q'}{n}}$

39. In a sequential probability ratio test, the criterion for acceptance of the lot with usual notations is

(A) $\lambda_m \leq \frac{\beta}{1-\alpha}$ (B) $\lambda_m \geq \frac{\beta}{1-\alpha}$ (C) $\lambda_m \geq \frac{1-\beta}{\alpha}$ (D) $\lambda_m \leq \frac{1-\beta}{\alpha}$

40. A sequential sampling plan is

(A) Infinite process

(B) Process requiring much more sampling units than a fixed sample size

(C) A process in which sampling terminates with probability one

(D) All the above

41. Number of defects follows

(A) Exponential distribution (B) Poisson distribution

(C) Normal distribution (D) Binomial distribution

42. If X is a random variate such that E(X )=3 , E($X^2$ )=13, then $P[-2 < X < 8]$ is greater than or equal to

(A) 21/25 (B) 4/25 (C) 1/ 25 (D) 2/25

43. The p.d.f of a random variable X is $f(x) = \begin{cases} \frac{3}{4}x(2-x) & ;0 \leq x \leq 2 \\ 0 & otherwise \end{cases}$

then the median of the distribution is

(A) 1 (B) 2/3 (C) 3/4 (D) 4/5

44. Which one of the following is not a property of mgf $M_X(t)$ of a random variable X.

(i) $M_X(0) = 1$

(ii) $M_{aX+b}(t) = e^{at}M_X(bt)$

(iii) $for\ X > 0, M_X'(t) \geq 0$

(iv) $M_{X+Y}(t) = M_X(t).M_Y(t)$ *,if X and Y are independent*

(A) (ii) (B) (i) (C) (iii) (D) (iv)

45. For a geometric distribution with p=1/4, the mgf is equal to

(A) $1/(4-3e^t)$ (B) $1/(3e^t-4)$ (C) $1/3e^t$ (D) $(3e^t-4)$

46. For a certain quadratic equation, it is given that one of the root is $2 + i\sqrt{3}$ then the equation is

(A) $x^2 - 4x + 7 = 0$ (B) $x^2 - 2x + 7 = 0$

(C) $x^2 - 4x + 6 = 0$ (D) $x^2 - 4x - 7 = 0$

47. The statistical function used to count the number of cells that are not empty in the specified range

(A) COUNT( ) (B) COUNTA ( ) (C) COUNTIF ( ) (D) COUNTIFS ( )

48. The excel option which helps in displaying the records which meets a particular condition

(A) Advanced Filter (B) Auto Filter

(C) Select Cases (D) Pivot table

49. The Process of verifying the data which is acceptable by applying certain rules is _____

(A) Data Validation (B) Data Consolidation

(C) Custom Validation (D) Pivot table

50. Which command will you choose to convert a column of data into row?

(A) Cut and Paste (B) Edit >> Paste Special >> Transpose

(C) Both of above (D) Paste link

51. Each excel file is a workbook that contains different sheets. Which of the following cannot be a sheet in workbook?

(A) work sheet (B) chart sheet
(C) module sheet (D) data sheet

52. The series $1 + r + r^2 + \ldots \infty$ is convergent if

(A) $r \leq 1$ (B) $|r|<1$ (C) $r \geq 1$ (D) $|r|>1$

53. An series $u_1 - u_2 + u_3 - u_4 + \ldots$ is said to be oscillatory if

(A) $\lim_{n \to \infty} u_n = 0$ (B) $\lim_{n \to \infty} |u_n| = 1$
(C) $\lim_{n \to \infty} u_n \neq 0$ (D) $\lim_{n \to \infty} |u_n| = 0$

54. If the series of arbitrary terms $u_1 + u_2 + u_3 + u_4 + \ldots$ be such that the series is convergent, then the series $\sum u_n$ is said to be _____

(A) Absolutely convergent (B) Conditional Convergent
(C) Oscillatory (D) Divergent

55. Find the coefficient of $x^n$ in the expansion of $(2+3x)^{-1}$

(A) $\left(\frac{1}{2}\right)\left(\frac{3}{2}\right)^n$ (B) $\left(\frac{-3}{2}\right)^n$ (C) $\left(\frac{1}{2}\right)\left(\frac{-3}{2}\right)^n$ (D) $\left(\frac{1}{3}\right)\left(\frac{2}{3}\right)^n$

56. If A is a square matrix of type (n x n), then det (Adj A) is

(A) $(\text{Det A})^n$ (B) $(\text{Det A})^{-n}$
(C) $(\text{Det A})^{n-1}$ (D) $(\text{Det A})^{1/n}$

57. The value of the determinant $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$ is

(A) 0 (B) 1 (C) $\omega$ (D) $\omega^2$

58. If a, b, c are all different and $\begin{vmatrix} a & a^2 & 1+a^3 \\ b & b^2 & 1+b^3 \\ c & c^2 & 1+c^3 \end{vmatrix} = 0$, then abc = _____

(A) 0 (B) 1 (C) $-1$ (D) a+b+c

59. The matrix $\begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$ is a

(A) Hermitian matrix (B) Skew Hermitian matrix
(C) Skew Symmetric matrix (D) Symmetric matrix

60. The dimension of $V = \{a_0+a_1 x +a_2 x^2+ a_3 x^3, x \in R\}$ is

(A) 1 (B) 2 (C) 3 (D) 4

61. Two complex numbers $z_1=x+iy$ and $z_2=a+ib$ are equal if

(A) x=a, y=b (B) x=b, y=a

(C) x=i, y=a (D) x=b, y=i

62. The rank of the matrix of order n x n, whose every element is unity is

(A) Greater than 1 (B) Equal to 1

(C) Equal to 0 (D) Equal to n

63. If $\lambda_1, \lambda_2, \ldots, \lambda_n$ are eigen values of matrix A, then trace of A is

(A) $\lambda_1, \lambda_2, \ldots, \lambda_n$ (B) $\lambda_1 + \lambda_2 + \ldots + \lambda_n$

(C) $1/(\lambda_1 + \lambda_2 + \ldots + \lambda_n)$ (D) $1/(\lambda_1 \lambda_2 \ldots \lambda_n)$

64. The Cramer rule on system of equations AX=B, X≠0, does not apply when

(A) A is singular matrix (B) B is singular matrix

(C) A is non-singular matrix (D) B is non-singular matrix

65. If $A = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$, then A(adj A) is

(A) $\begin{bmatrix} 10 & 0 \\ 10 & 0 \end{bmatrix}$ (B) $\begin{bmatrix} 0 & 10 \\ 10 & 0 \end{bmatrix}$ (C) $\begin{bmatrix} 1 & 3 \\ -2 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 3 & -14 \\ 4 & -2 \end{bmatrix}$

66. The rank of the matrix $\begin{bmatrix} 1 & -1 & 2 \\ 2 & -2 & 4 \\ 4 & -4 & 8 \end{bmatrix}$ is

(A) 1 (B) 2 (C) 3 (D) 4

67. If $\begin{bmatrix} x & 1 \\ -1 & -y \end{bmatrix} + \begin{bmatrix} y & 1 \\ 3 & x \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$, then the solution of (x, y) are

(A) (1, 0) (B) (0, 1) (C) (–1, 0) (D) (0, –1)

68. The solution of the matrix equation $\begin{bmatrix} 1 & x & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 1 \\ 15 & 3 & 2 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ x \end{bmatrix} = 0$ is

(A) $x = 11$ (B) $x = -14$

(C) $x = -11$ (D) $x = 14$

69. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ is a symmetric matrix, find the symmetric matrix $(A + A')$

(A) $\begin{bmatrix} 5 & 2 \\ 8 & 5 \end{bmatrix}$ (B) $\begin{bmatrix} 2 & 5 \\ 5 & 8 \end{bmatrix}$ (C) $\begin{bmatrix} -2 & 5 \\ 5 & -8 \end{bmatrix}$ (D) $\begin{bmatrix} 2 & -5 \\ -5 & 8 \end{bmatrix}$

70. In a nxn upper triangular matrix, the minimum number of zeroes is:

(A) $n(n-1)/2$ (B) $n(n+1)/2$

(C) $3n(n-1)/2$ (D) $2n(n-1)/3$

71. If $e^x + e^y = e^{x+y}$ then $\frac{dy}{dx}$ is

(A) $\frac{e^x(e^y-1)}{e^y(e^x-1)}$ (B) $\frac{e^y(e^y-1)}{e^x(e^x-1)}$ (C) $\frac{e^y(e^x-1)}{e^x(e^y-1)}$ (D) $\frac{e^x(1-e^y)}{e^y(e^x-1)}$

72. If $y = \log \sin x$ then $\frac{dy}{dx}$ is

(A) $\operatorname{cosec} x$ (B) $\cot x$ (C) $\tan x$ (D) $\sec x$

73. If $x\sqrt{1+y} + y\sqrt{1+x} = 0$ then $\frac{dy}{dx}$ is

(A) $-\frac{1}{1+x}$ (B) $-\frac{1}{1+y}$ (C) $-\frac{1}{(1+x)^2}$ (D) $-\frac{1}{(1+y)^2}$

74. If $x = at^2$, $y = 2at$ then $\frac{dy}{dx}$ is

(A) $t$ (B) $t^2$ (C) $\frac{1}{t^2}$ (D) $\frac{1}{t}$

75. If $A = \begin{bmatrix} 0 & 5 & -3 \\ -5 & 0 & 1 \\ 3 & -1 & x \end{bmatrix}$ and $A^T = -A$ then the value of x is

(A) 0 (B) 1 (C) –1 (D) 2

76. If $\begin{bmatrix} 1 & 2 & x \\ 4 & -1 & 7 \\ 2 & 4 & -6 \end{bmatrix}$ is a singular matrix, then the value of x?

(A) 0 (B) 1 (C) –3 (D) 3

77. The number of ways of distributing 4 balls in 2 urns such that each urn receives 2 balls is

(A) 24 (B) 6 (C) 4 (D) 8

78. The probability of having 53 Sundays in a leap year is

(A) 1/7 (B) 1/2 (C) 2/7 (D) 0

79. The mean and variance of a degenerate random variable X with degeneracy at 'a' are

(A) 0,0 (B) a,1 (C) a,a (D) a,0

80. Given the expected value and variance of a random variable X are 3 and 25 respectively, the value of $\{P|X-3| \geq 10\}$ is

(A) Less than or equal to ¼ (B) Less than or equal to ¾

(C) Greater than or equal to ¾ (D) Greater than or equal to 1/4

81. Let the joint probability density function of random variables X and Y be f(x,y) = 4xy; 0<x<1; 0<y<1. Then the correlation between X and Y is

(A) 0.5 (B) 1 (C) –1 (D) 0

82. Two players A and B fire at a target independently 10 times. The probability of hitting the target in each trial is 0.5 and 0.5 respectively. The probability of hitting the target in the 4th trial for the first time is

(A) $(0.5)^8$ (B) 0.5 (C) $(0.5)^7$ (D) 1

83. Consider the experiment of tossing two six faced dice and a coin simultaneously. The total number of points in the sample space is

(A) $6^2$ (B) 12 (C) $2^6$ (D) 72

84. Let $X_1, X_2$ *be i.i.d* $B(1,\theta)$, $0<\theta<1$ random variables and let $T_1(X_1,X_2)=X_1+X_2$ and $T_2(X_1,X_2)=2X_1-X_2$ be two estimators of $\theta$. Which of the following statement is true?

(A) Both $T_1$ and $T_2$ are unbiased estimators.

(B) $T_1$ is biased estimator and $T_2$ is unbiased estimator

(C) $T_1$ is unbiased estimator and $T_2$ is biased estimator

(D) Both $T_1$ and $T_2$ are biased estimators

85. Based on a random sample of size n=9 from a normal population with unknown mean and variance $\sigma^2=36$, an estimate of the population mean is obtained as 23. Then a 95% confidence interval for the population mean is

(A) (19.08,26.92) (B) (19.71,26.29)

(C) (18.34,27.66) (D) (17.84,28.16)

86. Let $X_1,....X_n$ be i.i.d observations from $U(0,\theta),\theta>0$. Which of the following statement is correct?

(A) $X_{(n)}$ is an unbiased estimator of $\theta$

(B) $X_{(n)}$ is the maximum likelihood estimator of $\theta$

(C) $X_{(1)}$ is the maximum likelihood estimator of $\theta$

(D) $X_{(n)}*(n+1)$ is an unbiased estimator of $\theta$

87. If variance of an estimator equals the Cramer-Rao lower bound, then the estimator is

(A) Uniformly Minimum Variance Unbiased estimator

(B) Minimum Variance Unbiased estimator

(C) Maximum likelihood estimator

(D) None of the above

88. In hypothesis testing, the objective is to

(A) Maximize both type I and type II errors

(B) Minimize type I error only

(C) Maximize Power only

(D) Minimize both type I and type II errors

89. The family of Cauchy distributions

(A) Posses monotone likelihood ratio in sample mean

(B) Posses monotone likelihood ratio in sample variance

(C) Posses monotone likelihood ratio in sample median

(D) Does not possess monotone likelihood ratio

90. Likelihood ratio test is

(A) Consistent (B) most powerful

(C) unbiased (D) similar

91. The process of building new classes from existing one is called _____

(A) Polymorphism (B) Structure

(C) Inheritance (D) Cascading

92. Which statement gets affected when i++ is changed to ++i

(A) i = 20; i++;
(B) for (i=0;i<20;i++) { }
(C) a = i++;
(D) while (i++ = 20) cout << i;

93. Which of the following is not a logical operator in C

(A) &
(B) &&
(C) ||
(D) !

94. What is stderr?

(A) standard error
(B) standard error types
(C) standard error streams
(D) standard error definitions

95. The command to display print \n on the monitor is

(A) printf ("\n");
(B) echo "\n";
(C) printf ('\n');
(D) printf ("\\n");

96. If $w = x + 2y + z^2$ and $x = \cos t$, $y = \sin t$, $z = t$, then dw/dt is

(A) $\sin t + \cos t + 2t$
(B) $-\sin t - \cos t + 2t$
(C) $-\sin t + 2\cos t + 2t$
(D) $\sin t + 2\cos t + 2t$

97. The value of $\int x^{16}(1+x^{17})^4 dx$ is equal to

(A) $\frac{1}{85}(1+x^{17})^5 + c$
(B) $\frac{1}{85}\frac{(1+x^{16})^5}{5} + c$
(C) $\frac{x^{17}}{85} + c$
(D) $\frac{1}{85}\frac{(1+x^{17})^6}{5} + c$

where c is a constant of integration.

98. A sufficient condition for an estimator $T_n$ to be consistent for $\theta$ is that

(A) Var $(T_n) \to 0 \; as \; n \to \infty$
(B) $E(T_n) \to \theta \; as \; n \to \infty$
(C) Var $(T_n)/E(T_n) \to 0 \; as \; n \to \infty$
(D) $E(T_n) \to \theta \; \& \; Var(T_n) \to 0 \; as \; n \to \infty$

99. $\int_0^1 \frac{1}{1+t^2} dt$ is equal to

(A) $\pi$
(B) 0
(C) $\pi/4$
(D) $-\pi/2$

100. Find the value of $n$ such that $\lim_{x \to 3} \frac{x^n - 3^n}{x-3} = 108$

(A) 3
(B) 1
(C) 4
(D) 2