ENTRANCE EXAMINATION FOR ADMISSION, MAY 2013.

M.Sc. Five Year Integrated Programme

(MATHEMATICS, COMPUTER SCIENCE AND STATISTICS)

COURSE CODE : 384

Register Number :

Signature of the Invigilator (with date)

COURSE CODE : 384

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 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.

Notation: R- Real Line, Q- Set of rationals, Z- set of Integers. The derivative of a function f is denoted by f'. The complement of a set A is denoted by A^c

1. The domain of the function $5\cos^{-1}\frac{2x}{3}$ is

(A) $\left[\frac{-3}{2},\frac{3}{2}\right]$

(B) $\left[\frac{-15}{2},\frac{15}{2}\right]$

(C) $\left[\frac{-5}{3},\frac{5}{3}\right]$

(D) $\left[\frac{-2}{3},\frac{2}{3}\right]$

2. The range of $\tan(-3x)$ over the open interval $\left(\frac{-\pi}{6},\frac{\pi}{6}\right)$

(A) $\left[\frac{-\pi}{2},\frac{\pi}{2}\right]$

(B) $[-1, 1]$

(C) $(-\infty,\infty)$

(D) $[0,\infty)$

3. The system of linear equations $y + 2z = 0, x - z = 0, x + y + z = 0$

(A) has no solution

(B) has at most two solutions

(C) has a unique solution

(D) has more than n solutions for every positive integer n

4. Vector equation of the straight line passing through $(-1,2,1)$ and $(2,3,0)$ is

(A) $\vec{r} = (3t-1)i + (t+2)j + (1-t)k$

(B) $\vec{r} = ti - j + (1-t)k$

(C) $\vec{r} = (-1-2t)i + (2-3t)j + k$

(D) $\vec{r} = (-1+2t)i + (2+3t)j + k$

5. If $|x|<1$, the coefficient of x^4 in the binomial expansion of $(2-x^2)^{-1}$ is

(A) $\frac{1}{8}$

(B) 4

(C) $\frac{1}{2}$

(D) 2

6. If $\vec{a} = i - 2j - k$ then $\vec{a}$ is perpendicular to every vector of the plane

(A) $x + 2y + z = 0$ (B) $x - 2y - z = 0$

(C) $x - 2y + z = 0$ (D) $x + 2y - z = 0$

7. The polar form of $(-i)^{13}$ is

(A) $\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}$ (B) $\cos\frac{3\pi}{2} + i\sin\frac{3\pi}{2}$

(C) $\cos\pi + i\sin\pi$ (D) $\cos\pi - i\sin\pi$

8. If z is a complex number that satisfies $|3z - 1| = 3|z + 1|$ then z lies on

(A) the circle $|z| = \frac{1}{3}$ (B) the straight line $x = 0$

(C) The straight line $x = \frac{-1}{3}$ (D) The circle $|z| = 3$

9. If $\cos 2\theta = \frac{1}{\alpha}$ then

(A) $\theta = \frac{1}{2}\tan^{-1}\sqrt{1-\alpha^2}$ (B) $\theta = \frac{1}{2}\tan^{-1}\sqrt{\alpha^2 - 1}$

(C) $\theta = \tan^{-1}\left(\frac{\sqrt{1+\alpha^2}}{2}\right)$ (D) $\theta = \tan^{-1}\left(\frac{\sqrt{1-\alpha^2}}{2}\right)$

10. If $f(x) = \begin{cases} 2x^2, & x \le 1 \\ x+1, & x > 1 \end{cases}$ then

(A) f is not continuous

(B) f is continuous and monotone increasing

(C) f is continuous but not differentiable

(D) f is differentiable

11. $e^{x\log 3} =$

(A) $3x$ (B) x^3

(C) e^{3x} (D) 3^x

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12. $\int_0^{\frac{\pi}{4}} \theta \sec^2 \theta d\theta$ is

(A) $\frac{\pi}{2}$ (B) $\frac{\pi}{4} - \log\sqrt{2}$

(C) $\frac{\pi}{4}\log\sqrt{2}$ (D) $\log\sqrt{2} - \frac{\pi}{4}$

13. If $f(x) = \frac{|2x-3| - |x+1|}{|3x-5|}$ then

(A) f is discontinuous for exactly two values of x

(B) f is discontinuous for exactly 3 values of x

(C) f is continuous for all values of x

(D) f is discontinuous exactly for one value of x

14. If $f(x) = 5x^{23} - 7x^{20} + 8x^{10} - x^5 + x^3 - 1$ then the value of the 43rd derivative of f at $x = -1$ is

(A) 0 (B) 5

(C) 23 (D) –1

15. $\sqrt{i}$ equals

(A) $1 + \frac{i}{\sqrt{2}}$ (B) $i\cos\frac{\pi}{3}$

(C) $\frac{1}{\sqrt{2}} + \frac{i}{\sqrt{2}}$ (D) $1 - \frac{i}{\sqrt{2}}$

16. If $i - 2$ is a root of the quadratic equation $x^2 + bx + c = 0$ then b is

(A) 1 (B) –4 (C) 4 (D) 0

17. If $xy = \tan(xy)$ then $\frac{dy}{dx} =$

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

(C) $\frac{x}{y}$ (D) $1 - x\sec^2(xy)$

18. $\lim_{x \to \frac{3}{2}} \frac{(2x)^5 - 3^5}{2x - 3} =$

(A) 0 (B) 51 (C) 405 (D) 15

19. If L is a line through the two points (2,5) and (4,6) and the point (7,K) is on the line L, then the value of k is

(A) 15/2 (B) 7/2 (C) 9/2 (D) 11/2

20. The minimum value of the distance between the point (-2,-2) and any point on the circumference of the circle $(x-1)^2 + (y-2)^2 = 4$, is

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

21. $\int_{-1}^{1} \log\left(\frac{3-x}{3+x}\right) dx$

(A) 1 (B) 0 (C) e^{-3} (D) e^3

22. If $f(x) = (x-1)^2$ and $g(x) = \sqrt{x}$, then $(g \circ f)(x) =$

(A) $|x-1|$ (B) $|x+1|$ (C) $|x|$ (D) $|x-2|$

23. The area of the circle $x^2 + y^2 - 8y - 48 = 0$ is

(A) 64π (B) 32π (C) 27π (D) π

24. The y coordinates of all the points of intersection of the parabola $y^2 = x + 2$ and the circle $x^2 + y^2 = 4$ are given by

(A) $0, \sqrt{3}, -\sqrt{3}$ (B) 0, 1, –1 (C) 0, 3, –3 (D) 0, 2, –2

25. A cylinder of radius 5cm is inserted within a cylinder of radius 10cm. The two cylinders have the same height of 20cm. Then the volume of the region between the two cylinders is

(A) 150π (B) 1000π (C) 15000π (D) 1500π

26. The function *f(x) = sin2x (1 + cos2x)* has a maximum, if *x* is

(A) $-\pi/2$ (B) $\pi/2$ (C) $\pi/3$ (D) $\pi/6$

27. If $x^2 + ax + b = 0$, $x^2 + bx + a = 0 \, (a \neq b)$ have a common root, then the common root is

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

28. If $\Delta = \begin{vmatrix} \omega & 1 & 0 \\ \omega^2 & \omega & 1 \\ 0 & \omega^2 & \omega \end{vmatrix}$ where ω is a cube root of unity, then $\Delta^2 + \Delta =$

(A) 0 (B) 2 (C) 1 (D) −1

29. The vectors $2\vec{i}-\vec{j}+l\vec{k}$, $4\vec{i}+2\vec{j}-2\vec{k}$ and $m\vec{i}+n\vec{j}+2\vec{k}$ are mutually perpendicular. Then the values of l, m, n are

(A) 3, 1, -4 (B) -3, 1, -4 (C) 3, -1, 4 (D) 3, -1, -4

30. The angle between two diagonals of a cube

(A) $\cos^{-1}\left(\frac{1}{2}\right)$ (B) $\cos^{-1}\left(\frac{1}{\sqrt{2}}\right)$

(C) $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$ (D) $\cos^{-1}\left(\frac{1}{3}\right)$

31. The solution of the differential equation $x\frac{dy}{dx} - y = x^2$

(A) $2y = x^3 + cx$ (B) $y = x^2 - c$

(C) $2y = x^2 + c$ (D) $y = x + 1$

32. The direction cosines of a vector normal to the plane passing through the points (3,4,2), (-3,1,4) and (1,2,3) are

(A) 1, 2, 6 (B) $-\frac{1}{\sqrt{41}}, -\frac{2}{\sqrt{41}}, \frac{6}{\sqrt{41}}$

(C) $-\frac{1}{\sqrt{41}}, \frac{2}{\sqrt{41}}, -\frac{6}{\sqrt{41}}$ (D) $\frac{1}{\sqrt{41}}, \frac{2}{\sqrt{41}}, \frac{6}{\sqrt{41}}$

33. The angle between the planes $2x + y - z = 9$ and $x + 2y + z = 7$ is

(A) 90° (B) 60° (C) 45° (D) 30°

34. To which one of the following functions, Roll's theorem is applicable?

(A) $f(x) = e^x \sin x, 0 \le x \le \pi$ (B) $f(x) = \tan x, 0 \le x \le \frac{\pi}{2}$

(C) $f(x) = x^3 - 3x + 3, 0 \le x \le 1$ (D) $f(x) = |x|, -1 \le x \le 1$

35. The maximum value of the function $\sin x + \cos 2x$ in the interval $[0,2\pi]$ is

(A) 0 (B) 1 (C) -2 (D) $\frac{9}{8}$

36. In the multiplicative group of non-zero congruence class modulo 7, the order of the elements [2] and [5] are

(A) 3 and 6 (B) 3 and 4 (C) 2 and 6 (D) 2 and 4

37. $\lim_{x\to\pi/2} \frac{\cos x}{\pi/2 - x} =$

(A) 0 (B) 1 (C) -1 (D) ∞

38. $\sin x \cos x =$

(A) $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \ldots.$

(B) $1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \ldots.$

(C) $2x - \frac{(2x)^3}{3!} + \frac{(2x)^5}{5!} - \ldots.$

(D) $x - \frac{4x^3}{3!} + \frac{16x^5}{5!} - \ldots.$

39. The order of -1 in the group (Z, +) is

(A) 2 (B) finite (C) infinite (D) empty

40. If $|z_1| = |z_2|$ and $Arg(z_1) + Arg(z_2) = 0$ with $\text{Arg}(z_1) \neq 0$ then

(A) $z_1 + z_2 = 0$

(B) $z_1 + \bar{z_2} = 0$

(C) $z_1 = \bar{z_2}$

(D) $z_1 = z_2$

41. If one root of $x^2 + ax + b = 0$ is $3 - i\sqrt{2}$ and a and b are real, then the value of a and b are

(A) $-6, 11$ (B) $6, -11$ (C) $-6, -11$ (D) $6, 11$

42. $\Delta = \begin{vmatrix} 1 & x & x \\ 1 & x+y & y \\ 1 & x & x+y \end{vmatrix}$ and $y = e^{\frac{i\pi}{4}}$ then Δ equals

(A) 1 (B) 0 (C) i (D) -i

43. The locus of a point P which represents a complex number z that satisfies $|z - z_1| = |z - z_2|$, is

(A) a circle with centre z_1 and radius $|z_2|$

(B) a circle with centre z_2 and radius $|z_1|$

(C) an ellipse

(D) perpendicular bisector of the line joining z_1 and z_2

44. The function $f(x) = x^3 - 6x^2 - 36x + 7$ is a decreasing function if

(A) x lies in the interval $(-3, 3)$ (B) x is in the interval $(-2, 6)$

(C) x lies in the interval $(-\infty, \infty)$ (D) x lies outside the interval $(-3, 3)$

45. If $px^2 + qx + 4$ attains its minimum value -1 at $x = -1$, then the values of p and q are

(A) 5, 5 (B) 5, –10 (C) 5, –5 (D) 10, –10

46. If $f(x) = e^{e^x}$ then the value of $f'(0)$ is

(A) e^2 (B) e (C) 1 (D) e^e

47. If $u(x, y) = e^{\frac{x^2}{y^2}} + e^{\frac{y^2}{x^2}}$ then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} =$

(A) u (B) 0 (C) $\frac{y^2}{x^2}$ (D) $\frac{x^2}{y^2}$

48. The values of x satisfying the equation $(x \ \ 1)\begin{pmatrix} 1 & 2 \\ -1 & 1 \end{pmatrix}\begin{pmatrix} x \\ 2 \end{pmatrix} = 0$

(A) 1, 2 (B) -1, 2 (C) -1, -2 (D) 1, -2

49. The value of $\begin{vmatrix} \log_3 64 & \log_4 3 \\ \log_3 8 & \log_4 9 \end{vmatrix} \times \begin{vmatrix} \log_2 3 & \log_8 3 \\ \log_3 4 & \log_3 4 \end{vmatrix}$ is

(A) 1 (B) 6 (C) $\log_3 4$ (D) $\log_2 3 \log_3 4$

50. If $xy = e^5, x = e^3 y$ then the value of x and y are

(A) 4,1 (B) e^{-4}, e^{-1} (C) e^4, e (D) 1,4

51. Angle between the parabolas $y^2 = x$ *and* $x^2 = y$ at origin is

(A) $2\tan^{-1}(3/4)$ (B) $\tan^{-1}(4/3)$ (C) $\frac{\pi}{2}$ (D) $\frac{\pi}{4}$

52. When the eccentricity of an ellipse becomes zero the ellipse becomes a

(A) straight line (B) pair of straight lines

(C) point (D) circle

53. The area bounded by curve $xy - 12 = 0$ and $x = 0, y = 1, y = e^2$ is

(A) 24 sq. units (B) e^{12} sq. units

(C) 12 sq. units (D) 48 sq. units

54. If $f(x) = |x-3|$, then for each real x,

(A) $f(x^2)=(f(x))^2$ (B) $f(|x|)=|f(x)|$

(C) $f(-x)=f(x)$ (D) $f(|x-1|)=0$ at $x=-2$.

55. The two circles $(x-2)^2 + (y+1)^2 = 8$ and $x^2 + (y-3)^2 = 16$

(A) intersect each other at exactly two points

(B) touch each other at a single point

(C) neither intersect nor touch each other

(D) are such that one lies entirely within the other.

56. $\frac{d b^x}{dx} =$

(A) b^x (B) $b^x \; x \log x$

(C) $b^x \log b$ (D) $b^x \log x$

57. The solution of the differential equation $e^x \frac{dy}{dx} + y = e^{-x}$ is satisfies

(A) $y = \frac{e^{3x}}{2} + ce^x$ (B) $y = e^{2x} + ce^{-x}$

(C) $y = e^x + ce^{-x}$ (D) $y = ce^{-x}$

58. If $f(x) = \frac{x+2}{3}$ then $f^1(x)$, the inverse of f at x is

(A) $\frac{3}{x+2}$ (B) $3x-2$ (C) $2x - 3$ (D) $3x+2$

59. The value of $(1+i)^4$ is

(A) 4 (B) 4i (C) -4 (D) -4i

60. The value of $(\log_x xy)(\log_{xy} x^y)$ is

(A) 1 (B) X (C) Y (D) XY

61. If f is differentiable on [0, 2] and $f(0) = -3$ and $1 \le f'(x) \le 5$ for $0 \le x \le 2$ then

(A) $f(2) \ge 10$

(B) $-1 \le f(2) \le 7$

(C) $f(2) < -2$

(D) $-2 \le f(2) < -1$

62. $\int_0^2 |x-1|\, dx =$

(A) 0 (B) 1 (C) 2 (D) 4

63. $\lim_{x\to 0} x^3 \cos\left(\frac{2}{x}\right) =$

(A) ∞ (B) 1 (C) $\frac{\pi}{2}$ (D) 0

64. If the derivation of a map f is given by $f'(x) = 6(x-2)(x+1)$ for any real x then

(A) f is monotone increasing if $1 \le x \le 2$

(B) f is monotone decreasing if $x > 2$

(C) f is monotone increasing if $-1 \le x \le 0$

(D) f is monotone decreasing if $-1 < x < 2$

65. If the perimeter of a rectangle of length l and breath b is 500, then the area of the rectangle is maximum when

(A) l = b = 125

(B) l = 200 and b = 50

(C) l = 150 and b = 100

(D) l = 175 and b = 75

66. The values of x for which the function $\log(\frac{x-1}{x+2})$ is continuous are

(A) $x < 1$

(B) $x > 1$ and $x < -2$

(C) $x < 1$ and $x > -2$

(D) $x > 1$

67. $\int \frac{dx}{1+\sqrt{x}}$ is

(A) $2\log\left|\sqrt{x}+1\right|$

(B) $\sqrt{x}+1$

(C) $2\left[\sqrt{x}-\log\left|\sqrt{x}+1\right|\right]$

(D) $2\left(1+\sqrt{x}\right)^{-1}$

68. The binary operation on A is a function from

(A) A to A (B) A to $A \times A$

(C) $A \times A$ to $A \times A$ (D) $A \times A$ to A

69. In the group (Q, +), the inverse of 0 is

(A) -1 (B) 0 (C) 1 (D) ∞

70. If 0.01011000....... is the binary expansion of a real number x is then x =

(A) $\frac{7}{32}$ (B) $\frac{5}{16}$ (C) $\frac{1}{8}$ (D) $\frac{11}{32}$

71. Choose the matrix for which the inverse does not exist.

(A) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (B) $\begin{pmatrix} \frac{1}{\sqrt{2}} & \frac{\sqrt{3}}{2} \\ \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \end{pmatrix}$ (C) $\begin{pmatrix} \frac{\sqrt{3}}{2} & \frac{\sqrt{3}}{2} \\ \frac{1}{2} & \frac{1}{2} \end{pmatrix}$ (D) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

72. The rank of the matrix $\begin{pmatrix} 1 & -2 & 3 \\ -2 & 4 & -6 \\ 5 & 1 & -1 \end{pmatrix}$ is

(A) 1 (B) 2 (C) 0 (D) 3

73. If $\alpha = \begin{vmatrix} 1 & a & a^3 \\ 1 & b & b^3 \\ 1 & c & c^3 \end{vmatrix}$ then

(A) a + b - c divides α (B) a - b + c divides α

(C) a - b - c divides α (D) a + b + c divides α

74. If $A = \begin{pmatrix} 2 & 0 \\ 0 & 3 \end{pmatrix}$, then the value of the determinant of $\left(A^5 A^{-1}\right)$ is

(A) 1296 (B) 7776 (C) 216 (D) 0

75. The smallest angle of the triangle ABC, with sides AC = 12, AB = 13 and BC = 14, is

(A) $\underline{|CAB}$ (B) $\underline{|CAB}$ and $\underline{|ABC}$

(C) $\underline{|ABC}$ (D) $\underline{|ACB}$

76. If P (A) = 1/3, P (B) = 1/4 and $P(A \cap B) = 1/6$. What is the value of $P(A^c \cap B)$?

(A) 5/6 (B) 1/12 (C) 7/12 (D) 8/12

77. Events having no sample points in common are called

(A) Independent events (B) Exhaustive events

(C) Exclusive events (D) Conditional events

78. The standard deviation of the following numbers 25, 35, 15, 20, 40 is

(A) 50.20 (B) 9.27 (C) 4.40 (D) 8.6

79. If P (A) = 1/2, P (B | A) = 4/5 then $P(A \cap B)$ is equal to

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

80. In an entrance examination in Maths and Statistics, of the 120 students appeared for the examination, 65 passed in Maths, 75 passed in statistics and 35 passed in both the tests. A student is selected at random. What is the probability that the student has failed in both the tests?

(A) 1/8 (B) 7/8 (C) 1/120 (D) 7/120

81. The probability of throwing a total of 3 or 5 or 11 with 2 dice is

(A) $\frac{1}{18}$ (B) $\frac{1}{9}$ (C) $\frac{1}{6}$ (D) $\frac{2}{9}$

82. A random variable Y has the following distribution

Y=y	:	-1	0	1	2
P(Y=y)	:	3c	2c	0.4	0.1

The value of the constant c is:

(A) 0.10 (B) 0.15 (C) 0.20 (D) 0.01

83. If f(x) has probability density function cx^2, $0 < x < 1$. The value of c is equal to

(A) 0 (B) 1 (C) 2 (D) 3

84. What is the mean of the following distribution?

x	:	1	2	3 ...	n
f_x	:	1	2	3 ...	n

(A) $\frac{n(n+1)}{2}$ (B) $\frac{n(n+1)(2n+1)}{6}$

(C) 1 (D) $\frac{2n+1}{3}$

85. If two independent random variables X and Y have Poisson distribution with parameters 3 and 4 respectively, then P(X + Y = 0) is

(A) e^{-3} (B) e^{-4} (C) e^{-7} (D) e^{-12}

86. X takes the value 0, 1, 2, 3 with respective probabilities 0.1, 0.3, 0.5, 0.1. What is the mean of $Y = x^2 + 2X$?

(A) 20 (B) 16 (C) 15.1 (D) 6.4

87. If the mean and variance of Binomial distribution are $\frac{3}{2}, \frac{3}{4}$ respectively then the parameters (n , p) are

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

88. The two types of cumulative frequency curves cut each other at the

(A) Median (B) First quartile

(C) Mode (D) Third quartile

89. If median of 3, 4, x and 8 is 5, then the value of x is

(A) 3 (B) 4 (C) 5 (D) 6

90. The probability density function of Normal distribution is $\sqrt{\frac{2}{\pi}} e^{-\frac{1}{2}(2x-6)^2}$. Then the mean and standard deviation are

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

91. Which one of them is not a property of cumulative distribution function F(x)?

(i) Step function

(ii) Right continuous

(iii) $F(\infty) = 0$

(A) Only (i) (B) Only (ii) (C) Only (iii) (D) All the three

92. If X has a Poisson distribution and P(X=2) = P(X=3) then the mean of the distribution is

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

93. The difference between the mean and the variance of a binomial distribution with n = 25 is 1. Then the value of p is

(A) 0.04 (B) 0.2 (C) 0.96 (D) 0.8

94. If X is a normal variate with mean 20 and variance 64, the probability that X lies between 12 and 32 is

(A) 0.4332 (B) 0.1189 (C) 0.7475 (D) 0.3143

[From the Normal table is given that

Z:	-1.0	1.5
$\Phi(Z)$:	0.3143	0.4332]

95. The p.d.f. of a continuous random variable X is $f(x) = e^{-x}$; $x \geq 0$. Then its cumulative distribution function is

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

96. If modal value is not clear in a distribution, it can be ascertained by the method of

(A) Grouping (B) Guessing

(C) Summarising (D) Trial and Error

97. If for a Binomial distribution, mean = 4, variance = 4/3, the probability, $P(X \geq 5)$ is

(A) $(2/3)^6$ (B) $(2/3)^5(1/3)$ (C) $(1/3)^6$ (D) $4(2/3)^6$

98. A continuous random variable X has probability density function,

$f(x) = 1/3 ; -1 \leq x \leq 0$

$= 2/3; 0 \leq x \leq 1$, then $E(X^2)$ is

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

99. Let X be a continuous random variable with probability density function,

$f(x) = kx ; 0 \leq x \leq 1$

$= k; 1 \leq x \leq 2$

$= 0$; otherwise

The value of k is

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

100. Which one of the following is correct? Binomial distribution, say B(n, p) tends to Poisson distribution when

(A) $n \to \infty$, $p \to 0$ and $np = \mu$ (finite) (B) $n \to \infty$, $p \to 1/2$ and $np = \mu$ (finite)

(C) $n \to 0$, $p \to 0$ and $np \to 0$ (D) $n \to 0$, $p \to 0$ and $np \to \mu$