APPLIED MATH-II

2nd Exam/COMMON/2354/Dec'11

Duration: 3 Hrs. Max. Marks: 75

NOTE: ATTEMPT ALL QUESTIONS.

Section-A

Q1. Choose the correct answer: 5

1) The order of the differential equation

$$\left(1+\left(\frac{dy}{dx}\right)^2\right)^3 = \left(\frac{d^2y}{dx^2}\right)^3$$ is

a) 2 b) 3 c) 6 d) 1

2) The probability that a card drawn at random from a pack of cards is a queen or heart is

a) 1/13 b) 1/2 c) 4/13 d) 1/4

3) $\int_0^{\pi/2} \cos x.e^{\sin x} dx =$

a) 0 b) 1 c) e d) e-1

4) The point on the curve $y = 3x^2 - 12x + 6$ at which tangent is parallel to x-axis is

a) (2,-6) b) (2,6)
c) (-2,6) d) (-2,-6)

5) If A is a non singular Matrix then A^{-1} is

a) |A| adjA b) $\frac{\text{AdjA}}{|A|}$

c) $(\text{adj A})^T$ d) $\frac{(\text{AdjA})^T}{|A|}$

Q2. State True or False 5

1) If A=$\begin{bmatrix} 3 & -1 \\ 7 & 2 \end{bmatrix}$ & B=$\begin{bmatrix} 1 & 3 \\ 0 & 4 \end{bmatrix}$ Then AB= $\begin{bmatrix} 3 & 13 \\ 7 & 13 \end{bmatrix}$

2) d/dx(xsinx) = xcosx

3) If $\underset{x\to 2}{Lt} \frac{x^n - 2^n}{x-2}$ =80 Then n=6

4) The Maximum value of xy subject to x+y=8 ia 16.

5) $\int e^{-mx} dx = \frac{e^{-mx}}{m}$

Q3. Fill in the blanks:- 5

1) If $\begin{vmatrix} 8 & k \\ 4 & 5 \end{vmatrix} = 0$ Then k = __________

2) $\underset{X\to 0}{Lt} \frac{\sin 5x - \sin 3x}{\sin x}$ =__________

3) $\frac{d}{dx}\left(\frac{x}{\log x}\right)$ = __________

4) The acceleration of a moving particle whose time equation is given by $x = 3t^2+2t-5$ is ____.

5) Area under the curve y=2+x and x-axis is _______.

Q4. Attempt any six questions: 5x6

1) Find the value of x if $\begin{vmatrix} x & 2 & -1 \\ 2 & 5 & x \\ -1 & 2 & x \end{vmatrix}$ =0

2) If siny = xsin(a+y)

Prove that $\frac{dy}{dx} = \frac{\sin^2(a+y)}{\sin a}$

3) Find the equation of the normal to the curve $y = x^4-6x^3+13x^2-10x+5$ at (1,3).

4) Evaluate $\int \log(1+x^2)dx$

5) Find the volume generated by the revolution of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ about the x-axis.

6) Solve the differential equation

$$(xy^2+x)\frac{dx}{dy} = yx^2 - y$$

7) Evaluate $\int_{-3}^{3} x^4 dx$ by Simpson's Rule taking seven equidistant ordinates.

8) The probability of a horse A winning the race is 1/4 and the probability of the horse B winning the race is 1/3. Find the probability that one of the horse wins the race.

Q5. Attempt all questions: 10x3

1) Find the maximum and minimum values of the function $f(x) = x^4-6x^2+8x+11$

OR Calculate the median and standard deviation from the following data:

Class internal	1-10	11-20	21-30	31-40	41-50	51-60
f	3	16	26	31	16	8

2) Using Matrix method solve the following system of equations:

$x-y+z = 4$
$x-2y-2z = 9$
$2x+y+3z = 1$

OR Find dy/dx, if $x^y + y^x = 2$

3) Integrate the following:

a) $\int \frac{dx}{x(x^4+1)}$ b) $\int \frac{dx}{5+4\cos x}$

OR Prove that $\int_0^a x^2(a^2-x^2)^{3/2} dx = \frac{\pi a^6}{32}$

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APPLIED MATHEMATICS-II

2nd Exam/Common/2251/5422/Dec'11

A

Duration : 2½ Hrs. M. Marks: 75

1) If A is a matrix of order 3 x 5, then each row of A has
(a) 3 elements
(b) 5 elements
(c) 8 elements
(d) 2 elements

2) If $\begin{bmatrix} 5 & k+2 \\ k+1 & -2 \end{bmatrix} = \begin{bmatrix} k+3 & 0 \\ 3 & k \end{bmatrix}$ then k =
(a) 0 (b) 2
(c) -2 (d) 1

3) If A= $\begin{bmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{bmatrix}$ is symmetric, then x =
(a) 3 (b) 5
(c) 2 (d) 4

4) $\begin{bmatrix} x & 4 & y+z \\ y & 4 & z+x \\ z & 4 & x+y \end{bmatrix} =$
(a) 4 (b) x + y +z
(c) xyz (d) 0

5) If
$\begin{vmatrix} 4 & 1 \\ 2 & 1 \end{vmatrix}^2 = \begin{vmatrix} 3 & 2 \\ 1 & x \end{vmatrix} - \begin{vmatrix} x & 3 \\ -2 & 1 \end{vmatrix}$ then x=
(a) 6 (b) 7
(c) 8 (d) 9

6) If A= $\begin{bmatrix} 5 & 2 \\ 3 & 1 \end{bmatrix}$ then A^{-1} =
(a) $\begin{bmatrix} 1 & -2 \\ -3 & 5 \end{bmatrix}$
(b) $\begin{bmatrix} -1 & 2 \\ 3 & -5 \end{bmatrix}$
(c) $\begin{bmatrix} -1 & -2 \\ -3 & -5 \end{bmatrix}$
(d) $\begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix}$

7) If A = $\begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then A^2=
(a) $\begin{bmatrix} 9 & 1 \\ 1 & 4 \end{bmatrix}$
(b) $\begin{bmatrix} 8 & -5 \\ -5 & 3 \end{bmatrix}$
(c) $\begin{bmatrix} 8 & 5 \\ 5 & -3 \end{bmatrix}$
(d) $\begin{bmatrix} 8 & 5 \\ -5 & 3 \end{bmatrix}$

8) $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+x & 1 \\ 1 & 1 & 1+y \end{vmatrix} =$
(a) x + y (b) xy
(c) x-y (d) 1+x+y

9) If U= $\begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$ and I= $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then the value of k so that U^2= 8U + kI is
(a) k=7 (b) k=-7
(c) k=0 (d) 1

10) If $\begin{vmatrix} x & 3 & 7 \\ 2 & x & 2 \\ 7 & 6 & x \end{vmatrix} = 0$ then x=
(a) -9 (b) 2
(c) 7 (d) -9,2,7

11) $\lim_{x\to 0} \frac{\text{six x-x}}{x} =$
(a) 1 (b) -1
(c) 0 (d) 2

12) $\lim_{x\to 0} \frac{(1+x)^2 -1}{x} =$
(a) n-2 (b) n-1
(c) n (d) 1

13) $\lim_{x\to 1} \frac{\log x}{x-1} =$
(a) 0 (b) 1
(c) 1/2 (d) 2

14) The maximum value of 3 Sin x is
(a) 1 (b) 2
(c) -1 (d) 3

15) If $y=e^{2x}$ then $\frac{d^3 y}{dx^3}$ =
(a) $8e^{2x}$ (b) $2e^{2x}$
(c) $4e^{2x}$ (d) e^{2x}

16) If $Y=\log(x^2)$ then dy/dx =
(a) 2logx (b) 2x
(c) log2x (d) 2/x

17) If $xy=c^2$, then dy/dx=
(a) –x/y (b) –y/x
(c) x/y (d) y/x

18) $\frac{d}{dx} \quad \frac{1}{x^6} =$
(a) $-6x^5$ (b) $-6x^{-6}$
(c) $6x^{-6}$ (d) $-6x^{-7}$

19) If y= Sin (cos x) then $\frac{d^2y}{dx^2}$ at x= $\frac{\pi}{2}$ is
(a) 1 (b) -1
(c) 2 (d) 0

20) The equation of normal to the curve $y = x^2$ at (0,0) is
(a) x=0 (b) y=0
(c) x=y (d) x=2y

21) The derivative of x^6 w.r.t x^3 is
(a) $6x^6$ (b) $-2x^3$
(c) $2x^3$ (d) $-6x^6$

22) $\frac{d}{dx} \cos^{-1}(\text{Sinx}) =$
(a) 1 (b) -1
(c) 2 (d) -2

23) If $x=at^2$, y=4 at then $\frac{dy}{dx}$ =
(a) 2t (b) $\frac{2}{t}$
(c) -2t (d) $\frac{-2}{t}$

24) The function $\frac{\log x}{x}$ has its maximum value at x=
(a) 1 (b) e
(c) $\frac{1}{e}$ (d) $\frac{2}{e}$

25) If $\sqrt{x}+\sqrt{y}=1$ then $\frac{dy}{dx}$ at $(1/4,1/4)$ is
(a) $\frac{1}{2}$ (b) 1
(c) -1 (d) 2

26) The derivative of $\cos^{-1}(2x^2-1)$ w.r.t $\cos^{-1}x$ is
(a) 2 (b) $\frac{1}{2\sqrt{1-x^2}}$
(c) $\frac{2}{x}$ (d) $1-x^2$

27) The tangent to the curve $y=e^{2x}$ at the point (0.1) meets X-axis at
(a) (0,2) (b) (2,0)
(c) (-1/2,0) (d) (0,1)

28) The equation of the normal to the curve y=x (2-x) ate the point (2,0) is
(a) x-2y=2
(b) x-2y+2=0
(c) 2x+y=4
(d) 2x+y+4=0

29) The point on the curve $y^2=x$ where the tangent makes angle of 45^0 with x-axis is
(a) $\left(\frac{1}{2},\frac{1}{4}\right)$ (b) $\left(\frac{1}{4},\frac{1}{2}\right)$
(c) (4,2) (d) (1,1)

30) The function f(x)= Ksinx +1/3 Sin3x has maximum value at $x=\frac{\pi}{3}$. Then K=
(a) 3 (b) 1/3
(c) 2 (d) 1/2

31) The maximum value of xy subject to x + y=8 is
(a) 28 (b) 24
(c) 20 (d) 16

32) If $x=e^y$ then $\frac{dy}{dx}$
(a) 1/x (b) e^y
(c) e^x (d) logx

33) The radius of a sphere is found to be 20cm with a possible error of 2 cm. Then % error in its surface area is
(a) 10 (b) 20
(c) 30 (d) 40

34) The instantaneous rate of change for the function $f(t) = te^t + 4$ at t=0 is
(a) 9 (b) 0
(c) 1 (d) 4

35) The maximum value of x^3-3x+2 occurs at x=
(a) -2 (b) -1
(c) 1 (d) 2

36) $\int \sin 2x dx$ =
(a) Cos2x
(b) 2Cos2x
(c) $\frac{1}{2}$ Cos2x
(d) $\frac{-1}{2}$ Cos2x

37) $\int \frac{2}{\cos^2 x} dx$=
(a) 2tanx (b) 2cotx
(c) 2sinx (d) 2cosx

38) $\int \log x dx$ =
(a) xlogx-x
(b) xlogx+x
(c) -xlogx-x
(d) 1/x

39) $\int \frac{1}{x \log x} dx$=
(a) logx
(b) log(logx)
(c) $\log\left(\frac{1}{\log x}\right)$
(d) 1/logx

40) If $\int \frac{2^{1/x}}{x^2} dx = k.2^{1/x}$ then k=
(a) -1 (b) –log2
(c) $\frac{-1}{\log 2}$ (d) 1/2

41) $\int \cot^2 x\, dx$=
(a) –cotx-x
(b) –cotx + x
(c) cotx
(d) tanx

42) $\int e^x (x^3+3x^2)dx$ =
(a) $e^x.x^2$
(b) $e^x.x^3$
(c) $\frac{e^x}{x^2}$
(d) $\frac{e^x}{x^3}$

43) $\int \frac{dx}{x(x-1)}$ =
(a) $\log\frac{x-1}{x}$
(b) $\log\frac{x}{x-1}$
(c) $-\log\frac{x-1}{x}$
(d) log (x-1)

44) $\int_0^{\pi/2} \cos^6 x\, dx$ =
(a) 0 (b) 1
(c) 5/32 (d) $\frac{5\pi}{32}$

45) $\sqrt{1-\cos 2x}\, dx$=
(a) $\sqrt{2}$ cosx
(b) $-\sqrt{2}$ cosx
(c) $\sqrt{2}$ sinx
(d) sinx

46) $\int_1^{\sqrt{3}} \frac{dx}{1+x^2}$ =
(a) $\frac{\pi}{2}$ (b) $\frac{2\pi}{3}$
(c) $\frac{\pi}{6}$ (d) $\frac{\pi}{12}$

47) $\int_0^{\pi/2} \frac{dx}{1+\sin x}$ =
(a) 0 (b) ½
(c) 1 (d) 3/2

48) $\int_0^{\pi/2} e^x(\sin x + \cos x)\, dx$=
(a) 1 (b) $e^{\pi/4}$
(c) e^{π} (d) $e^{\pi/2}$

49) The area covered by the curve $y^2=x$ and the lines y=4 and y-axis is
(a) 16/3 (b) 64/3
(c) $\frac{7}{\sqrt{2}}$ (d) 64

50) Area bounded by the curves x=1, x=3, xy=1 and x=axis is
(a) Log2 (b) Log3
(c) Log4 (d) Log5

51) $\int_0^\pi \cos 3x \sin 2x \, dx =$
(a) 0 (b) -4/5
(c) 5/4 (d) 1

52) The volume of revolution about x-axis of the parabola $y^2=4x$ bounded by x=1 is
(a) 2π (b) 3π
(c) 4π (d) 8π

53) Simpson's rule for area is applicable if number of intervals is
(a) Even (b) Odd
(c) both (d) none

54) Mean value of x^2 over the range from x=1 to x=4 is
(a) 5 (b) 6
(c) 7 (d) 8

55) For calculating $\int_0^{10} x^2$ by using trapezoidal rule with eleven ordinates the value of h =
(a) 4 (b) 2
(c) 3 (d) 1

56) $\int_0^{\pi/2} \text{Sin}^4 x \, \text{Cos}^2 x \, dx =$
(a) $\pi/4$ (b) $\pi/8$
(c) $\pi/16$ (d) $\pi/32$

57) $\int_{-a}^{a} f(x) \, dx = 0$ if f(x) is
(a) Even (b) odd
(c) both (d) none

58) $\int_O^k \frac{1}{2+8x^2} dx = \pi/16$ then k =
(a) 1 (b) 1/2
(c) 1/4 (d) 1/5

59) If $\int x^6 \sin(5x^7) \, dx = k/5 \cos(5x^7)$ then k =
(a) 7 (b) –7
(c) 1/7 (d) –1/7

60) $\int \frac{e^x}{e^x+1} dx =$
(a) X + log(x^2 +1)
(b) e^x
(c) e^x +1
(d) none

61) $\int \frac{x}{\cos^2 x} dx=$
(a) Log(cosx) (b) xtanx
(c)cotx (d) none

62) Volume generated by revolving the ellipse $9x^2 + 16y^2=144$ about the major axis is
(a) 12π (b) 24π
(c) 48π (d) 96π

63) $\int \frac{1}{x^2-1} dx =$
(a) $\log\left|\frac{x-1}{x+1}\right|$
(b) $\log\left|\frac{x+1}{x-1}\right|$
(c) $\frac{1}{2}\log\left|\frac{x-1}{x+1}\right|$
(d) log 2

64) The probability that a leap year selected at random contains 53 Sundays is
(a) 1/7 (b) 2/7
(c) 3/7 (d) 4/7

65) Two dice are thrown simultaneously. The probability of obtaining a total score of 5 is
(a) 1/18 (b) 1/12
(c) 1/9 (d) 1/8

66) The probability that the three cards drawn from a pack of 52 cards all are redis
(a) 2/17 (b) 3/17
(c) 2/19 (d) 1/17

67) Mode is
(a) Least frequent value
(b) Middle most value
(c) Most frequent value
(d) None on these

68) The probability of throwing a number greater than 2 with a fair dice is
(a) 3/5 (b) 2/3
(c) 2/5 (d) 1/3

69) The mean of five numbers is 18. If one number is excluded then mean is 16. The excluded number is
(a) 26 (b) 25
(c) 24 (d) 23

70) The medium of 10, 14, 11, 9, 8, 12, 6 is
(a) 10 (b) 12
(c) 14 (d) 11

71) The mean of absolute derivation from an average is called
(a) S.D (b) M.D
(c) Variance (d) none

72) The general solution of the differential equation $\frac{dy}{dx} = \frac{x^2}{y^2}$ is
(a) $x^3- y^3=C$ (b) $x^3+ y^3=C$
(c) $y^3- x^3=C$ (d) none

73) The degree of the differential equation $\frac{d^2y}{dx^2}+5\left(\frac{dy}{dx}\right)^3 +4 =0$ is
(a) 3 (b) 2
(c) 1 (d) 4

74) The order of the differential equation $\frac{d^2y}{dx^2}-5\left(\frac{dy}{dx}\right) +6y=3$ is
(a) 2 (b) 1
(c) 6 (d) 0

75) Solution of $dy/dx = e^{x+y}$ is
(a) $e^y = e^x + c$
(b) $e^y = -e^x + c$
(c) $-e^{-y} = -e^x + c$
(d) none

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APPLIED MATHEMATICS-II

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B

Duration : 2½ Hrs. M. Marks: 75

1) The derivative of x^6 w.r.t x^3 is
(a) $6x^6$ (b) $-2x^3$
(c) $2x^3$ (d) $-6x^6$

2) $\frac{d}{dx}\cos^{-1}(\sin x) =$
(a) 1 (b) -1
(c) 2 (d) -2

3) If $x=at^2$, y=4 at then $\frac{dy}{dx} =$
(a) 2t (b) $\frac{2}{t}$
(c) -2t (d) $\frac{-2}{t}$

4) The function $\frac{\log x}{x}$ has its maximum value at x=
(a) 1 (b) e
(c) $\frac{1}{e}$ (d) $\frac{2}{e}$

5) If $\sqrt{x}+\sqrt{y}=1$ then $\frac{dy}{dx}$ at $(1/4,1/4)$ is
(a) $\frac{1}{2}$ (b) 1
(c) -1 (d) 2

6) The derivative of $\cos^{-1}(2x^2-1)$ w.r.t $\cos^{-1}x$ is
(a) 2 (b) $\frac{1}{2\sqrt{1-x^2}}$
(c) $\frac{2}{x}$ (d) $1-x^2$

7) The tangent to the curve $y=e^{2x}$ at the point (0.1) meets X-axis at
(a) (0,2) (b) (2,0)
(c) (-1/2,0) (d) (0,1)

8) The equation of the normal to the curve y=x (2-x) ate the point (2,0) is
(a) x-2y=2
(b) x-2y+2=0
(c) 2x+y=4
(d) 2x+y+4=0

9) The point on the curve $y^2=x$ where the tangent makes angle of 45^0 with x-axis is
(a) $\left(\frac{1}{2},\frac{1}{4}\right)$
(b) $\left(\frac{1}{4},\frac{1}{2}\right)$
(c) (4,2) (d) (1,1)

10) The function f(x)= Ksinx +1/3 Sin3x has maximum value at $x=\frac{\pi}{3}$. Then K=
(a) 3 (b) 1/3
(c) 2 (d) 1/2

11) The maximum value of xy subject to x + y=8 is
(a) 28 (b) 24
(c) 20 (d) 16

12) If $x=e^y$ then $\frac{dy}{dx}$
(a) 1/x (b) e^y
(c) e^x (d) logx

13) The radius of a sphere is found to be 20cm with a possible error of 2 cm. Then % error in its surface area is
(a) 10 (b) 20
(c) 30 (d) 40

14) The instantaneous rate of change for the function $f(t) = te^t +4$ at t=0 is
(a) 9 (b) 0
(c) 1 (d) 4

15) The maximum value of x^3-3x+2 occurs at x=
(a) -2 (b) -1
(c) 1 (d) 2

16) $\int \sin 2x dx =$
(a) Cos2x
(b) 2Cos2x
(c) $\frac{1}{2}$ Cos2x
(d) $\frac{-1}{2}$ Cos2x

17) $\int \frac{2}{\cos^2 x} dx=$
(a) 2tanx (b) 2cotx
(c) 2sinx (d) 2cosx

18) $\int \log x dx =$
(a) xlogx-x
(b) xlogx+x
(c) -xlogx-x
(d) 1/x

19) $\int \frac{1}{x \log x} dx=$
(a) logx
(b) log(logx)
(c) $\log\left(\frac{1}{\log x}\right)$
(d) 1/logx

20) If $\int \frac{2^{1/x}}{x^2} dx=k.2^{1/x}$ then k=
(a) -1 (b) –log2
(c) $\frac{-1}{\log 2}$ (d) 1/2

21) $\int \cot^2 x \, dx=$
(a) –cotx-x
(b) –cotx + x
(c) cotx
(d) tanx

22) $\int e^x (x^3+3x^2)dx =$
(a) $e^x.x^2$
(b) $e^x.x^3$
(c) $\frac{e^x}{x^2}$
(d) $\frac{e^x}{x^3}$

23) $\int \frac{dx}{x(x-1)} =$
(a) $\log\frac{x-1}{x}$
(b) $\log\frac{x}{x-1}$

(c) $-\log\dfrac{x-1}{x}$

(d) log (x-1)

24) $\int_0^{\pi/2}\cos^6 x\,dx =$

(a) 0 (b) 1

(c) 5/32 (d) $\dfrac{5\pi}{32}$

25) $\sqrt{1-\cos 2x}\,dx=$

(a) $\sqrt{2}$ cosx

(b) $-\sqrt{2}$ cosx

(c) $\sqrt{2}$ sinx

(d) sinx

26) $\int_1^{\sqrt{3}}\dfrac{dx}{1+x^2} =$

(a) $\dfrac{\pi}{2}$ (b) $\dfrac{2\pi}{3}$

(c) $\dfrac{\pi}{6}$ (d) $\dfrac{\pi}{12}$

27) $\int_0^{\pi/2}\dfrac{dx}{1+\sin x} =$

(a) 0 (b) ½

(c) 1 (d) 3/2

28) $\int_0^{\pi/2} e^x(\sin x+\cos x)\,dx=$

(a) 1 (b) $e^{\pi/4}$

(c) e^{π} (d) $e^{\pi/2}$

29) The area covered by the curve $y^2=x$ and the lines y=4 and y-axis is

(a) 16/3 (b) 64/3

(c) $\dfrac{7}{\sqrt{2}}$ (d) 64

30) Area bounded by the curves x=1, x=3, xy=1 and x=axis is

(a) Log2 (b) Log3

(c) Log4 (d) Log5

31) $\int_0^{\pi}\cos 3x\sin 2x\,dx=$

(a) 0 (b) -4/5

(c) 5/4 (d) 1

32) The volume of revolution about x-axis of the parabola $y^2=4x$ bounded by x=1 is

(a) 2π (b) 3π

(c) 4π (d) 8π

33) Simpson's rule for area is applicable if number of intervals is

(a) Even (b) Odd

(c) both (d) none

34) Mean value of x^2 over the range from x=1 to x=4 is

(a) 5 (b) 6

(c) 7 (d) 8

35) For calculating $\int_0^{10}x^2$ by using trapezoidal rule with eleven ordinates the value of h =

(a) 4 (b) 2

(c) 3 (d) 1

36) $\int_0^{\pi/2}\sin^4 x\cos^2 x\,dx =$

(a) $\pi/4$ (b) $\pi/8$

(c) $\pi/16$ (d) $\pi/32$

37) $\int_{-a}^{a} f(x)\,dx=0$ if f(x) is

(a) Even (b) odd

(c) both (d) none

38) $\int_O^k\dfrac{1}{2+8x^2}dx=\pi/16$ then k =

(a) 1 (b) 1/2

(c) 1/4 (d) 1/5

39) If $\int x^6\sin(5x^7)\,dx =$ $k/5\cos(5x^7)$ then k =

(a) 7 (b) –7

(c) 1/7 (d) –1/7

40) $\int\dfrac{e^x}{e^x+1}dx =$

(a) X + $\log(x^2+1)$

(b) e^x

(c) e^x+1

(d) none

41) $\int\dfrac{x}{\cos^2 x}dx=$

(a) Log(cosx) (b) xtanx

(c)cotx (d) none

42) Volume generated by revolving the ellipse $9x^2+16y^2=144$ about the major axis is

(a) 12π (b) 24π

(c) 48π (d) 96π

43) $\int\dfrac{1}{x^2-1}dx =$

(a) $\log\left|\dfrac{x-1}{x+1}\right|$

(b) $\log\left|\dfrac{x+1}{x-1}\right|$

(c) $\dfrac{1}{2}\log\left|\dfrac{x-1}{x+1}\right|$

(d) log 2

44) The probability that a leap year selected at random contains 53 Sundays is

(a) 1/7 (b) 2/7

(c) 3/7 (d) 4/7

45) Two dice are thrown simultaneously. The probability of obtaining a total score of 5 is

(a) 1/18 (b) 1/12

(c) 1/9 (d) 1/8

46) The probability that the three cards drawn from a pack of 52 cards all are redis

(a) 2/17 (b) 3/17

(c) 2/19 (d) 1/17

47) Mode is

(a) Least frequent value

(b) Middle most value

(c) Most frequent value

(d) None on these

48) The probability of throwing a number greater than 2 with a fair dice is

(a) 3/5 (b) 2/3

(c) 2/5 (d) 1/3

49) The mean of five numbers is 18. If one number is excluded then mean is 16. The excluded number is

(a) 26 (b) 25

(c) 24 (d) 23

50) The medium of 10, 14, 11, 9, 8, 12, 6 is

(a) 10 (b) 12

(c) 14 (d) 11

51) The mean of absolute derivation from an average is called
(a) S.D (b) M.D
(c) Variance (d) none

52) The general solution of the differential equation $\frac{dy}{dx} = \frac{x^2}{y^2}$ is
(a) $x^3 - y^3 = C$ (b) $x^3 + y^3 = C$
(c) $y^3 - x^3 = C$ (d) none

53) The degree of the differential equation $\frac{d^2y}{dx^2} + 5\left(\frac{dy}{dx}\right)^3 + 4 = 0$ is
(a) 3 (b) 2
(c) 1 (d) 4

54) The order of the differential equation $\frac{d^2y}{dx^2} - 5\left(\frac{dy}{dx}\right) + 6y = 3$ is
(a) 2 (b) 1
(c) 6 (d) 0

55) Solution of $dy/dx = e^{x+y}$ is
(a) $e^y = e^x + c$
(b) $e^y = -e^x + c$
(c) $-e^{-y} = -e^x + c$
(d) none

56) If A is a matrix of order 3 x 5, then each row of A has
(a) 3 elements
(b) 5 elements
(c) 8 elements
(d) 2 elements

57) If $\begin{bmatrix} 5 & k+2 \\ k+1 & -2 \end{bmatrix} = \begin{bmatrix} k+3 & 0 \\ 3 & k \end{bmatrix}$ then k =
(a) 0 (b) 2
(c) -2 (d) 1

58) If $A = \begin{bmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{bmatrix}$ is symmetric, then x =
(a) 3 (b) 5
(c) 2 (d) 4

59) $\begin{bmatrix} x & 4 & y+z \\ y & 4 & z+x \\ z & 4 & x+y \end{bmatrix} =$
(a) 4 (b) x + y + z
(c) xyz (d) 0

60) If
$\begin{vmatrix} 4 & 1 \\ 2 & 1 \end{vmatrix}^2 = \begin{vmatrix} 3 & 2 \\ 1 & x \end{vmatrix} - \begin{vmatrix} x & 3 \\ -2 & 1 \end{vmatrix}$ then x=
(a) 6 (b) 7
(c) 8 (d) 9

61) If $A = \begin{bmatrix} 5 & 2 \\ 3 & 1 \end{bmatrix}$ then $A^{-1} =$
(a) $\begin{bmatrix} 1 & -2 \\ -3 & 5 \end{bmatrix}$
(b) $\begin{bmatrix} -1 & 2 \\ 3 & -5 \end{bmatrix}$
(c) $\begin{bmatrix} -1 & -2 \\ -3 & -5 \end{bmatrix}$
(d) $\begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix}$

62) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then $A^2 =$
(a) $\begin{bmatrix} 9 & 1 \\ 1 & 4 \end{bmatrix}$
(b) $\begin{bmatrix} 8 & -5 \\ -5 & 3 \end{bmatrix}$
(c) $\begin{bmatrix} 8 & 5 \\ 5 & -3 \end{bmatrix}$
(d) $\begin{bmatrix} 8 & 5 \\ -5 & 3 \end{bmatrix}$

63) $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+x & 1 \\ 1 & 1 & 1+y \end{vmatrix} =$
(a) x + y
(b) xy
(c) x-y
(d) 1+x+y

64) If $U = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then the value of k so that $U^2 = 8U + kI$ is
(a) k=7 (b) k=-7
(c) k=0 (d) 1

65) If $\begin{vmatrix} x & 3 & 7 \\ 2 & x & 2 \\ 7 & 6 & x \end{vmatrix} = 0$ then x=
(a) -9 (b) 2
(c) 7 (d) -9,2,7

66) $\lim_{x \to 0} \frac{\text{six x-x}}{x} =$
(a) 1 (b) -1
(c) 0 (d) 2

67) $\lim_{x \to 0} \frac{(1+x)^2 - 1}{x} =$
(a) n-2 (b) n-1
(c) n (d) 1

68) $\lim_{x \to 1} \frac{\log x}{x-1} =$
(a) 0 (b) 1
(c) 1/2 (d) 2

69) The maximum value of 3 Sin x is
(a) 1 (b) 2
(c) -1 (d) 3

70) If $y = e^{2x}$ then $\frac{d^3 y}{dx^3} =$
(a) $8e^{2x}$ (b) $2e^{2x}$
(c) $4e^{2x}$ (d) e^{2x}

71) If $Y = \log(x^2)$ then dy/dx =
(a) 2logx (b) 2x
(c) log2x (d) 2/x

72) If $xy = c^2$, then dy/dx=
(a) –x/y (b) –y/x
(c) x/y (d) y/x

73) $\frac{d}{dx} \frac{1}{x^6} =$
(a) $-6x^5$ (b) $-6x^{-6}$
(c) $6x^{-6}$ (d) $-6x^{-7}$

74) If y= Sin (cos x) then $\frac{d^2y}{dx^2}$ at $x = \frac{\pi}{2}$ is
(a) 1 (b) -1
(c) 2 (d) 0

75) The equation of normal to the curve $y = x^2$ at (0,0) is
(a) x=0 (b) y=0
(c) x=y (d) x=2y

S.B. Roll No. _________

APPLIED MATHEMATICS-II

2nd Exam/Common/2251/5422/Dec'11

C

Duration : 2½ Hrs. M. Marks: 75

1) $\int \cot^2 x \; dx=$
(a) –cotx-x
(b) –cotx + x
(c) cotx
(d) tanx

2) $\int e^x (x^3+3x^2)dx =$
(a) $e^x.x^2$
(b) $e^x.x^3$
(c) $\frac{e^x}{x^2}$
(d) $\frac{e^x}{x^3}$

3) $\int \frac{dx}{x(x-1)} =$
(a) $\log\frac{x-1}{x}$
(b) $\log\frac{x}{x-1}$
(c) $-\log\frac{x-1}{x}$
(d) log (x-1)

4) $\int_0^{\pi/2} \cos^6 x \, dx =$
(a) 0 (b) 1
(c) 5/32 (d) $\frac{5\pi}{32}$

5) $\sqrt{1-\cos 2x}$ dx=
(a) $\sqrt{2}$ cosx
(b) $-\sqrt{2}$ cosx
(c) $\sqrt{2}$ sinx
(d) sinx

6) $\int_1^{\sqrt{3}} \frac{dx}{1+x^2} =$
(a) $\frac{\pi}{2}$ (b) $\frac{2\pi}{3}$
(c) $\frac{\pi}{6}$ (d) $\frac{\pi}{12}$

7) $\int_0^{\pi/2} \frac{dx}{1+\sin x} =$
(a) 0 (b) ½
(c) 1 (d) 3/2

8) $\int_0^{\pi/2} e^x(\sin x + \cos x)\, dx=$
(a) 1 (b) $e^{\pi/4}$
(c) e^{π} (d) $e^{\pi/2}$

9) The area covered by the curve $y^2=x$ and the lines y=4 and y-axis is
(a) 16/3 (b) 64/3
(c) $\frac{7}{\sqrt{2}}$ (d) 64

10) Area bounded by the curves x=1, x=3, xy=1 and x=axis is
(a) Log2 (b) Log3
(c) Log4 (d) Log5

11) $\int_0^{\pi} \cos 3x \sin 2x \; dx=$
(a) 0 (b) -4/5
(c) 5/4 (d) 1

12) The volume of revolution about x-axis of the parabola $y^2=4x$ bounded by x=1 is
(a) 2π (b) 3π
(c) 4π (d) 8π

13) Simpson's rule for area is applicable if number of intervals is
(a) Even (b) Odd
(c) both (d) none

14) Mean value of x^2 over the range from x=1 to x=4 is
(a) 5 (b) 6
(c) 7 (d) 8

15) For calculating $\int_0^{10} x^2$ by using trapezoidal rule with eleven ordinates the value of h =
(a) 4 (b) 2
(c) 3 (d) 1

16) $\int_0^{\pi/2} \sin^4 x \cos^2 x \, dx =$
(a) $\pi/4$ (b) $\pi/8$
(c) $\pi/16$ (d) $\pi/32$

17) $\int_{-a}^{a} f(x)\, dx$ =0 if f(x) is
(a) Even (b) odd
(c) both (d) none

18) $\int_O^k \frac{1}{2+8x^2} dx = \pi/16$ then k =
(a) 1 (b) 1/2
(c) 1/4 (d) 1/5

19) If $\int x^6 \sin(5x^7)\, dx =$ $k/5 \cos(5x^7)$ then k =
(a) 7 (b) –7
(c) 1/7 (d) –1/7

20) $\int \frac{e^x}{e^x+1} dx =$
(a) X + log(x^2 +1)
(b) e^x
(c) e^x +1
(d) none

21) $\int \frac{x}{\cos^2 x} dx=$
(a) Log(cosx) (b) xtanx
(c)cotx (d) none

22) Volume generated by revolving the ellipse $9x^2 + 16y^2=144$ about the major axis is
(a) 12π (b) 24π
(c) 48π (d) 96π

23) $\int \frac{1}{x^2-1} dx =$
(a) $\log\left|\frac{x-1}{x+1}\right|$
(b) $\log\left|\frac{x+1}{x-1}\right|$
(c) $\frac{1}{2}\log\left|\frac{x-1}{x+1}\right|$
(d) log 2

24) The probability that a leap year selected at random contains 53 Sundays is
(a) 1/7 (b) 2/7
(c) 3/7 (d) 4/7

25) Two dice are thrown simultaneously. The probability of obtaining a total score of 5 is
(a) 1/18 (b) 1/12
(c) 1/9 (d) 1/8

26) The probability that the three cards drawn from a pack of 52 cards all are redis
(a) 2/17 (b) 3/17
(c) 2/19 (d) 1/17

27) Mode is
(a) Least frequent value
(b) Middle most value
(c) Most frequent value
(d) None on these

28) The probability of throwing a number greater than 2 with a fair dice is
(a) 3/5 (b) 2/3
(c) 2/5 (d) 1/3

29) The mean of five numbers is 18. If one number is excluded then mean is 16. The excluded number is
(a) 26 (b) 25
(c) 24 (d) 23

30) The medium of 10, 14, 11, 9, 8, 12, 6 is
(a) 10 (b) 12
(c) 14 (d) 11

31) The mean of absolute derivation from an average is called
(a) S.D (b) M.D
(c) Variance (d) none

32) The general solution of the differential equation $\frac{dy}{dx} = \frac{x^2}{y^2}$ is
(a) $x^3- y^3=C$ (b) $x^3+ y^3=C$
(c) $y^3- x^3=C$ (d) none

33) The degree of the differential equation $\frac{d^2y}{dx^2}+5\left(\frac{dy}{dx}\right)^3 +4 =0$ is
(a) 3 (b) 2
(c) 1 (d) 4

34) The order of the differential equation $\frac{d^2y}{dx^2}-5\left(\frac{dy}{dx}\right)+6y=3$ is
(a) 2 (b) 1
(c) 6 (d) 0

35) Solution of $dy/dx =e^{x+y}$ is
(a) $e^y = e^x + c$
(b) $e^y = -e^x + c$
(c) $-e^{-y} = -e^x + c$
(d) none

36) If A is a matrix of order 3 x 5, then each row of A has
(a) 3 elements
(b) 5 elements
(c) 8 elements
(d) 2 elements

37) If $\begin{bmatrix} 5 & k+2 \\ k+1 & -2 \end{bmatrix} = \begin{bmatrix} k+3 & 0 \\ 3 & k \end{bmatrix}$ then k =
(a) 0 (b) 2
(c) -2 (d) 1

38) If $A=\begin{bmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{bmatrix}$ is symmetric, then x =
(a) 3 (b) 5
(c) 2 (d) 4

39) $\begin{vmatrix} x & 4 & y+z \\ y & 4 & z+x \\ z & 4 & x+y \end{vmatrix} =$
(a) 4 (b) x + y +z
(c) xyz (d) 0

40) If $\begin{vmatrix} 4 & 1 \\ 2 & 1 \end{vmatrix}^2 = \begin{vmatrix} 3 & 2 \\ 1 & x \end{vmatrix} - \begin{vmatrix} x & 3 \\ -2 & 1 \end{vmatrix}$ then x=
(a) 6 (b) 7
(c) 8 (d) 9

41) If $A=\begin{bmatrix} 5 & 2 \\ 3 & 1 \end{bmatrix}$ then A^{-1} =
(a) $\begin{bmatrix} 1 & -2 \\ -3 & 5 \end{bmatrix}$
(b) $\begin{bmatrix} -1 & 2 \\ 3 & -5 \end{bmatrix}$
(c) $\begin{bmatrix} -1 & -2 \\ -3 & -5 \end{bmatrix}$
(d) $\begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix}$

42) If $A =\begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then A^2=
(a) $\begin{bmatrix} 9 & 1 \\ 1 & 4 \end{bmatrix}$
(b) $\begin{bmatrix} 8 & -5 \\ -5 & 3 \end{bmatrix}$
(c) $\begin{bmatrix} 8 & 5 \\ 5 & -3 \end{bmatrix}$
(d) $\begin{bmatrix} 8 & 5 \\ -5 & 3 \end{bmatrix}$

43) $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+x & 1 \\ 1 & 1 & 1+y \end{vmatrix} =$
(a) x + y (b) xy
(c) x-y (d) 1+x+y

44) If $U=\begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$ and $I=\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then the value of k so that $U^2= 8U + kI$ is
(a) k=7 (b) k=-7
(c) k=0 (d) 1

45) If $\begin{vmatrix} x & 3 & 7 \\ 2 & x & 2 \\ 7 & 6 & x \end{vmatrix} = 0$ then x=
(a) -9 (b) 2
(c) 7 (d) -9,2,7

46) $\lim_{x\to 0} \frac{\text{six } x-x}{x} =$
(a) 1 (b) -1
(c) 0 (d) 2

47) $\lim_{x\to 0} \frac{(1+x)^2 -1}{x} =$
(a) n-2 (b) n-1
(c) n (d) 1

48) $\lim_{x\to 1} \frac{\log x}{x-1} =$

(a) 0 (b) 1
(c) 1/2 (d) 2

49) The maximum value of 3 Sin x is
(a) 1 (b) 2
(c) -1 (d) 3

50) If $y=e^{2x}$ then $\frac{d^3y}{dx^3}$ =
(a) $8e^{2x}$ (b) $2e^{2x}$
(c) $4e^{2x}$ (d) e^{2x}

51) If $Y=\log(x^2)$ then dy/dx =
(a) 2logx (b) 2x
(c) log2x (d) 2/x

52) If $xy=c^2$, then dy/dx=
(a) –x/y (b) –y/x
(c) x/y (d) y/x

53) $\frac{d}{dx} \frac{1}{x^6}$ =
(a) $-6x^5$ (b) $-6x^{-6}$
(c) $6x^{-6}$ (d) $-6x^{-7}$

54) If y= Sin (cos x) then $\frac{d^2y}{dx^2}$ at $x=\frac{\pi}{2}$ is
(a) 1 (b) -1
(c) 2 (d) 0

55) The equation of normal to the curve $y = x^2$ at (0,0) is
(a) x=0 (b) y=0
(c) x=y (d) x=2y

56) The derivative of x^6 w.r.t x^3 is
(a) $6x^6$ (b) $-2x^3$
(c) $2x^3$ (d) $-6x^6$

57) $\frac{d}{dx}\cos^{-1}(\sin x)$ =
(a) 1 (b) -1
(c) 2 (d) -2

58) If $x=at^2$, y=4 at then $\frac{dy}{dx}$ =
(a) 2t (b) $\frac{2}{t}$
(c) -2t (d) $\frac{-2}{t}$

59) The function $\frac{\log x}{x}$ has its maximum value at x=
(a) 1 (b) e
(c) $\frac{1}{e}$ (d) $\frac{2}{e}$

60) If $\sqrt{x}+\sqrt{y}=1$ then $\frac{dy}{dx}$ at $(1/4,1/4)$ is
(a) $\frac{1}{2}$ (b) 1
(c) -1 (d) 2

61) The derivative of $\cos^{-1}(2x^2-1)$ w.r.t $\cos^{-1}x$ is
(a) 2 (b) $\frac{1}{2\sqrt{1-x^2}}$
(c) $\frac{2}{x}$ (d) $1-x^2$

62) The tangent to the curve $y=e^{2x}$ at the point (0.1) meets X-axis at
(a) (0,2) (b) (2,0)
(c) (-1/2,0) (d) (0,1)

63) The equation of the normal to the curve y=x (2-x) ate the point (2,0) is
(a) x-2y=2
(b) x-2y+2=0
(c) 2x+y=4
(d) 2x+y+4=0

64) The point on the curve $y^2=x$ where the tangent makes angle of 45^0 with x-axis is
(a) $\left(\frac{1}{2},\frac{1}{4}\right)$ (b) $\left(\frac{1}{4},\frac{1}{2}\right)$
(c) (4,2) (d) (1,1)

65) The function f(x)= Ksinx +1/3 Sin3x has maximum value at $x=\frac{\pi}{3}$. Then K=
(a) 3 (b) 1/3
(c) 2 (d) 1/2

66) The maximum value of xy subject to x + y=8 is
(a) 28 (b) 24
(c) 20 (d) 16

67) If $x=e^y$ then $\frac{dy}{dx}$
(a) 1/x (b) e^y
(c) e^x (d) logx

68) The radius of a sphere is found to be 20cm with a possible error of 2 cm. Then % error in its surface area is
(a) 10 (b) 20
(c) 30 (d) 40

69) The instantaneous rate of change for the function $f(t) = te^t + 4$ at t=0 is
(a) 9 (b) 0
(c) 1 (d) 4

70) The maximum value of x^3-3x+2 occurs at x=
(a) -2 (b) -1
(c) 1 (d) 2

71) $\int \sin 2x\,dx$ =
(a) Cos2x
(b) 2Cos2x
(c) $\frac{1}{2}$ Cos2x
(d) $\frac{-1}{2}$ Cos2x

72) $\int \frac{2}{\cos^2 x} dx$=
(a) 2tanx
(b) 2cotx
(c) 2sinx
(d) 2cosx

73) $\int \log x\,dx$ =
(a) xlogx-x
(b) xlogx+x
(c) -xlogx-x
(d) 1/x

74) $\int \frac{1}{x\log x} dx$=
(a) logx
(b) log(logx)
(c) $\log\left(\frac{1}{\log x}\right)$
(d) 1/logx

75) If $\int \frac{2^{1/x}}{x^2} dx = k.2^{1/x}$ then k=
(a) -1
(b) –log2
(c) $\frac{-1}{\log 2}$
(d) 1/2

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APPLIED MATHEMATICS-II

2^{nd} Exam/Common/2251/5422/Dec'11

D

Duration : 2½ Hrs. M. Marks: 75

1) $\int \frac{x}{\cos^2 x} dx=$
(a) Log(cosx)
(b) xtanx
(c) cotx
(d) none

2) Volume generated by revolving the ellipse $9x^2 + 16y^2=144$ about the major axis is
(a) 12π (b) 24π
(c) 48π (d) 96π

3) $\int \frac{1}{x^2-1} dx =$
(a) $\log\left|\frac{x-1}{x+1}\right|$
(b) $\log\left|\frac{x+1}{x-1}\right|$
(c) $\frac{1}{2}\log\left|\frac{x-1}{x+1}\right|$
(d) log 2

4) The probability that a leap year selected at random contains 53 Sundays is
(a) 1/7 (b) 2/7
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5) Two dice are thrown simultaneously. The probability of obtaining a total score of 5 is
(a) 1/18 (b) 1/12
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(a) 2/17 (b) 3/17
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(a) Least frequent value
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(d) None on these

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(c) 24 (d) 23

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(a) 10 (b) 12
(c) 14 (d) 11

11) The mean of absolute derivation from an average is called
(a) S.D (b) M.D
(c) Variance (d) none

12) The general solution of the differential equation $\frac{dy}{dx} = \frac{x^2}{y^2}$ is
(a) $x^3- y^3=C$ (b) $x^3+ y^3=C$
(c) $y^3- x^3=C$ (d) none

13) The degree of the differential equation $\frac{d^2y}{dx^2}+5\left(\frac{dy}{dx}\right)^3 +4 =0$ is
(a) 3 (b) 2
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14) The order of the differential equation $\frac{d^2y}{dx^2}-5\left(\frac{dy}{dx}\right) +6y=3$ is
(a) 2 (b) 1
(c) 6 (d) 0

15) Solution of $dy/dx =e^{x+y}$ is
(a) $e^y = e^x + c$
(b) $e^y = -e^x + c$
(c) $-e^{-y} = -e^x + c$
(d) none

16) If A is a matrix of order 3 x 5, then each row of A has
(a) 3 elements
(b) 5 elements
(c) 8 elements
(d) 2 elements

17) If $\begin{bmatrix} 5 & k+2 \\ k+1 & -2 \end{bmatrix} = \begin{bmatrix} k+3 & 0 \\ 3 & k \end{bmatrix}$ then k =
(a) 0 (b) 2
(c) -2 (d) 1

18) If A= $\begin{bmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{bmatrix}$ is symmetric, then x =
(a) 3 (b) 5
(c) 2 (d) 4

19) $\begin{bmatrix} x & 4 & y+z \\ y & 4 & z+x \\ z & 4 & x+y \end{bmatrix} =$
(a) 4 (b) x + y +z
(c) xyz (d) 0

20) If $\begin{vmatrix} 4 & 1 \\ 2 & 1 \end{vmatrix}^2 = \begin{vmatrix} 3 & 2 \\ 1 & x \end{vmatrix} - \begin{vmatrix} x & 3 \\ -2 & 1 \end{vmatrix}$ then x=
(a) 6 (b) 7
(c) 8 (d) 9

21) If A= $\begin{bmatrix} 5 & 2 \\ 3 & 1 \end{bmatrix}$ then A^{-1} =
(a) $\begin{bmatrix} 1 & -2 \\ -3 & 5 \end{bmatrix}$
(b) $\begin{bmatrix} -1 & 2 \\ 3 & -5 \end{bmatrix}$
(c) $\begin{bmatrix} -1 & -2 \\ -3 & -5 \end{bmatrix}$
(d) $\begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix}$

22) If A = $\begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then A^2=
(a) $\begin{bmatrix} 9 & 1 \\ 1 & 4 \end{bmatrix}$
(b) $\begin{bmatrix} 8 & -5 \\ -5 & 3 \end{bmatrix}$
(c) $\begin{bmatrix} 8 & 5 \\ 5 & -3 \end{bmatrix}$
(d) $\begin{bmatrix} 8 & 5 \\ -5 & 3 \end{bmatrix}$

23) $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+x & 1 \\ 1 & 1 & 1+y \end{vmatrix} =$

(a) x + y (b) xy
(c) x-y (d) 1+x+y

24) If U= $\begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$ and I= $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then the value of k so that $U^2= 8U + kI$ is
(a) k=7 (b) k=-7
(c) k=0 (d) 1

25) If $\begin{vmatrix} x & 3 & 7 \\ 2 & x & 2 \\ 7 & 6 & x \end{vmatrix} = 0$ then x=

(a) -9 (b) 2
(c) 7 (d) -9,2,7

26) $\lim_{x\to 0} \frac{\text{six x-x}}{x} =$
(a) 1 (b) -1
(c) 0 (d) 2

27) $\lim_{x\to 0} \frac{(1+x)^2 -1}{x} =$
(a) n-2 (b) n-1
(c) n (d) 1

28) $\lim_{x\to 1} \frac{\log x}{x-1} =$
(a) 0 (b) 1
(c) 1/2 (d) 2

29) The maximum value of 3 Sin x is
(a) 1 (b) 2
(c) -1 (d) 3

30) If $y=e^{2x}$ then $\frac{d^3 y}{dx^3} =$
(a) $8e^{2x}$ (b) $2e^{2x}$
(c) $4e^{2x}$ (d) e^{2x}

31) If $Y=\log(x^2)$ then dy/dx =
(a) 2logx (b) 2x
(c) log2x (d) 2/x

32) If $xy=c^2$, then dy/dx=
(a) –x/y (b) –y/x
(c) x/y (d) y/x

33) $\frac{d}{dx} \quad \frac{1}{x^6} =$
(a) $-6x^5$ (b) $-6x^{-6}$
(c) $6x^{-6}$ (d) $-6x^{-7}$

34) If y= Sin (cos x) then $\frac{d^2y}{dx^2}$ at x= $\frac{\pi}{2}$ is
(a) 1 (b) -1
(c) 2 (d) 0

35) The equation of normal to the curve $y = x^2$ at (0,0) is
(a) x=0 (b) y=0
(c) x=y (d) x=2y

36) The derivative of x^6 w.r.t x^3 is
(a) $6x^6$ (b) $-2x^3$
(c) $2x^3$ (d) $-6x^6$

37) $\frac{d}{dx} \cos^{-1} (\text{Sinx}) =$
(a) 1 (b) -1
(c) 2 (d) -2

38) If $x=at^2$, y=4 at then $\frac{dy}{dx} =$

(a) 2t (b) $\frac{2}{t}$

(c) -2t (d) $\frac{-2}{t}$

39) The function $\frac{\log x}{x}$ has its maximum value at x=
(a) 1 (b) e
(c) $\frac{1}{e}$ (d) $\frac{2}{e}$

40) If $\sqrt{x} + \sqrt{y} = 1$ then $\frac{dy}{dx}$ at $(1/4, 1/4)$ is

(a) $\frac{1}{2}$ (b) 1
(c) -1 (d) 2

41) The derivative of $\cos^{-1} (2x^2-1)$ w.r.t $\cos^{-1}x$ is

(a) 2 (b) $\frac{1}{2\sqrt{1-x^2}}$

(c) $\frac{2}{x}$ (d) $1-x^2$

42) The tangent to the curve $y=e^{2x}$ at the point (0.1) meets X-axis at
(a) (0,2) (b) (2,0)
(c) (-1/2,0) (d) (0,1)

43) The equation of the normal to the curve y=x (2-x) ate the point (2,0) is
(a) x-2y=2
(b) x-2y+2=0
(c) 2x+y=4
(d) 2x+y+4=0

44) The point on the curve $y^2=x$ where the tangent makes angle of 45^0 with x-axis is

(a) $\left(\frac{1}{2}, \frac{1}{4}\right)$ (b) $\left(\frac{1}{4}, \frac{1}{2}\right)$

(c) (4,2) (d) (1,1)

45) The function f(x)= Ksinx +1/3 Sin3x has maximum value at $x=\frac{\pi}{3}$. Then K=
(a) 3 (b) 1/3
(c) 2 (d) 1/2

46) The maximum value of xy subject to x + y=8 is
(a) 28 (b) 24
(c) 20 (d) 16

47) If $x=e^y$ then $\frac{dy}{dx}$
(a) 1/x (b) e^y
(c) e^x (d) logx

48) The radius of a sphere is found to be 20cm with a possible error of 2 cm. Then % error in its surface area is
(a) 10 (b) 20
(c) 30 (d) 40

49) The instantaneous rate of change for the function $f(t) = te^t +4$ at t=0 is
(a) 9 (b) 0
(c) 1 (d) 4

50) The maximum value of x^3-3x +2 occurs at x=
(a) -2 (b) -1
(c) 1 (d) 2

51) $\int \sin 2x dx =$
(a) Cos2x
(b) 2Cos2x

(c) $\frac{1}{2}$ Cos2x

(d) $\frac{-1}{2}$ Cos2x

52) $\int \frac{2}{\cos^2 x} dx=$

(a) 2tanx (b) 2cotx
(c) 2sinx (d) 2cosx

53) $\int \log x dx =$

(a) xlogx-x
(b) xlogx+x
(c) -xlogx-x
(d) 1/x

54) $\int \frac{1}{x \log x} dx=$

(a) logx
(b) log(logx)
(c) $\log\left(\frac{1}{\log x}\right)$
(d) 1/logx

55) If $\int \frac{2^{1/x}}{x^2} dx=k.2^{1/x}$ then k=

(a) -1 (b) –log2
(c) $\frac{-1}{\log 2}$ (d) 1/2

56) $\int \cot^2 x\ dx=$

(a) –cotx-x
(b) –cotx + x
(c) cotx
(d) tanx

57) $\int e^x (x^3+3x^2)dx =$

(a) $e^x.x^2$
(b) $e^x.x^3$
(c) $\frac{e^x}{x^2}$
(d) $\frac{e^x}{x^3}$

58) $\int \frac{dx}{x(x-1)} =$

(a) $\log\frac{x-1}{x}$
(b) $\log\frac{x}{x-1}$
(c) $-\log\frac{x-1}{x}$
(d) log (x-1)

59) $\int_0^{\pi/2} \cos^6 x\, dx =$

(a) 0 (b) 1
(c) 5/32 (d) $\frac{5\pi}{32}$

60) $\sqrt{1-\cos 2x}\ dx=$

(a) $\sqrt{2}$ cosx
(b) $-\sqrt{2}$ cosx
(c) $\sqrt{2}$ sinx
(d) sinx

61) $\int_1^{\sqrt{3}} \frac{dx}{1+x^2} =$

(a) $\frac{\pi}{2}$ (b) $\frac{2\pi}{3}$
(c) $\frac{\pi}{6}$ (d) $\frac{\pi}{12}$

62) $\int_0^{\pi/2} \frac{dx}{1+\sin x} =$

(a) 0 (b) ½
(c) 1 (d) 3/2

63) $\int_0^{\pi/2} e^x(\sin x + \cos x)\, dx=$

(a) 1 (b) $e^{\pi/4}$
(c) e^{π} (d) $e^{\pi/2}$

64) The area covered by the curve $y^2=x$ and the lines y=4 and y-axis is

(a) 16/3 (b) 64/3
(c) $\frac{7}{\sqrt{2}}$ (d) 64

65) Area bounded by the curves x=1, x=3, xy=1 and x=axis is

(a) Log2
(b) Log3
(c) Log4
(d) Log5

66) $\int_0^{\pi} \cos 3x \sin 2x\ dx=$

(a) 0 (b) -4/5
(c) 5/4 (d) 1

67) The volume of revolution about x-axis of the parabola $y^2=4x$ bounded by x=1 is

(a) 2π (b) 3π
(c) 4π (d) 8π

68) Simpson's rule for area is applicable if number of intervals is

(a) Even (b) Odd
(c) both (d) none

69) Mean value of x^2 over the range from x=1 to x=4 is

(a) 5 (b) 6
(c) 7 (d) 8

70) For calculating $\int_0^{10} x^2$ by using trapezoidal rule with eleven ordinates the value of h =

(a) 4 (b) 2
(c) 3 (d) 1

71) $\int_0^{\pi/2} \sin^4 x \cos^2 x\, dx =$

(a) $\pi/4$ (b) $\pi/8$
(c) $\pi/16$ (d) $\pi/32$

72) $\int_{-a}^{a} f(x)\, dx =0$ if f(x) is

(a) Even (b) odd
(c) both (d) none

73) $\int_0^k \frac{1}{2+8x^2} dx = \pi/16$ then k =

(a) 1 (b) 1/2
(c) 1/4 (d) 1/5

74) If $\int x^6 \sin(5x^7)\, dx =$ k/5 $\cos(5x^7)$ then k =

(a) 7 (b) –7
(c) 1/7 (d) –1/7

75) $\int \frac{e^x}{e^x+1} dx =$

(a) X + log(x^2 +1)
(b) e^x
(c) e^x +1
(d) none