

16/4/16

B. Pharm / Sem - III (BS&S KT) Maths

(3 Hours)

QP Code : 24946

[Total Marks : 70]

Note: All Questions are compulsory
Use of simple calculator is allowed
Figure at right indicate maximum marks

Q.1 Attempt any 7 [2 marks each]

[14]

- I. If $A = \begin{bmatrix} 3 & 4 \\ 5 & 7 \end{bmatrix}$ then the inverse of the A is:
- (a) $\begin{bmatrix} 7 & -4 \\ -5 & 3 \end{bmatrix}$ (b) $\begin{bmatrix} 3 & 5 \\ 4 & 7 \end{bmatrix}$ (c) $\begin{bmatrix} -4 & 7 \\ -5 & 3 \end{bmatrix}$ (d) $\begin{bmatrix} 7 & -5 \\ -4 & 3 \end{bmatrix}$
- II. The value of $\int_2^5 (3x^2 + 2x + 1) dx$ is:-
- (a) 411 (b) 141 (c) 142 (d) 35
- III. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ x & 8 & 9 \end{bmatrix}$ is a singular matrix, then the value of x is:-
- (a) 5 (b) 6 (c) 7 (d) 8
- IV. As per Rolle's theorem to $f(x) = x^2 - 4x + 3$ in $[1, 3]$ the point belongs to $(1, 3)$ is:-
- (a) 1 (b) 2 (c) 3 (d) 4
- V. If $y = 2x$ then Δy by taking $h = 1$ is :-
- (a) 4 (b) 2 (c) 3 (d) 1
- VI. The n^{th} derivative of $f(x) = x^n$ is;
- (a) $a^n \cdot n!$ (b) $n!$ (c) $(-1)^n n!$ (d) $x \cdot n!$
- VII. General solution for the differential equation $(D^2 - 5D + 6)y = 0$ is;
- (a) $C_1 e^{2x} + C_2 e^{3x}$ (b) $C_1 e^{-x} + C_2 e^{2x}$ (c) $C_1 e^{4x} + C_2 e^x$ (d) $C_1 e^{-x} + C_2 e^{2x}$
- VIII. The N^{th} derivative of $f(x) = \log(2x+1)$ is;
- (a) $y_n = \frac{1}{2!}$ (b) $y_n = \frac{(-1)^n n!}{(2x+1)^n}$ (c) $y_n = \frac{(-1)^{n-1} \cdot (n-1)! 2^n}{(2x+1)^n}$ (d) $y_n = \frac{(-1)^{n-1} \cdot (n-1)!}{(2x+1)^n}$
- IX. The partial derivative of $Z = 2x^3 + 2xy + xy^2$ with respect to x is:
- (a) $6x^2 + 2y + y^2$ (b) $6x^3 + 2x + 2xy$ (c) $6x + 2y + y^2$ (d) $6x + 2y + y^2$

[TURN OVER]

Q.1 [b] Attempt any one:-

[1]

X. Which of the following is homogeneous differential equation?
 (a) $\frac{dy}{dx} = x^2 - 4xy + 5y^2$ (b) $\frac{dy}{dx} = 2x + 3y$ (c) $\frac{dy}{dx} = 3x^3 - 7y^2$ (d) a and b

XI. The value of $\int_{-1}^1 3x^3 dx$ is: (a) 15/2 (b) 0 (c) 16/3 (d) 3/2

Q.2 [a] Attempt any two:- (4 marks each)

[8]

(i) Find the Nth derivative of $y = \frac{x+1}{x^2-9}$

(ii) Using Maclaurin's series find the expansion of $f(x) = \sin x$.

(iii) Verify $\frac{\partial^2 U}{\partial x \partial y} = \frac{\partial^2 U}{\partial y \partial x}$ for the function $U = e^{xy}$

Q.2[b] Attempt any one:-

[3]

(i) Differentiate the equation

$$(1+x^2)y_2 - xy_1 + y = 0, \text{ n times with respect to } x.$$

(ii) Verify Lagrange's mean value theorem, for the function $f(x) = x^2 - 3x + 5$, on $[1, 3]$.

Q.3 [a] Attempt any two:- (4 marks each)

[8]

(i) Obtain the reduction formula for $\int_0^{\pi/2} \sin^n x dx$, hence evaluate $\int_0^{\pi/2} \sin^7 x dx$.

(ii) Find the length of the curve $x = a \sin \theta$, $y = a \cos \theta$ from $\theta = 0$ to $\theta = \frac{\pi}{4}$.

(iii) Evaluate $\int \tan^{-1} x dx$.

Q.3 [b] Attempt any one

[3]

(i) Find the area bounded by the curve $y = \sin x$, x-axis and the lines $x = 0$ and $x = \pi$.

(ii) By using the properties of definite integral solve :- $\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}} dx$.

Q.4[a] Attempt any two:- (4 marks each)

[8]

(i) By using the Adjoint method, find the inverse of the matrix,

$$A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$$

(ii) Solve by Cramer's rule, $2x - y + 3z = 9$, $x + y + z = 6$, $x - y + z = 2$.

[TURN OVER

(iii) Verify Cayley Hamilton theorem for the matrix:-

$$A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Q.4 [b] Attempt any one:-

[3]

(i) Find the value of x if determinant of matrix $A = \begin{bmatrix} 1 & -6 & -x \\ 2 & -3 & x-3 \\ -3 & 2 & x+2 \end{bmatrix}$ is zero.

(ii) Find the rank of the matrix :- $A = \begin{bmatrix} 1 & 2 & 3 & 1 \\ 2 & 4 & 6 & 2 \\ 1 & 2 & 3 & 2 \end{bmatrix}$.

Q.5 [a] Attempt any two:-(4 marks each)

[8]

(i) Solve the differential equation $\frac{dy}{dx} = \frac{xy+y^2}{x^2+xy}$

(ii) Find the particular solution of $(D^2+D-2)y = 0$, when $x=0$, $y=1$ and $\frac{dy}{dx} = 0$

(iii) Solve $(D^2+2D+1)y = 2x+x^2$.

Q.5 [b] Attempt any one:-

[3]

(i) Obtain the differential equation for the equation, $x^2 - 4ax + y^2 = 0$

(ii) Solve the differential equation $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$

Q.6 [a] Attempt any two:-(4 marks each)

[8]

(i) By using Newton's forward Interpolation formula estimate $f(2.5)$ from:-

X	1	2	3	4
f(x)	10	16	26	40

(ii) Evaluate $\int_1^5 (x^3+4) dx$, using Simpson's 1/3 rd rule. (Take $n=4$)

(iii) Estimate the missing term by taking E and Δ from the following

X	0	1	2	3	4
Y	1	3	9	-	81

Q. 6[b] Attempt any one

[3]

(i) Evaluate $(\frac{\Delta^2}{E})x^3$

(ii) Find Δy for $y = 5x^2$, by taking $h=1$.

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Correction:

Q.no. 6(a)(ii)

Read As:

(ii) Evaluate..... 1/3rd rule. (take n=8)

Instead of:

(ii) Evaluate..... 1/3rd rule. (take n=4)

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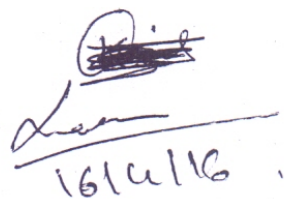
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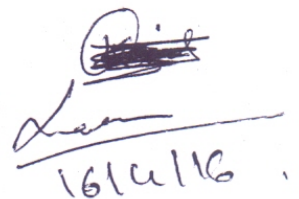
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