



AJEENKYA

D Y PATIL UNIVERSITY

Summer Term Examinations (July 2019)

School: School of Engineering

Program: BTECH (MACT/CTIS/DS)

Course: Linear Algebra and Differential Calculus

Course Code: ENG101

Semester: Summer Term

Max Marks: 50

Duration (mins): 90 mins

Section A

Q1 Fill in the Blanks. (Any Five)

10 Marks

- 1) Theform solved by using both row & column transformation.
- 2) The function is of the form $\frac{\partial y}{\partial x}$ is called
- 3) The vectors X_1, X_2, X_3, X_n are said to be linearly Independent.....
- 4) To find rank of matrix by Normal form means convert given Matrix in to.....
- 5) $\frac{\partial(x, y)}{\partial(u, v)} = \dots\dots\dots$
- 6) For Caley Hamilton theorem, the characteristic question is of the form.....
- 7) Taylor's series expand in power of $(x - a)$ is written as

Section B

Q2. Answer the following (Any Four)

20 Marks

1) Verify Cayley –Hamilton Theorem for $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$

2) Convert the following matrix in to Echelon form $\begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$

3) Expand the series expansion for e^{e^x}

4) Find the rank of matrix by Normal form $\begin{pmatrix} 4 & 2 & -1 & 2 \\ 1 & -1 & 2 & 1 \\ 2 & 2 & -2 & 0 \end{pmatrix}$

5) Evaluate $\log[\sin(x + \frac{\pi}{4})]$ using Taylor's Theorem in ascending power of x

Section C

Q3. Answer the following (Any Two)

20 Marks

a) Verify Cayley-Hamilton Theorem and hence find A^{-1} for the Matrix

$A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ Also find A^4

b) Expand $\frac{x}{e^x - 1}$ up to x^4

c) Find non-singular matrices P and Q such that PAQ is in normal form where ,

$A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$

d) If $x = u(1 - v)$; $y = uv$ then prove that $JJ' = 1$
