Course: Calculus and analytical geometry
Program: BS (SE, CS)
Instructor: Muhammad Abrar Khan
Examination: Final Paper
Total Marks: 50
Date: September. 24, 2020

Note: Attempt all questions. Use examples and diagrams where necessary.

Q.1

a) Differentiate $\frac{3x^4-2x^3+5}{x^3+1}$ with respect to x.

b) Differentiate $\frac{(x^3+1)^2}{x^3-1}$ with respect to x.

Q.2

a) Find the Integration of $\int \frac{1}{\sqrt{x^5}}$ dx.

b) Find the Integration of $\int \frac{1}{(8x+7)^8}$dx.

Q.3

a) Find the Integration of $\int \frac{-x+9}{2x^2-8x+6}$dx by Partial fractions.

b) Find the Integration of $\int \frac{4x^2+8x}{(x^{2+1})(x^2+2x+3)}$dx by Partial fractions.

Q.4

Solve each of the following matrix equations:

a) $X + \begin{bmatrix} 3 & -1 \\ 2 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 1 \\ -3 & 1 \end{bmatrix}$

b) $X + \begin{bmatrix} -1 & 0 \\ 0 & 2 \end{bmatrix} = \begin{bmatrix} 2 & 6 \\ 1 & 5 \end{bmatrix} + \begin{bmatrix} -4 & -8 \\ -2 & 0 \end{bmatrix}$

c) $X + 2I = \begin{bmatrix} 3 & -1 \\ 1 & 2 \end{bmatrix}$

Q.5

a) If $A = \begin{bmatrix} 1 & 4 \\ 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$, $C = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$ Find A^2+BC