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**MATRIC NUMBER: 19/sci01/099**

**Question 1**

**i)** X = 1 2 8

4 7 6

9 5 3

/X/ = 1 2 8

4 7 6

9 5 3

/X/ = 1 7 6 - 2 4 6 + 8 4 7

5 3 9 3 9 5

/X/ = 1(21 – 30) – 2 (12 – 54) + 8(20 – 63)

/X/ = - 9 + 84 – 344

/X/ = - 269

/X/≠ 0 , therefore, X is a NON-SINGULAR MATRIX

ii) Y = 0 5 0

-3 -7 -1

2 1 9

/Y/ = 0 5 0

-3 -7 -1

2 1 9

/Y/ = 0 -7 -1 -5 -3 -1 +0 -3 -7

1 9 2 9 2 1

/Y/ = 0[-63-(-1)] -5[-27-(-2)] +0[-3-(-14)]

/Y/ = 0[-62] -5[-25] +0[11]

/Y/ = 125

/Y/ ≠ 0, therefore, Y is a NON-SINGULAR MATRIX

iii) Rank of Y

/Y/ = 0 5 0

-3 -7 -1

2 1 9

/Y/ = 0 -7 -1 -5 -3 -1 +0 -3 -7

1 9 2 9 2 1

/Y/ = 0[-63-(-1)] -5[-27-(-2)] +0[-3-(-14)]

/Y/ = 0[-62] -5[-25] +0[11]

/Y/ = 125

Since Y ≠ 0, the rank of the matrix Y is 3

iv) /X + Y/

/X/ = 1 2 8 /Y/ = 0 5 0

4 7 6 -3 -7 -1

9 5 3 2 1 9

/X + Y/ = 1 7 8

1 0 5

11 6 12

/X + Y/ = 1 0 5 -7 1 5 +8 1 0

6 12 11 12 11 6

/X + Y/ = 1[0 – 30] -7[12 – 55] +8[6 – 0]

/X + Y/ = 1[-30] -7[-43] +8[6]

/X + Y/ = -30 + 301 + 48

/X + Y/ = 319

/X + Y/ ≠ 0, therefore, it is a NON-SINGULAR MATRIX

v) 5Y = 0 5 0

5 -3 -7 -1

2 1 9

/5Y/ = 0 25 0

-15 -35 -5

10 5 45

/5Y/ = 0 -35 -5 -25 -15 -5 +0 -15 -35

5 45 10 45 10 5

/5Y/ = 0[-1575 –(-25)] -25[-675 – (-50)] +0[-75 –(-350)]

/5Y/ = 0 + 15625 + 0

/5Y/ = 15625

/5Y/ ≠ 0, therefore it is a NON-SINGULAR MATRIX

**Question 2**

**T : Q R**

**Q R**

**m . . 1**

**h . . 3**

**i . . 5**

**k . . 7**

**o . . 9**

**r .** codomain

**c .**

domain

**T(m) = T(h) = 1**

**T(i) = 3**

**T(k) = 5**

**T(o) = T(r) = 7**