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MATRIC NO: 18/SCI01/082

QUESTIONS Given the following matrices A=(1,-3,6), (4,0,2), (8,5,1) B=(1,1,2), (1,-2,1), (0,3,-4) C=(0,4,3), (6,-7,1), (1,-3,2) Find (I). Rank of A (ii). Rank of B transpose (iii). Rank of (A+C)transpose (iv). Rank of (B+C) (v). Rank of (A+B+C)

**SOLUTION**

**A= 1 -3 6 B= 1 1 2 C= 0**  **4 3**

 **4 0 2 1 -2 1 6 -7 1**

 **8 5 1 0 3 -4 1 -3 2**

1. **RANK OF A**

 **A** = 1 -3 6

 4 0 2

 8 5 1

= **1**  0 2 -(**-3)**  4 2 **+6** 4 0

 5 1 8 1 8 5

= 1(0 - 10) +3(4-16) +6(20-0)

= -10 - 36 +120

= **74**

**Since** A ≠ 0 , **The Rank of A is 3**

1. **RANK OF BT**

**B** = 1 1 2 **B**T = 1 1 0

 1 -2 1 1 -2 3

 0 3 -4 2 1 -4

= **1** -2 3 **-1** 1 3 **+0** 1 -2

 1 -4 2 -4 2 1

1(8 - 3) -1(-4-6) +0(1+4)

= 5 + 10 + 0

**=15**

**Since** BT ≠ 0 , **The Rank of BT is 3**

1. **RANK OF (A+C)T**

A = 1 -3 6 C= 0 4 3 1 1 9

 4 0 2 **+** 6 -7 1 = 10 -7 3

 8 5 1 1 -3 2 9 2 3

(A+C)T= 1 10 9

 1 -7 2

 9 3 3

= **1**  -7 2 -**10** 1 2 +9 1 -7

 3 3 9 3 9 3

1(-21-6) -10(3-18) +9(3+63)

= -27 +150 + 594

**= 742**

Since (A+C)T ≠ 0 **, Hence the rank of (A+C)T is 3**

1. **RANK OF (B+C)**

B+C= 1 1 2 0 4 3 **1 5 5**

 1 -2 1 + 6 7 1 = **7 -9 2**

 0 3 4 1 -3 2 **1 0 -2**

= **1** -9 5 **-5** 7 5 **+5** 1 9

 0 -2 1 -2 1 0

= 1(18– 0) -5(-14 – 2) +5( 0 + 9)

= -18 +80 + 45

= **143**

Hence, The Rank of **B + C is 3**

1. **RANK OF A+B+C**

A+B+C = 5 0 5 1 1 20 4 3 **2 2 11**

 -3 - 7 -1 + 1 -2 1 + 6 -7 1 = **11 -9 4**

 2 1 9 0 3 -41 -3 2 **9 5 -1**

= **2** -9 4 **-2**  11 4 +11 11 -9

 5 -1 9 -1 9 5

= 2(9 - 20) -2(-11 -36 ) +11( 55 + 81)

= -22 +94 + 1496

=**1,568**

**Since, A+B+C ≠ 0 Hence , The RANK OF (A+B+C) is if Rank 3**