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Find the time complexity of the below functions in Θ form. Write NA if the function does not

apply to any case.

a) T (n) = 3T (n/2) + n

b) T (n) = 64T (n/8) − n^2(log n)

c) T (n) = 2nT (n/2) + n^n

d) T (n) = 3T (n/3) + n/2

e) T (n) = 7T (n/3) + n^2

Note: You don’t have to submit the full solution, the final time complexity in form of Θ is perfectly

acceptable.

Time Complexity in any other asymptomatic notation will lead to zero marks.

Case-1: T(n) = 𝜽(n^d) , if a < (b^d)

Case-2: T(n) = 𝜽(n^d log n), if a = (b^d)

Case-3: T(n) = 𝜽(n^log a[base b]), if a>(b^d)

1. T(n) = 3T (n/2) + n (case-3 applied)

Time complexity is 𝜽(n^log 3[base 2])

1. T(n) = 64T (n/8) – n^2(log n)

N/A – No algorithm has negative time taken.

1. T(n) = 2nT(n/2) + n^n

N/A – Not solvable by Mater Theorem since a = 2n and it is not a constant.

1. T(n) = 3T(n/3) + n/2 (case-2 applied)

f(n) = n^log a[base b] = n^ log 3[base 3] = n

a=b^d; 3 = 3^1

Time complexity: T(n) = 𝜽(n log n)

1. T(n) = 7T(n/3) + n^2 (case-1 applied)

a< b^d = 7 < 3^2

T(n) = 𝜽(n^d) = 𝜽(n^2)