Find the time complexity of the below functions in Θ form.

Write NA if the function does not apply to any case.

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| ***MASTER‘s THEOREM*** |
| T(1)=c  T(n)= aT(n/b)+f(n) where a>=1,b>=2, c>0  f(n)= Θ(nd) where d>=0 then  case 1 : T(n)= Θ(nd) if a<bd  case 2 : T(n)= Θ(nd logn) if a=bd  case 3 : T(n)= Θ(nlog b [base a]) if a> bd |

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

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| Solution :  On comparing with Master theorem   * a=3 , b=2 * f(n)=n   =>f(n)= Θ(n1) where d=1  Since 3>21 , therefore case 3 applies and hence  T(n)= Θ(nlog 2 [base 3]) |

b) T (n) = 64T (n/8) − n^2(log n)

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| Solution :  On comparing with Master theorem   * a=64 , b=8 * f(n)=-n^2(log n)   =>f(n) is negative , hence cannot apply Master’s theorem here  Therefore solution is NA. |

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

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| Solution :  On comparing with Master theorem   * a=2n , b=2   Since a is not constant , we cannot apply Master’s theorem.  Therefore solution is NA. |

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

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| Solution:  On comparing with Master theorem   * a=3 , b=3 * f(n)=n/2   =>f(n)= Θ(n1/2) where d=1  Since 3=31 , case 2 applies and hence  T(n)= Θ(n1 logn) |

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

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| Solution:  On comparing with Master theorem   * a=7 , b=3 * f(n)=n^2   =>f(n)= Θ(n2) where d=2  Since 7<32 , case1 applies hence  T(n)= Θ(n2) |