Practice Questions on Master Theorem and Back Substitution Method

Qus1. The running time of an algorithm is represented by the following recurrence relation:

**if n <= 3 then T(n) = n**

**else T(n) = T(n/3) + cn**

Which one of the following represents the time complexity of the algorithm?   
(A) (n)  
(B) (n log n)  
(C) (n^2)  
(D) (n^2log n)

Ans A

Qus.2 The running time of an algorithm T(n), where ‗n‘ is the input size, is given by—

T (n) = 8T(n/2)+ qn, if n > 1 = p, if n = 1

where p, q are constants. The order of this algorithm is—

(a) n2 (b) nn

(c) n3 (d) n

**Solution:** Option (c)

Qus.3 The running time of an algorithm T(n), where ‗n‘ is the input size, is given by—

T (n) = 7T(n/2)+ qn, if n > 1 = p, if n = 1

where p, q are constants. The order of this algorithm is—

(a) n2.81 (b) nn

(c) n3 (d) n

**Solution:** Option (a)

Qus.4 The running time of an algorithm T(n), where ‗n‘ is the input size, is given by—

T (n) = T(n/2)+ logn, if n > 1 = p, if n = 1

where p, q are constants. The order of this algorithm is—

(a) n2 (b) loglogn

(c) logn (d) (logn)2

**Solution:** Option (d)

Qus.5 The running time of an algorithm T(n), where ‗n‘ is the input size, is given by—

T (n) = T(n-1)+ 1, if n > 1 = p, if n = 1

where p, q are constants. The order of this algorithm is—

(a) n2 (b) nn

(c) n3 (d) n

**Solution:** Option (d)

Qus.6 The running time of an algorithm T(n), where ‗n‘ is the input size, is given by—

T (n) = 3T(n/3)+ n/2, if n > 1

The order of this algorithm is—

(a) n2 (b) nn

(c) nlogn (d) n

**Solution:** Option (c)

Qus.7 The running time of an algorithm T(n), where ‗n‘ is the input size, is given by—

T (n) = 3T(n/3)+ nlogn, if n > 1 = p, if n = 1

where p, q are constants. The order of this algorithm is—

(a) n2 (b) nn

(c) n3 (d) n(logn)2

**Solution:** Option (d)