Practice Questions on Master Theorem and Back Substitution Method

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

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if  n <= 3  then   T(n) = n
else T(n) = T(n/3) + cn
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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) n^2 (b) n^n
(c) n^3 (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) $n^{2.81}$ (b) n^n
(c) n^3 (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) n^2 (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) n^2 (b) n^n
(c) n^3 (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) n^2 (b) n^n
(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) n^2 (b) n^n
(c) n^3 (d) $n(\log n)^2$
Solution: Option (d)