T(n) = 3T(n/2) + n2

a=3, b=2, $f(n)=n^2$

.. az b are const. z fen) is a +ve function

masters theorem is applicable

c= log a = log 3 = 1.58

=) m = m 1.58

which is n2 > n1.58

. case 3 is applied here

Solz: T(n) = 4T (n/2)+n2 a = 4 b = 2, $f(n) = n^2$

. as b are const and for is a +ve function

.. Master's theorem is applicable

$$= log_2 y = log_2 2^2 = 2log_2 2 = 2$$

$$=)$$
 $n^{c} = n^{2}$

which is
$$n^2 = f(n)$$

Case 2 is applied here

$$Tn = \theta(n^2 \log n)$$

Sol3 T(n) = T(n/2)+2n a=1 b=2 $f(n)=2^n$ as b are const. and fin, is a +ve func. Masters theorem is applicable C= log a = log) =) n c = n = 1 f(n) > nc ease 3 is applied here [T(n) = 0 (an)] Soly: T(n) = 21 T (n/2) +nh $a=a^n$ b=2 $f(n)=n^n$

: a not court, its value depunds on n : Martins theorem is not applicable.

Sols: T(n) = 16T(n/4)+n a=16, b=4 f(n)=n

all are court. and f(n) is a tre flone

- Masters theorem is applicable here. C= log a= log 16 = log (4)2 = 2 log 4= 2

=) n (= h2

: f(n) < n c

· · · Case , is applied here

T(n) = 0 (n2)

3

 $T(n) = aT(n/2) + n \log n$ $a = a \quad b = 2 \quad f(n) = n \log n$ $a \notin b \quad \text{are const.} \quad \boxtimes f(n) \text{ is a +ve function}$ $c = \log_b a$ $\log_2 2 = 1$ $n^c = n$ $n \ln \log n \quad = \text{is applied}$ ease 3 is applied

Soly T(n) = aT(n/2) + n | log n a = a b = a f(n) = n | log n $a \notin b$ are const. & fon, is a +ve function c = log a

 $n^{c} = \log 2 = 1$ $n^{c} = n^{1} = n$

: non-polynomial eliffuence b/w f(n) & ne

... Master's theorem is not applicable.

$$\frac{5018}{a=2}$$
: $T(n)=aT(n)_{4}+n^{0.51}$

a & b are could and f(n) is a +ve function

.. Master theorem is applicable $c = log_b a = log_2 = 0.50$ $n^c = n^{0.50}$ $f(n) = n^c$

Case 3 is applicable => $T(n) = \theta(n^{0.50})$

(4)

 $\frac{Sol9: T(n) = 0.5 T(n/2) + 1/n}{a = 0.5 b = 2 f(n) = 1/n}$

: Master's theorem is not applicable.

Sol10 T(n) = 16 T(n/4) + n!

a = 16 b = 4 f(n) = n!

axb are const and f(n) is a +ve function

Master's theorem is applicable

 $C = \log_{6} \alpha$ = $\log_{4} 16 = \log_{4} 4^{2} = 2 \log_{4} 4 = 2$

nc = n2

fninc

case 3 is applied here

Th) = 0 (n!)

Solu T(n) = 4T (n/2) + logn

a=4 b=2 f(n)= logn

a and b are constant and fing is a fre func

: moster's theorem is applicable

 $C = \log_{b} a = \log_{a} y = \log_{a} 2^{2} = 2\log_{a} 2^{2} = 2$

nc = n2

fnotne

case 1 is applied

 $T(n) = \Theta(n^2)$

 $\frac{80112}{a} \int_{0}^{\infty} \int_$

" a is not constant

.. Master's theorem is not applicable.

 $\frac{80113}{a=3}$: T(n) = 3T(n/2) + na=3 b=2 f(n)=n

.. a & b are const and fing is a +ve func

: Master's theorem is applicable C= log a = log 3 = 0.1.58

nc = n1.58

 $f(n) \neq n^e$

.. case 1 is opplied here

T(n) = 0 (n1.58)

B14 T(n)= 3T (n/3) = dn

a=3 b=3, f6)= In

a and b are constant and fing is a + ve func.

C= loga = log 3 = 1

 $h^c = h^l = n$

: f(n) (n)

· case i is applicable

T(n) = O(n)

Sol16 T(n) = 4T (n/2) + c.n a=4, b=2, f(n)= e-n .: a T b are constant & fin) is a tre fr ... Masters theorem is applicable here. C= log a = log 4 = log 2 = 2 log 2 = 2 nc = n2 -: f(n) = nc .. case 1 is applied here. T(n) = O(n2) Sol 16 T(n) = 3T (n/4) + nlog n a=3, b=4 f(n)=nlogn.. axb are coull. x fcn, is a +ve function .. Moster's theorem is applicable here.

 $c = \log_{b} a = \log_{4} 3 = 0.79$ $n^{c} = n^{0.79}$ $f(n) > n^{c}$

cases is applicable houe

T(n) = O(nlogn)

 $\frac{60|17}{}$ 7(n) = 37(n/3) + n/2a = 3, b = 3, f(n) = n/2

.: ax b are court. & f(n) is a +ve func.

: Masters theorem is applicable here c= log a = log 3 = 1

 $f(n) = n^{2n}$

Solib:
$$T(n) = 67(n/3) + n^2 \log n$$

 $a = 6$, $b = 3$ $f(n) = n^2 \log n$
 $a = 6$, $b = 3$ $f(n) = n^2 \log n$
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 $a = 6$, $b = 3$ $f(n) = n^2 \log n$
 $a = 6$, $b = 6$,

$$c = \log_{b} a = \log_{3} 6 = 1.63$$
 $n^{c} = n^{1.63}$
 $f(n) > n^{c}$

Case 3 is applied here.
$$T(n) = \theta(n^2 \log n)$$

Soliq T(n) = 4T (n/2) + n/logn

$$a = 4, b = 2$$
 f(n) = n/logn

.. azb are const. and for, is a +ve function

.. Master's theorem is applicable here

$$C = \log_{2} \alpha$$

$$= \log_{2} 4$$

$$= \log_{2} 2 = \log_{2} 2 = 2$$

$$n^{c} = n^{2}$$

$$\therefore f(n) < n^{c}$$

$$\therefore case 1 \text{ is applied howe}$$

$$|\overline{I(n)} = \theta(n^2)|$$

Sol20 T(n) = 64T (n/8) - n2 logn .: adb are const but f(n) is a -ve fn .. Masters theorem is applied here.

Solz1 T(n) = 7+ (n/3) +n2 $a = 7 b = 3 f(n) = n^2$

: a, b are coult & f(n) is a +ve fn

-. Moster's Theorem is applied here.

=) $C = log_b a = log_3 7 = 1.77$ $n^{c} = n^{1.77}$

> : f(n) > nc : Case 3 is applied here. $T(n) = O(n^2)$

(0122) T(n) = T(n/2) + n (2- cosn)

.. fing is not negular func.

:. Master's theorem can not be applied here.