a) $T(n) = 4T(n/4) + 5n$

$a=4 \quad b=4 \quad c=1 \quad d=1$

$n^1 < 5n \rightarrow$ ~~$5n$~~

$n = n \rightarrow \boxed{n \log n}$

b) $T(n) = 4T(n/5) + 5n$

$a=4 \quad b=5 \quad c=\log_5^4 \quad d=1$

$n^{\log_5^4} < n \rightarrow n$

c) $T(n) = 5T(n/4) + 4n$

$a=5 \quad b=4 \quad c=\log_4^5 \quad d=1$

$n^{\log_4^5} > n \rightarrow \boxed{n^c}$

d) $T(n) = 25T(n/5) + n^2$

$a=25 \quad b=5 \quad c=\log_5^{25}=2 \quad d=2$

$c=d \rightarrow \boxed{n^2 \log n}$

e) $T(n) = 4T(n/5) + \log n$

$a = 4 \quad b = 5 \quad c = \log_5 4$

$n^{\log_5 4} > \log n \rightarrow$ [redacted] $\boxed{n^c}$

F) $T(n) = 4T(n/5) + \log^5 n\sqrt{n}$

$a = 4 \quad b = 5 \quad c = \log_5 4$

$n^{\log_5 4} < \log^5 n\sqrt{n} \rightarrow \boxed{n^{.8} \cdot \log^5 n\sqrt{n}}$

G) $T(n) = 4T(\sqrt{n}) + \log^5 n$ $\quad n = 2^m \rightarrow (1)$

$T(2^m) = 4T(2^{m/2}) + m^5$ $\quad T(2^m) = S(m) \rightarrow (2)$

$S(m) = 4S(m/2) + m^5$

$a = 4 \quad b = 2 \quad c = \log_2 4 = 2$

$m^2 < m^5 \rightarrow m^5 \rightarrow \boxed{(\log n)^5}$

H) $T(n) = 4T(\sqrt{n}) + \log^2 n$ $\quad n = 2^m \rightarrow ①$

$T(2^m) = 4T(2^{m/2}) + m^2$ $\quad T(2^m) = S(m) \rightarrow ②$

$S(m) = 4S(m/2) + m^2$

$a = 4 \quad b = 2 \quad c = \log_2 4 = 2$

$m^2 = m^2 \rightarrow m^2 \log m \rightarrow \boxed{(\log n)^2 \log(\log n)}$

i) $T(n) = T(\sqrt{n}) + 5$ $\quad n = 2^m \rightarrow ①$

$T(2^m) = T(2^{m/2}) + 5$ $\quad T(2^m) = S(m) \rightarrow ②$

$S(m) = S(m/2) + 5$

$a = 1 \quad b = 2 \quad c = \log_2 1 = 0$

$m^0 = 1 \rightarrow \log m \rightarrow \log(\log n)$