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Q#1

(a) Maximum Degree of Concurrency = 3

(b) Critical Path → $T_1 \to T_4 \to T_6 \to T_7 \to T_{10}$

(c) Critical Path Length → $10 + 7 + 15 + 9 + 10 = 51$

(d) Maximum Speedup →

Total Work = $10 + 5 + 6 + 7 + 13 + 15 + 9 + 23 + 20 + 10$

$\Rightarrow 118$

$$P = \frac{total\ work - Critical\ path}{total\ work}$$

$$P = \frac{118 - 51}{118}$$

$$P = 56\%$$

Speedup for infinite processors. $\Rightarrow \dfrac{1}{1-P}$

$$\Rightarrow \frac{1}{1 - 0.56}$$

$$\Rightarrow 2.27$$

Q#2

(i)

Cost $\Rightarrow$ $2p$ $\Rightarrow$ 2×16 $\Rightarrow$ 32

diameter $\Rightarrow$ $2(\sqrt{16}/2)$ $\Rightarrow$ 4

Bisection Width $\Rightarrow$ $2\sqrt{p}$ $\Rightarrow$ 8

Arc Connectivity $\Rightarrow$ 4

(ii)

Cost $\Rightarrow$ $2(p - \sqrt{p})$ $\Rightarrow$ $2(16 - \sqrt{16})$ $\Rightarrow$ 24

diameter $\Rightarrow$ $2(\sqrt{p} - 1)$ $\Rightarrow$ $2(16 - 1)$ $\Rightarrow$ 30

Bisection Width $\Rightarrow$ $\sqrt{p}$ $\Rightarrow$ $\sqrt{16}$ $\Rightarrow$ 4

Arc Connectivity $\Rightarrow$ 2.

(iii)

Cost $\Rightarrow$ $(p \log p / 2)$ $\Rightarrow$ $((16 \log_2 16)/2)$ $\Rightarrow$ 32

diameter $\Rightarrow$ $\log p$ $\Rightarrow$ $\log_2 16$ $\Rightarrow$ 4

Bisection Width $\Rightarrow$ $p/2$ $\Rightarrow$ 8

Arc Connectivity $\Rightarrow$ $\log p$ $\Rightarrow$ 4