Midterm 1

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1. 60% = 0.6x, speed up = 1.2

a) $= \frac{x}{1.2} = \frac{x}{\frac{0.6x}{n} + 0.4x} \Rightarrow \frac{1}{\frac{0.6}{n} + 0.4} = 1.2$

$= \frac{0.6}{n} + 0.4 = \frac{1}{1.2} \Rightarrow n = \frac{1.2}{1 - 0.48} = n = \boxed{1.38}$ ✓

b) speed up = 60% = 0.6, so 0.4 before

$= \frac{1}{0.6} = \boxed{1.6}$ ✓

So total = $\boxed{2.24}$ ✓

a) 2. Because all arithmetic operations get their from to addressable registers

c) Yes, [True] ✓

a) 3. RISV ✓ has 32- while PDP-8 has 1

b) 1960's suffered more because the Dram memory was more volatile and needed constant maintenance but the circuit complexity was more efficient.

c) Yes, True ✓

4. a) It should be at 0 = 70 ns

b) at 1 = 20ns

5. a) Avg = 6 , load/store = 0.3

Fraction = 1 - 0.3 => 0.7

0.7 - 0.4

Fraction = 0.3

b) $CPI_A = 6 - 0.40 = 2.4$

$CPI_B = 0.7$

$= \frac{2.4}{0.7}$, $\frac{6}{2.4} = 2.5$,

CPI A is faster

6. Average = 1,24 . 1,24 · 100 = 124
= with no stalls it would be
124 = (conditional branches)(remaining)

7. No [False], because hardware does not support all kinds of hazards, some are done via software only.

8. Prob = $\frac{1}{MTTF} + \frac{1}{MTFF} \Rightarrow \frac{1}{2yr} + \frac{1}{2yr}$

$= \frac{1}{2} + \frac{1}{2} = 1$ year