Date / / Subject

Sheet 6

1

a) offset has 5 bits ∴ 32 byte

∴ $\frac{32}{4}$ = 8 words

b) index has 5 bits ∴ 2^5 = 32 entries

2

miss penality = 100 ns X 2 Gz = 200 cycle

a) CPI 1st level = Base CPI + missrate X miss penality

= 1.5 + 0.07 x 200

= 15.5 cycles

b) CPI 2nd level Direct-mapped = Base CPI + missrate x speed of level 2 + missrate level 2 x miss penality of memory

= 1.5 + 0.07 X 12 + 0.035 x 200

= 9.34 cycle

c) CPI 2nd level 8-way = 1.5 + 0.07 x 28 + 0.015 x 200

= 6.46 cycle

d) at AMAT = 200 ns ∴ miss Penality = 400 cycles

b) CPI = 1.5 + 0.07 x 12 + 0.035 x 400

= 16.34 cycles

c) CPI = 1.5 + 0.07 x 28 + 0.015 x 400

= 9.46 Cycles

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at AMAT = 50 ms

miss penalty = 100 cycles

b) CPI = 1.5 + 0.07 x 12 + 0.035 x 100

= 5.84 cycles

c) CPI = 1.5 + 0.07 x 28 + 0.015 x 100

= 4.96 cycles

3

a) miss CPI = Miss for instruction + miss for data

= 1 x 0.03 x 100 + 0.36 x 0.1 x 100

= 6.6 cycles

b) actual CPI = 2 + 6.6

= 8.6 cycles

4 miss rate L1 = 0.05

miss rate L2 = $\frac{30}{50}$ = 0.6

AMAT = base CPI + missrate L1 x (hit time L2 + missrate L2 x MissPenalty L2)

= 1 + 0.05 x (9 + 0.6 x 150)

= 5.95 cycles

K.M.S.