Assignment 5

a) Record Size

$R = Name + SSn + Dpt\_code + Addr + Phone + Bdate + Gender + Job + Sal + Del$

$R = 30 + 9 + 9 + 40 + 10 + 8 + 1 + 4 + 4 + 1$

$R = 116 \ bytes$

Blocking factor:

$B = 512 \ bytes$

$bfr = \left\lfloor \dfrac{B}{R} \right\rfloor = \left\lfloor \dfrac{512 \ \frac{bytes}{block}}{116 \ \frac{bytes}{record}} \right\rfloor = 4 \ records \ per \ block$

Number of File Blocks:

$b = \lceil r/bfr \rceil \qquad , \quad r = 34816$

$b = \left\lceil \dfrac{34816}{4} \right\rceil = 8704 \ blocks$

b) Index Blocking factor:

$bfr_i = \lfloor B/R_i \rfloor \qquad P = 6 \ bytes \qquad SSN = 9 \ bytes$

$R_i = 9 + 6 = 15 \ bytes$

$bfr_i = \left\lfloor \dfrac{512}{15} \right\rfloor = 34 \ entries \ per \ block$

Total number of indices:

$r_i = 8704$

Number of index blocks:

$b_i = \left\lceil \dfrac{r_i}{bfr_i} \right\rceil = \left\lceil \dfrac{8704}{15} \right\rceil = 581$

Total number of accesses:

$\lceil \log_2 (b_i) \rceil = \lceil \log_2 (581) \rceil = 10$