1)

a)

$\Sigma(i = 4 \rightarrow n^2)\ O(i \log I)$

$\Theta(n^2 \log n^2) =$ **$\Theta(n^2 \log n)$**

b)

$\Sigma(i = 4 \rightarrow [n \wedge 3/20])\ O(i^2)$

$\Theta([n \wedge 3/20]^3) =$ **$\Theta(n^{9}/20)$**

c)

$\Sigma(i = [n/5] \rightarrow n)\ O(n - i)$

$\Theta((n - [n/5] + 1)^2) =$ **$\Theta(n^2)$**

d)

$\Sigma(i = n \rightarrow 2n^2)\ O(1)$

$\Theta(n^2)$

e)

Outer loop - $\Theta(n^3)$

Middle loop – $\Theta(n) \rightarrow \Theta(n^7)$

Inner Loop – $\Theta(n^4)$

Total – $\Theta(n^3) * \Theta(n^7) * \Theta(n^4) =$ **$\Theta(n^{14})$**

2)

a)

fa(n) = sum of Gp = ¾ + ¾ ^2 + ….. + ¾ ^n

= (¾ * (¾ n^2 – 1)) | (¾ – 1)

fa(n) = **O ((¾) n^2)**

b)

log4(17) = O(1), 1 << log4(n)

fb(n) = **O(log(n))**

c)

sum of Ap = 2 * n/2 * (2 * 1 + (2 * 1 + (2n + 1 – 1) * 4) – 1

= n * (2 + 8n) – 1

hence n << n^2

fc(n) = **O(n^2)**

d)

6^13 = O(1)

fd(n) = **O(1)**

e)

n^0.6 << n^0.7

fe(n) = **O(n^0.7)**

f)

√(n) << √(n^2) << √(n^3)

ff(n) = **O(√(n^3))**

g)

log3(n) << nlog3(n)

fg(n) = **O(nlog3(n))**