

1)

a) unnsa
 unnsi
 unna
 unsa
 unns
 unna
 unni
 unnsa
 unnsi
 unna

unsa

11 unique subsets

b)

unsa	$= 5!$	$= 120$
unnsa	$= 5!/2!$	$= 60$
unnsi	$= 5!/2!$	$= 60$
unna	$= 5!/2!$	$= 60$
unsa	$= 5!/2!$	$= 60$
unns	$= 5!/3!$	$= 20$
unna	$= 5!/3!$	$= 20$
unni	$= 5!/3!$	$= 20$
unnsa	$= 5!/3!$	$= 20$
unnsi	$= 5!/3!$	$= 20$
unna	$= 5!/3!$	$= 20$

480
strings

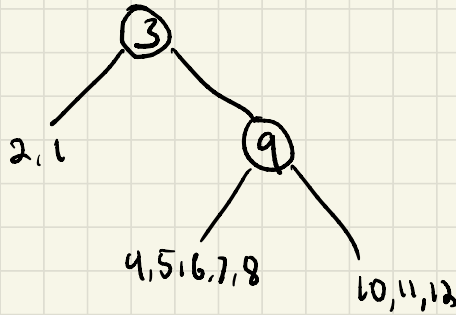
$$2) \binom{13}{2} \binom{4}{2} \binom{4}{2} \binom{11}{1} \binom{4}{1} = \frac{13!}{1!2!} \cdot \frac{4!}{2!2!} \cdot \frac{4!}{2!2!} \cdot 11 \cdot 4 = \frac{13 \cdot 12}{2} \cdot 3! \cdot 3! \cdot 44$$

$$= 13 \cdot 6 \cdot 3 \cdot 2 \cdot 1 \cdot 3 \cdot 2 \cdot 1 \cdot 44 = \boxed{123552}$$

$$3) \quad n=6 \quad r=15 \quad \frac{(6+15-1)!}{15! (n-1)!} = \frac{20!}{15! \cdot 5!} \approx 15504$$

$$15504 \cdot {}_7C_1 = 15504 \cdot 7 = \boxed{108528}$$

4)



$$n = \frac{{}_n C_n}{n+1}$$

i) $n=2$

$$\frac{{}_4 C_2}{3} = \frac{6}{3} = 2$$

ii) $n=5$

$$\frac{{}_{10} C_5}{6} = \frac{252}{6} = 42$$

iii) $n=3$

$$\frac{{}_6 C_3}{4} = \frac{20}{4} = 5$$

$$2 \cdot 42 \cdot 5 = \boxed{420}$$

5) $(1, 1, 1, 7)$ $(1, 1, 8)$

$(1, 1, 2, 6)$ $(1, 2, 7)$

$(1, 1, 3, 5)$ $(1, 3, 6)$

$(1, 1, 4, 4)$ $(1, 4, 5)$

$(1, 2, 2, 5)$ $(2, 2, 6)$

$(1, 2, 3, 4)$ $(2, 3, 5)$

$(1, 3, 3, 3)$ $(2, 4, 4)$

$(2, 2, 2, 4)$ $(3, 3, 4)$

$(2, 2, 3, 3)$

17 combinations

assuming indistinguishable
objects into indistinguishable
boxes since question states
nurses are identical