1).
ANSWER:

Step 1. The population is 20,000,000.
Step 2. The margin of error is 2.5%.
Step 3.

Formula: $n = \frac{N}{1+Ne^2}$

$$\mathbf{n} = \frac{20,000,000}{1+20,000,000(.025)^2}$$

$$\mathbf{n} = \frac{20,000,000}{1+20,000,000(.000625)}$$

$$\mathbf{n} = \frac{20,000,000}{1+12,500}$$

$$\mathbf{n} = \frac{20,000,000}{12,501}$$

$$\mathbf{n} = 1,599.8720102391 \,/\, 1,600$$

2)

Step 1. The total population is 4,937.
Step 2. the margin of error is 3%.
Step 3.

Formula: $n = \frac{N}{1+Ne^2}$

$n = \frac{4,937}{1+4,937(.03)^2}$

$n = \frac{4,937}{1+4,937(.0009)}$

$n = \frac{4,937}{1+4.4433}$

$n = \frac{4,937}{5.4433}$

n = 906.986 or 907

Step 4.

Formula: Sample proportion(%) = n/N

n = 907
N= 4,937

907/4,937
= 0.1837 or 0.20

Step 5-6

		(%)	Sample
BS Architecture	915	20	183
BS medical Technology	986	20	197
BS Engineering	3,036	20	607
			987

The total sample needed is 987

3)

Step 1. The population is 2,000

Step 2. The margin of error is:

A) 3%

B) 5%

A)

Step 3.

Formula: $n= \frac{N}{1+Ne^2}$

$n= \frac{2,000}{1+2,000(.03)^2}$

$n= \frac{2,000}{1+2,000(.0009)}$

$n= \frac{2,000}{1+1.8}$

$n= \frac{2,000}{2.8}$

n= 714.282 or 714

B)

Step 3.

Formula: $n= \frac{N}{1+Ne^2}$

$n= \frac{2,000}{1+2,000(.05)^2}$

$n= \frac{2,000}{1+2,000(.0025)}$

$n= \frac{2,000}{1+5}$

$n= \frac{2,000}{6}$

n= 400