Question 2 Page 1

a) To find the index value for construction of a plant today we will use the following equation:

$$\bar{I}_n = \frac{W_1(C_{n1}/C_{K1}) + W_2(C_{n2}/C_{K2}) + W_3(C_{n3}/C_{K3})}{W_1 + W_2 + W_3} \times \bar{I}_K$$

Where $\bar{I}_n$ is the index today
$\bar{I}_K$ is the index 20 years ago, given = 100
W is the weight assigned to each item
C_K is the unit price 20 years ago
C_n is the unit price today

$$\bar{I}_n = \frac{0.3(200/150) + 0.5(365/250) + 0.2(155/100)}{0.3 + 0.5 + 0.2} \times 100$$

$$\boxed{\bar{I}_n = 144}$$

b) To find the cost of a 200 000m² plant today we use the following equation

$$C_n = C_K\left(\frac{I_n}{I_K}\right)$$

$$C_n = \$100\,000\,000.00\left(\frac{144}{100}\right)$$

$$\boxed{C_n = \$144\,000\,000.00}$$

Therefore it would cost approximately \$144 million to build a 200 000m² plant today

c) From question b) we know it will cost roughly \$144 million to build a plant of size 200 000 m². Using power sizing technique with a cost capacity factor of 0.80 we will estimate the other two sizes.

$$C_A = C_B\left(\frac{S_A}{S_B}\right)^X$$

Where C_A is cost of project being estimated
C_B is cost of known project
S_A is size of project being estimated
S_B is size of known project

Question 2 Page 2.

X is cost-capacity factor, given = 0.80

Project A - Two 150 000 m^2 plants

$$C_A = 144 \times 10^6 \left(\frac{150\,000}{200\,000}\right)^{0.80}$$

$$\boxed{C_A = \$114\ 396\ 174.80}$$

Therefore it will cost roughly \$114.4 M for one 150 000 m^2 plant and \$228 792 349.70 for the total cost of Project A.

Project B - One 300 000 m^2 plant

$$C_A = 144 \times 10^6 \left(\frac{300\,000}{200\,000}\right)^{0.80}$$

$$\boxed{C_A = \$199\ 175\ 308.90}$$

Therefore the total cost of Project B is \$199 175 308.90

Therefore the company should build one 300 000 m^2 plant as it is more cost effective than building two 150 000 m^2 plants.