ECO 300 – MICROECONOMIC THEORY – FALL 2005
SOLUTIONS FOR PRECEPTS WEEK 3 – OCTOBER 4-5

INITIAL EQUILIBRIUM

Demand: The elasticity is $\frac{P}{Q}\frac{dQ}{dP} = -0.05$, and P = 50, Q = 80. Therefore $\frac{dQ}{dP} = -0.08$.
Then the equation of the demand curve is Q = 80 – 0.08 (P-50).

Supply: The elasticity is $\frac{P}{Q}\frac{dQ}{dP} = 0.10$, and P = 50, Q = 10 + 45 = 55 (non-OPEC).

Therefore $\frac{dQ}{dP} = 0.11$, and the equation of the supply curve is Q = 25 + 55 + 0.11 (P-50).

SHORT RUN

After the hurricanes hit, the quantity at P = 50 is Q = 8 + 45 = 53. Then $\frac{dQ}{dP} = 0.106$, and the equation of the supply curve is Q = 25 + 53 + 0.106 (P-50).

In the new short-run equilibrium, 80 – 0.08 (P-50) = 78 + 0.106 (P-50), so
0.186 (P-50) = 2, or P = 50 + 2/0.186 = 60.75

To maintain the price at $50, the government would obviously have to release an amount equal to the supply shortfall at this price, namely 2 million barrels per day. If the damage to the capacity persists, the strategic reserve will be depleted in 350 days.

LONG RUN

Demand: The elasticity is $\frac{P}{Q}\frac{dQ}{dP} = -0.40$, and P = 50, Q = 80. Therefore $\frac{dQ}{dP} = -0.64$.
Then the equation of the demand curve is Q = 80 – 0.64 (P-50).

Supply: The elasticity is $\frac{P}{Q}\frac{dQ}{dP} = 0.40$, and P = 50, Q = 10 + 45 = 55 (non-OPEC).

Therefore $\frac{dQ}{dP} = 0.44$, and the equation of the supply curve is Q = 25 + 55 + 0.44 (P-50).

After the hurricanes hit, the quantity at P = 50 is Q = 8 + 45 = 53. If the damage persists in the long run, $\frac{dQ}{dP} = 0.424$, and the equation of the supply curve is
Q = 25 + 53 + 0.424 (P-50). Then, in the new long-run equilibrium,
80 – 0.64 (P-50) = 78 + 0.424 (P-50), so 1.064 (P-50) = 2, or P = 50 + 2/1.064 = 51.88