COMM 220 – PRACTICE PROBLEM SET 4 SOLUTIONS

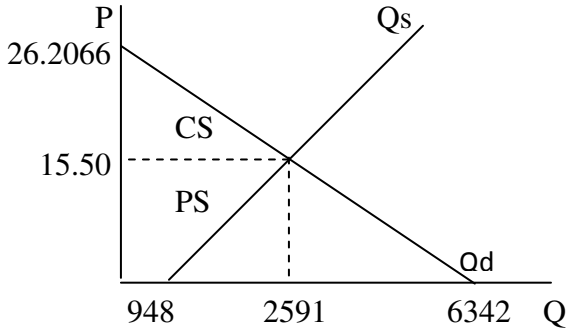
a. $Qd = Qs \Rightarrow P^* = (6342 - 948)/(242 + 106) =$ **$15.5** and $Q^* = 6342 - 242(15.5) =$ **2591**

b. For demand: Q = 0, P = 6342/242 = 26.2066; P = 0, Q = 6342

For supply: P = 0, Q = 948

CS = (26.2066 – 15.5)(2591)/2 = **$13870.4153**

PS = (948 + 2591)(15.5)/2 = **$27427.25**



c. P = 12, Qd = 6342 – 242(12) = 3438 and Qs = 948 + 106(12) = 2220

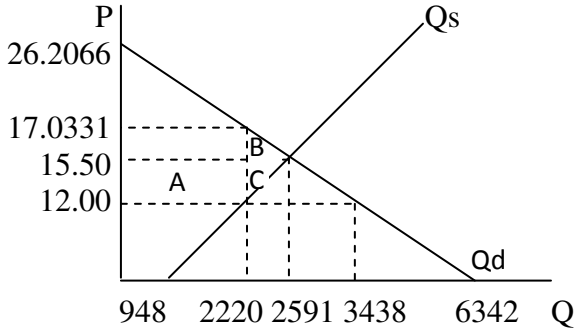
Qd > Qs ⇒ **Shortage** = 3438 – 2220 = **1218**

Qd = 2220, P = (6342 – 2220)/242 = 17.0331

ΔCS = A – B = (15.5 – 12)(2220) – (17.0331 – 15.5)(2591 – 2220)/2 = **$7485.61**

ΔPS = – A – C = – (15.5 – 12)(2220) – (15.5 – 12)(2591 – 2220)/2 = **– $8419.25**

DW loss = ΔCS + ΔPS = – B – C = **– $933.64**



d. P = 18, Qd = 6342 – 242(18) = 1986 and Qs = 948 + 106(18) = 2856

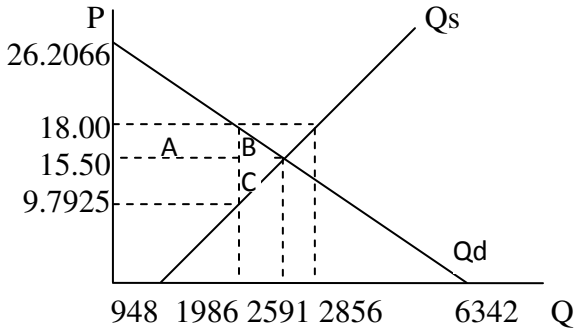
Qs > Qd ⇒ **Surplus** = 2856 – 1986 = **870**

Qs = 1986, P = (1986 – 948)/106 = 9.7925

ΔCS = – A – B = – (18 – 15.5)(1986) – (18 – 15.5)(2591 – 1986)/2 = **– $5721.25**

ΔPS = A – C = (18 – 15.5)(1986) – (15.5 – 9.7925)(2591 – 1986)/2 = **$3238.48**

DW loss = ΔCS + ΔPS = – B – C = **– $2482.77**

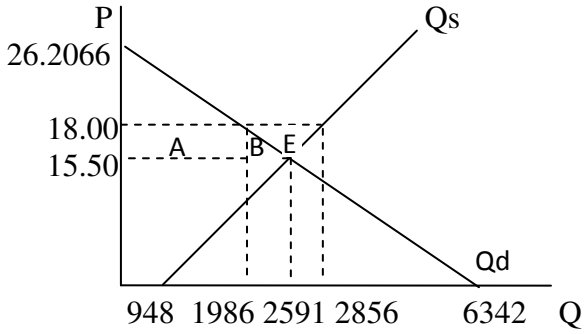


e. P = 18, Surplus = 870, Government cost = 870(18) = **$15660**

ΔCS = – A – B = – (18 – 15.5)(1986) – (18 – 15.5)(2591 – 1986)/2 = **– $5721.25**

ΔPS = A +B + E
= (18–15.5)(1986) + (18–15.5)(2591–1986)/2 + (18–15.5)(2856–1986)/2 = **$6808.75**

DW loss = ΔCS + ΔPS – Government cost = **– $14572.50**



f. Tax = 2, Pb – Ps = 2

Qd = Qs ⇒ 6342 – 242Pb = 948 + 106Ps ⇒ 6342 – 242(Ps + 2) = 948 + 106Ps

Ps = (6342 – 484 – 948)/(242 + 106) = **$14.1092** and Pb = 14.1092 + 2 = **$16.1092**

Q = 6342 – 242(16.1092) = **2443.5747**

% of tax paid by buyers = (16.1092 – 15.5)/2 = **30.46%**

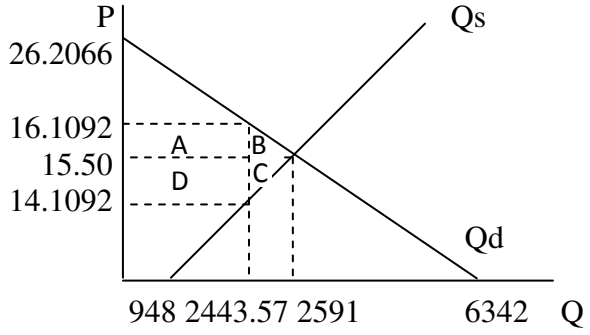
% of tax paid by sellers = (15.5 – 14.1092)/2 = **69.54%**

ΔCS = – A – B
= – (16.1092–15.5)(2443.5747) – (16.1092–15.5)(2591–2443.5747)/2 = **– $1533.53**

ΔPS = – D – C
= – (15.5–14.1092)(2443.5747) – (15.5–14.1092)(2591–2443.5747)/2 = – **$3501.04**

Government tax revenue = A + D = 2(2443.5747) = **$4887.15**

DW loss = ΔCS + ΔPS + Government tax revenue = – B – C = **– $147.42**



g. Subsidy = 2, Ps – Pb = 2

Qd = Qs ⇒ 6342 – 242Pb = 948 + 106Ps ⇒ 6342 – 242(Ps – 2) = 948 + 106Ps

Ps = (6342 + 484 – 948)/(242 + 106) = **$16.8908** and Pb = 16.8908 – 2 = **$14.8908**

Q = 6342 – 242(14.8908) = **2738.4253**

% of subsidy accrued to buyers = (15.5 – 14.8908)/2 = **30.46%**

% of subsidy accrued to sellers = (16.8909 – 15.5)/2 = **69.54%**

ΔCS = C + D = (15.5 – 14.8908)(2591 + 2738.4253)/2 = **$1623.34**

ΔPS = A + B = (16.8908 –15.5)(2738.4253 +2591)/2 = **$3706.08**

Government cost = A + B + C + D + F = 2(2738.4253) = **$5476.85**

DW loss = ΔCS + ΔPS - Government cost = – F = **– $147.43**