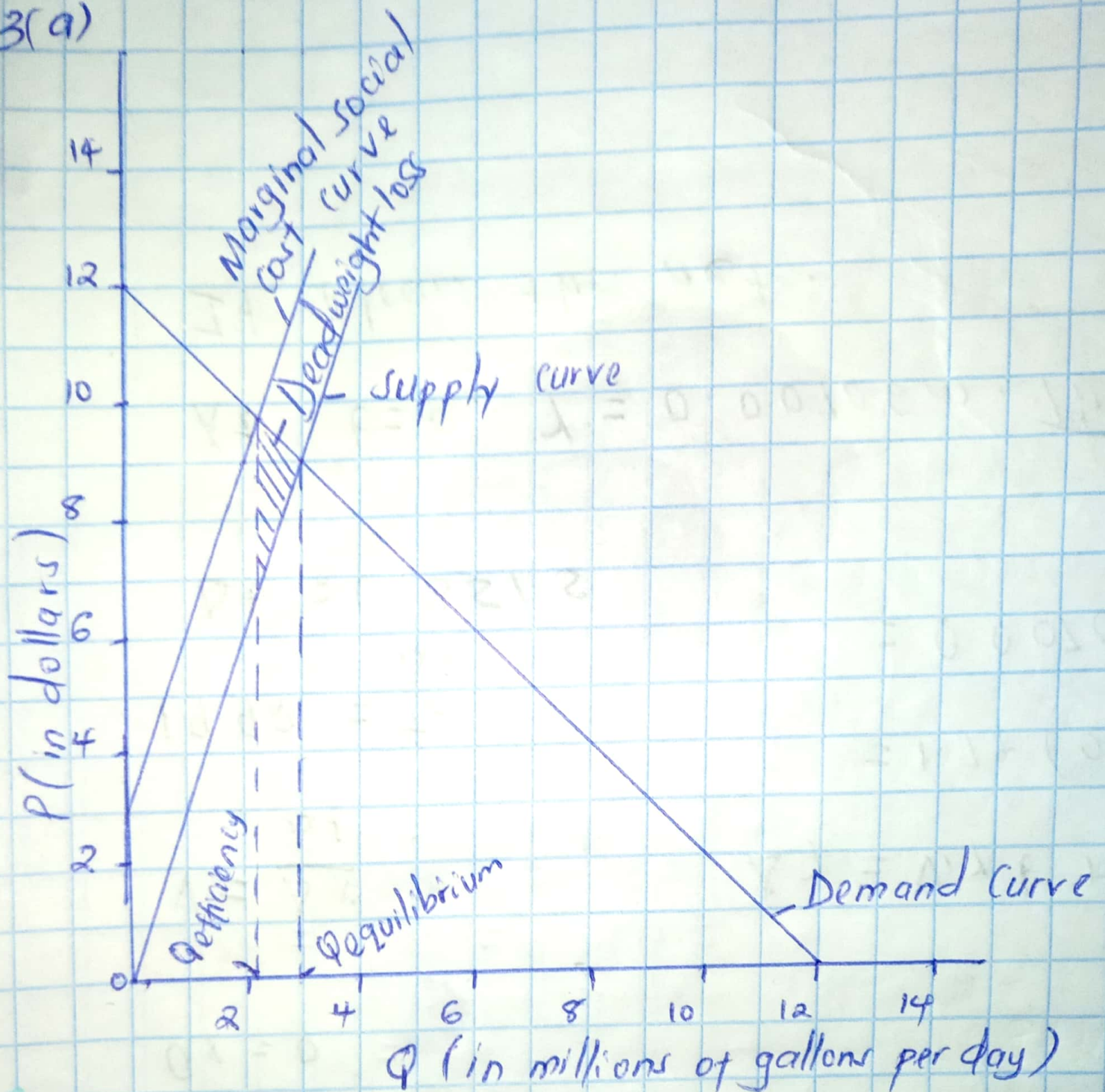


3(a)



(b) Equilibrium quantity

Demand curve = Supply curve

$$12 - Q = 3Q$$

$$12 = 4Q$$

$$Q = 3$$

Efficient quantity

Demand Curve = Social marginal cost curve

$$12 - Q = 3Q + 3$$

$$12 - 3 = 3Q + Q$$

$$9 = 4Q$$

$$Q = \frac{9}{4} = 2.25$$

$$(c) \text{ Deadweight loss} = \frac{1}{2} (9.75 - 6.75) (3 - 2.25)$$

$$= 1.125$$

(d) (i) at equilibrium quantity

(d) (i) at equilibrium quantity.

$$= \frac{1}{2} (12 - 3) (9) = \frac{1}{2} \times 9 \times 9 = \frac{81}{2} \\ = 40.5$$

(ii) at efficient quantity

$$= \frac{1}{2} (12 - 2.25) (9.75) \\ = 47.53125$$

(e) (i) The efficient level of emissions will still remain the same

(ii) The total damages from the pollution will increase since there is no regulation.

$$(f) \text{ Pigovian tax} = 9.75 - 6.75 \\ = 3$$

$$P = 12 - Q \quad P + \text{tax} = 12 - Q \quad P + 3 = 12 - Q \\ P = 3Q$$

Demand curve = supply curve

$$9 - Q = 3Q \quad 9 = 4Q$$

$$Q = 2.25$$

$$P = 3(2.25) = 6.75$$