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Question 01:

$Q_d = 24 - 2P$

$Q_s = -5 + 7P$

$Q_s = Q_d$.

$-5 + 7P = 24 - 2P \Rightarrow 7P + 2P = 24 + 5$

$\Rightarrow \quad 9P = 29 \Rightarrow \boxed{\bar{P} = \frac{29}{9}}$

Put "P" in (1)

$Q = 24 - 2P \Rightarrow 24 - 2\left(\frac{29}{9}\right)$

$= 24 - \frac{58}{9} \Rightarrow \frac{216 - 58}{9}$

$\Rightarrow \boxed{\bar{Q} = \frac{158}{9}}$ Answer.

Question #02:-

$Q_d = 51 - 3P$

$Q_s = 6P - 10$

$Q_s = Q_d$.

$6P - 10 = 51 - 3P \Rightarrow 6P + 3P = 51 - 10$

$9P = 41 \Rightarrow P = \frac{41}{9}$

Put in (1)

$Q = 51 - 3\left(\frac{41}{9}\right) \Rightarrow 51 - \frac{123}{9}$

$= \frac{459 - 123}{9} = \frac{336}{9} = \frac{112}{3}$

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$\bar{Q} = \frac{112}{3}$ $\bar{P} = \frac{41}{9}$

Question # 03:-

$Q_d = 30 - 2P$

$Q_s = -6 + 5P$

$Q_s = Q_d$.

$-6 + 5P = 30 - 2P$

$2P + 5P = 30 + 6 \Rightarrow 7P = 36$

$\bar{P} = 36/7$

$Q = 30 - 2P \Rightarrow 30 - 2\left(\frac{36}{7}\right)$

$= \frac{30 - 72}{7} \Rightarrow \frac{210 - 72}{7}$

$\bar{Q} = 140/7$

Question # 04:-

$Q_d = 100 - 2P$

$Q_s = -50 + 3P$

$Q_s = Q_d$.

$-50 + 3P = 100 - 2P$

$2P + 3P = 100 + 50 \Rightarrow 5P = 150$

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$P = \frac{150}{5} \overset{30}{}$

$\bar{P} = 30$

Put in equation.

$Q = 100 - 2P$

$= 100 - 2(30) \Rightarrow 100 - 60$

$\bar{Q} = 40$

Question # 05:-

$Q_d = 20 - 5P$

$Q_s = 4 + 3P$

$Q_s = Q_d$

$4 + 3P = 20 - 5P$

$3P + 5P = 20 - 4 \Rightarrow 8P = 16$

$P = \frac{16}{8}$ $\bar{P} = 2$

Put in equation

$Q = 20 - 5P \Rightarrow 20 - 5(2)$

$20 - 10$

$\bar{Q} = 10$

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Question :- 1

(a). find $\bar{P}$ and $\bar{Q}$.

$Q_d = 100 - 2P$

$Q_s = -50 + 3P$

$Q_s = Q_d$

$-50 + 3P = 100 - 2P$

$3P + 2P = 100 + 50$

$5P = 150 \Rightarrow P = \frac{150}{5}$

$\bar{P} = 30$

to find $\bar{Q}$,

$\bar{Q} = 100 - 2P$

$= 100 - 2(30) \Rightarrow 100 - 60$

$\bar{Q} = 40$.

b. $\bar{P}$ and $\bar{Q}$ when a tax of Rs. 5 per unit of output is imposed on Producers.

$Q_s = -50 + 3P \qquad T = 5$

$= -50 + 3(P - T)$

$= -50 + 3P - 3T$

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$-50 + 3P - 3(5) \Rightarrow -50 + 3P - 15$

$Q_s = -65 + 3P$, $Q_d = 100 - 2P$

now,

$Q_d = Q_s$.

$100 - 2P = -65 + 3P$

$100 + 65 = 3P + 2P \Rightarrow 165 = 5P$

$\frac{165}{5} = P \Rightarrow P = 33$

Put in equation.

$Q_s = 100 - 2P \Rightarrow 100 - 2(33)$

$100 - 66 \Rightarrow 34$

$\bar{P} = 33$, $\bar{Q} = 34$.

c. Imposed on Consumer.

$100 - 2P \Rightarrow 100 - 2(P + T)$

$100 - 2P + 2T \Rightarrow 100 - 2P - 2(5)$

$100 - 2P - 10 \Rightarrow 90 - 2P$

So,

$Q_s = Q_d$.

$-50 + 3P = 90 - 2P$

$3P + 2P = 90 + 50 \Rightarrow 5P = 140$

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$P = \frac{140}{5} \Rightarrow P = 28$.

Put in equation.

$= 90 - 2P \Rightarrow 90 - 2(28)$.

$90 - 56 \Rightarrow 34$

$Q = 34$

$\bar{P} = 28$, $\bar{Q} = 34$

d. Imposed on both producer (or seller) or consumer.

effect on Producer.

$-50 + 3(P - T)$.

$-50 + 3P - 3(5) \Rightarrow -50 + 3P - 15$

$Q_s = -65 + 3P$

$Q_s = Q_d$.

$-65 + 3P = 90 - 2P$

$3P + 2P = 90 + 65 \Rightarrow 5P = 155$

$P = \frac{155}{5} \Rightarrow P = 31$.

Put in equation,

$Q_d = 90 - 2P \Rightarrow 90 - 2(31)$

$= 90 - 62 \Rightarrow 28 \quad Q = 28$.

$\bar{P} = 31$, $\bar{Q} = 28$.

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Question 2:-

$Q_d = 20 - 5P$

$Q_s = 4 + 3P$

(a). $\bar{P}$ and $\bar{Q}$

$Q_s = Q_d$

$4 + 3P = 20 - 5P$

$3P + 5P = 20 - 4$

$8P = 16 \Rightarrow P = \frac{16}{8}$

$P = 2$.

Put in equation.

$Q_d = 20 - 5P \Rightarrow 20 - 5(2)$

$20 - 10 \Rightarrow 10$.

$\bar{P} = 2$, $\bar{Q} = 10$

b. 20% per unit imposed on Producer.

$Q_s = 4 + 3P$ 20%

$= 4 + 3(P - T)$. $\frac{20}{100} = 0.2$

$= 4 + 3P - 3T$

$= 4 + 3P - 3(0.2) \Rightarrow 3P - 3.4$

$4 + 3P - 0.6$

$3.4 + 3P$

$3P - 0.6$

$Q_s = Q_d$ ∴ Put in equation

$3.4+3P = 20-5P \Rightarrow 20-5P$

$3P+5P = 20-3.4 \Rightarrow 20-5(2.16)$

$8P = 16.6 \Rightarrow 20-10.8$

$P = \frac{16.6}{8} \Rightarrow 9.2$

$\bar{P} = 2.16$

$\bar{P} = 2.16 \quad \bar{Q} = 9.2$

"Imposed on Consumer"

$Q_d = 20-5P$

$= 20-5(P+T)$

$= 20-5P-5T \Rightarrow 20-5P-5(0.2)$

$= 20-5P-1 \Rightarrow 19-5P$

$Q_s = Q_d$

$4+3P = 19-5P$

$3P+5P = 19-4 \Rightarrow 8P = 15$

$P = 15/8 \Rightarrow P = 1.8$

Put in equation

$19-5P \Rightarrow 19-5(1.8) \Rightarrow 19-9$

$Q_1 = 10$

$\bar{P} = 1.8 \quad \bar{Q} = 10$

"effect on producer"

$\Rightarrow 4+3P \Rightarrow 4+3(P-T)$

$4+3P-3T \Rightarrow 4+3P-3(0.2)$

$4+3P-0.6 \Rightarrow 3P-3.4$

$Q_s = Q_d$

$3P-3.4 = 19-5P$

$3P+5P = 19+3.4$

$8P = 22.4 \Rightarrow P = \frac{22.4}{8}$

$P = 2.8.$

Put in equation.

$Q = 19-5P$

$= 19-5(2.8) \Rightarrow 19-14$

$Q = 5$

$\bar{P} = 2.8 \quad \bar{Q} = 5$

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Question 03:-

$3x+4y=18$

$7x-2y=8$

equation (1) multiply by 7 &
equation (2) multiply by 3.

$7(3x+4y=18) \Rightarrow 21x+28y=126$

$3(7x-2y=8) \Rightarrow 21x-6y=24$

Subtracting equation (1)-(2)

$21x+28y=126$

$\pm 21x \mp 6y = \pm 24 \Rightarrow y = \frac{102}{34}$

$34y = 102$

$\bar{y} = 3$

Put the value of y in eq (2)

$7x-2(3)=8 \Rightarrow 7x-6=8$

$7x = 8+6 \Rightarrow 7x = 14$

$\bar{x} = 2$

$\bar{x} = 2$, $\bar{y} = 3$

Question # 04:-

$2x-4y=-24$

$9x-3y=-3$

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equation (1) multiply by "9"
equation (2) multiply by "2"

$9(2x-4y=-24) = 18x-36y=-216$

$2(9x-3y=-3) = 18x-6y=-6$

Subtracting equation (2) from (1)

$18x-6y=-216$

$\pm 18x \mp 36y = \mp 6 \Rightarrow y = \frac{210}{30}$

$30y = 210$

$\bar{y} = 7$ put in (1)

$2x-4y=-24 \Rightarrow 2x-4(7)=-24$

$2x-28=-24 \Rightarrow 2x = -24+28$

$2x = 4 \Rightarrow \bar{x} = 2$

$\bar{x} = 2$, $\bar{y} = 7$.

Question # 05:-

$5x+4y=220$

$4x+5y=230$

equation (1) multiply by (4)
equation (2) multiply by "5."

$4(5x+4y=220) = 20x+16y=880$

$5(4x+5y=230) = 20x+25y=1150$

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Subtracting (2) from (1)

$20x + 25y = 1150 \Rightarrow y = \frac{270}{9}$

$\pm 20x \pm 16y = \pm 880$

$9y = 270 \quad \bar{y} = 30$

Put in equation (1)

$5x + 4y = 220 \Rightarrow 5x + 4(30) = 220$

$5x + 120 = 220 \Rightarrow 5x = 220 - 120$

$5x = 100 \Rightarrow \bar{x} = 20$

$\bar{x} = 20 \;,\; \bar{y} = 30$

Question # 06:-

$2x - 4y = 3$

$x + 2y = 14$

multiply equation (2) by "2"

$2(x + 2y = 14) \Rightarrow 2x + 4y = 28.$

Subtracting (2) from (1)

$2x + 4y = 28$

$\pm 2x \mp 4y = \pm 3$

$8y = 21$

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"Market Equillibium"

Question:

$Q_{d_1} = a_0 + a_1 p_1 + a_2 p_2$

$Q_{s_1} = b_0 + b_1 p_1 + b_2 p_2$

Σ

$Q_{d_2} = \alpha_0 + \alpha_1 P_1 + \alpha_2 P_2$

$Q_{s_2} = \beta_0 + \beta_1 p_1 + \beta_2 p_2$

$Q_d - Q_s = 0$

$(a_0 + a_1 p_1 + a_2 p_2) - (b_0 + b_1 p_1 + b_2 p_2) = 0$

$a_0 + a_1 p_1 + a_2 p_2 - b_0 - b_1 p_1 - b_2 p_2 = 0$

$a_0 - b_0 + a_1 p_1 - b_1 p_1 + a_2 p_2 - b_2 p_2 = 0$

$(a_0 - b_0) + p_1 (a_1 - b_1) + p_2 (a_2 - b_2) = 0$

$c_0 + c_1 p_1 + c_2 p_2 = 0 \quad \text{——— (1)}$

Σ

$Q_{d_2} - Q_{s_2} = 0$

$\Rightarrow (\alpha_0 + \alpha_1 p_1 + \alpha_2 p_2) - (\beta_0 + \beta_1 p_1 + \beta_2 p_2) = 0$

$\Rightarrow \alpha_0 + \alpha_1 p_1 + \alpha_2 p_2 - \beta_0 - \beta_1 p_1 + \beta_2 p_2 = 0$

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$(\alpha_0 - \beta_0) + \alpha_1 p_1 - \beta_1 p_1 + \alpha_2 p_2 - \beta_2 p_2 = 0$

$(\alpha_0 - \beta_0) + p_1(\alpha_1 - \beta_1) + p_2(\alpha_2 - \beta_2) = 0$

$\gamma_0 + \gamma_1 p_1 + \gamma_2 p_2 = 0 \longrightarrow (2)$

$C_0 + C_1 p_1 + C_2 p_2 \longrightarrow 1$

$\gamma_0 + \gamma_1 p_1 + \gamma_2 p_2 \longrightarrow 2$

$\Rightarrow C_0 + C_1 p_1 + C_2 p_2 = 0$

$C_1 p_1 + C_2 p_2 = -C_0$

$\Rightarrow \gamma_0 + \gamma_1 p_1 + \gamma_2 p_2 = 0$

$\gamma_1 p_1 + \gamma_2 p_2 = -\gamma_0$

- multiply equation (1) by γ_1

$\gamma_1 C_1 p_1 + \gamma_1 C_2 p_2 = -\gamma_1 C_0$

- multiply equation (2) by C_1

$\gamma_1 C_1 p_1 + \gamma_2 C_1 p_2 = -\gamma_0 C_1$

$\gamma_1 C_1 p_1 + \gamma_1 C_2 p_2 = -\gamma_1 C_0$

$\pm \gamma_1 C_1 p_1 \pm \gamma_2 C_1 p_2 = \mp \gamma_0 C_1$

$\gamma_1 C_2 p_2 - \gamma_2 C_1 p_2 = \gamma_0 C_1 - \gamma_1 C_0$

$p_2(\gamma_1 C_2 - \gamma_2 C_1) = \gamma_0 C_1 - \gamma_1 C_0$

$p_2 = \dfrac{-(\gamma_0 C_1 - \gamma_1 C_0)}{-(\gamma_1 C_2 - \gamma_2 C_1)} \Rightarrow \dfrac{-\gamma_1 C_0 + \gamma_0 C_1}{-\gamma_2 C_1 + \gamma_1 C_2}$

$\Rightarrow p_2$ put in equation. $\longrightarrow (1)$.

$C_0 + C_1 p_1 + C_2 \left(\dfrac{\gamma_1 C_0 - \gamma_0 C_1}{\gamma_2 C_1 - \gamma_1 C_2} \right) = 0$

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$$= \frac{(C_0+C_1P_1)(\gamma_2 C_1 - \gamma_1 C_2) + C_2\gamma_1 C_0 - C_1C_2\gamma_0 = 0}{\gamma_2 C_1 - \gamma_1 C_2}$$

$$= (C_0+C_1P_1)(\gamma_2 C_1 - \gamma_1 C_2) + C_2\gamma_1 C_0 - C_1C_2\gamma_0 = 0$$

$$= \gamma_2 C_1 C_0 - \gamma_1 C_0 C_2 + C_1^2 P_1 \gamma_2 - C_1C_2P_1\gamma_1 + C_2\gamma_1 C_0 - C_1C_2\gamma_0 = 0$$

$$= \gamma_2 C_1 C_0 + C_1^2 P_1 \gamma_2 - C_1C_2P_1\gamma_1 - C_1C_2\gamma_0 = 0$$

$$= C_1^2 P_1 \gamma_2 - C_1C_2P_1\gamma_1 + \gamma_2 C_1 C_0 - C_1C_2\gamma_0 = 0$$

$$= P_1(C_1^2\gamma_2 - C_1C_2\gamma_1) + \gamma_2 C_1 C_0 = C_1C_2\gamma_0 -$$

$$= P_1(C_1^2\gamma_2 - C_1C_2\gamma_1) = C_1C_2\gamma_0 - \gamma_2 C_1 C_0$$

$$P_1 = \frac{C_1C_2\gamma_0 - \gamma_2 C_1 C_0}{C_1^2\gamma_2 - C_1C_2\gamma_1}$$

Taking common C_1

$$P_1 = \frac{C_1(C_2\gamma_0 - C_0\gamma_2)}{C_1(C_1\gamma_2 - C_2\gamma_1)}$$

$$P_1 = \frac{C_2\gamma_0 - C_0\gamma_2}{C_1\gamma_2 - C_2\gamma_1}$$

$$\mathbf{P_1 =} \frac{C_2\gamma_0 - C_0\gamma_2}{C_1\gamma_2 - C_2\gamma_1}$$

$$\mathbf{P_2 =} \frac{\gamma_1 C_0 - \gamma_0 C_1}{\gamma_2 C_1 - \gamma_1 C_2}$$

Answer.

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Question :-

$Q_{d_1} = 18 - 3P_1 + P_2$, $Q_{d_2} = 12 + P_1 - 2P_2$

$Q_{s_1} = -2 + 4P_1$, $Q_{s_2} = -2 + 3P_2$

$$Q_{d_1} = Q_{s_1}$$

$$18 - 3P_1 + P_2 = -2 + 4P_1$$

$$18 + 2 = 4P_1 + 3P_1 - P_2$$

$$20 = 7P_1 - P_2$$

$$7P_1 - P_2 = 20 \quad \text{—— (1)}$$

Now

$$Q_{d_2} = Q_{s_2}$$

$$12 + P_1 - 2P_2 = -2 + 3P_2$$

$$P_1 - 2P_2 - 3P_2 = -2 - 12$$

$$P_1 - 5P_2 = -14 \quad \text{—— (2)}$$

Solving equation (1)

$7P_1 - P_2 = 20 \rightarrow (1)$

$P_1 - 5P_2 = -14 \rightarrow (2)$

multiply equation (2) by 7.

$7(P_1 - 5P_2 = -14) \Rightarrow 7P_1 - 35P_2 = -98$

Subtracting (1) from (2)

$7P_1 - P_2 = 20$

$+ 7P_1 - 35P_2 = -98$

$34P_2 = 118$

$P_2 = \frac{118}{34}$

$P_2 = \frac{59}{17}$

Put $\bar{P}_2$ in equation

$7P_1 - P_2 = 20$

$7P_1 - \left(\frac{59}{17}\right) = 20 \Rightarrow 7P_1 = 20 + \frac{59}{17}$

$7P_1 = \frac{340 + 59}{17} \Rightarrow \frac{399}{17}$

$7P_1 = \frac{399}{17} \Rightarrow P_1 = \frac{57}{\cancel{399}_{\cancel{17}}} \times \frac{1}{\cancel{7}_1}$

$P_1 = \frac{57}{17}$ Put this value into $Q_{s_1} = -2 + 4P_1$

$Q_{s_1} = -2 + 4\left(\frac{57}{17}\right)$

$= -2 + \frac{228}{17} \Rightarrow \frac{194 + 228}{17}$

$= \frac{194}{17}$

Now put $P_2 = \frac{59}{11}$ into $Q_{s_2} = -2 + 3P_2$

$Q_{s_2} = -2 + 3\left(\frac{59}{11}\right) \Rightarrow -2 + \frac{177}{17}$

$= \frac{-34 + 177}{17} = \frac{143}{17}$

$$\bar{P}_1 = \frac{57}{17} \qquad \bar{P}_2 = \frac{59}{17}$$

$$\bar{Q}_1 = \frac{194}{17} \qquad \bar{Q}_2 = \frac{143}{17}$$

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Question 5:-

$Q_{d_1} = 410 - 5P_1 - 2P_2$

$Q_{s_1} = -60 + 3P_1$

ΣP

$Q_{d_2} = 295 - P_1 - 3P_2$

$Q_{s_2} = -120 + 2P_2$.

$Q_{s_1} = Q_{d_1}$, $Q_{s_2} = Q_{d_2}$

$-60 + 3P_1 = 410 - 5P_1 - 2P_2$, $-120 + 2P_2 = 295 - P_1 - 3P_2$

$3P_1 + 5P_1 + 2P_2 = 410 + 60$, $2P_2 + P_1 + 3P_2 = 295 + 120$

$\Rightarrow 8P_1 + 2P_2 = 470$, $P_1 + 5P_2 = 415$

equation (1) equation (2)

equation (2) multiply by "8"

$8(P_1 + 5P_2 = 415) \Rightarrow 8P_1 + 40P_2 = 3320$

Solving equations.

$8P_1 + 40P_2 = 3320$

$\pm 8P_1 \pm 2P_2 = \pm 470$ $\Rightarrow \frac{2850}{38}$

$38P_2 = 2850$

$P^2 = 75$

Put P_2 in equation (2)

$P_1 + 5P_2 = 415$ $= P_1 + 5(75) = 415$

$P_1 + 375 = 415 \Rightarrow P_1 = 415 - 375$

$P_1 = 40$

to find $\bar{Q}$:

$Q_{s_1} = -60 + 3P_1$

$= -60 + 3(40)$

$= -60 + 120 \Rightarrow 60$

$Q_{s_1} = 60$

$Q_{s_2} = -120 + 2P_2$

$= -120 + 2(75)$

$= -120 + 150$

$Q_{s_2} = 30$

$\bar{P}_1 = 40$ $\bar{Q}_1 = 60$

$\bar{P}_2 = 75$ $\bar{Q}_2 = 30$

Question :-

$Q_{d_1} = 6 - P_1 - P_2$

$Q_{s_1} = -2 + P_2$

ΣP

$Q_{d_2} = 10 - P_1 - 2P_2$

$Q_{s_2} = -3 + P_1 + P_2$

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$Q_{S1} = Q_{d1}$ $\quad Q_{S2} = Q_{d2}$

$-2 + P_2 = 6 - P_1 - P_2$ $\quad \Rightarrow -3 + P_1 + P_2 = 10 - P_1 - 2P_2$

$P_1 + P_2 + P_2 = 6 + 2$ $\quad \Rightarrow P_1 + P_2 + P_1 + 2P_2 = 10 + 3$

$P_1 + 2P_2 = 8$ $\quad \Rightarrow 2P_1 + 3P_2 = 13$

① ②

equation (1) multiply by 2

$2(P_1 + 2P_2 = 8) \Rightarrow 2P_1 + 4P_2 = 16$

Solving equations by subtracting.

$2P_1 + 4P_2 = 16$

$\pm 2P_1 \pm 3P_2 = \pm 13 \Rightarrow \boxed{P_2 = 3}$

$P_2 = 3$

Put (P_2) in equation (1)

$P_1 + 2(3) = 8 \Rightarrow P_1 + 6 = 8$

$P_1 = 8 - 6 \Rightarrow \boxed{P_1 = 2}$

to find $\bar{Q}$:

So,

$Q_{S1} = -2 + P_2 \Rightarrow -2 + 3.$

$Q_{S1} = 1$

$Q_{S2} = -3 + P_1 + P_2$

$= -3 + 2 + 3$

$Q_{S2} = 2$

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$\bar{P}_1 = 2$ $\quad \bar{P}_2 = 3$

$\bar{Q}_1 = 1$ $\quad \bar{Q}_2 = 2$

Question:-

$Q_{dB} = 82 - 3P_B + P_m$

$Q_{SB} = -5 + 15P_B$ &

$Q_{dm} = 92 + 2P_B - 4P_m$

$Q_{Sm} = -6 + 32P_m$

$\Rightarrow Q_{dB} = Q_{SB}$

$82 - 3P_B + P_m = -5 + 15P_B$

$82 + 5 = 15P_B + 3P_B - P_m$

$87 = 18P_B - P_m \longrightarrow ①$

$\Rightarrow Q_{dm} = Q_{sm}$

$92 + 2P_B - 4P_m = -6 + 32P_m$

$92 + 6 = 32P_m + 4P_m - 2P_B$

$98 = 36P_m - 2P_B \longrightarrow ②$

$-2P_B + 36P_m = 98.$

multiply equation (2) by 9.

$= 9(-2P_B + 36P_m = 98).$

$= -18P_B + 324P_m = 882.$

Solving these equations.

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$18P_m - P_m = 87$

$-18P_m + 324P_m = 882 \Rightarrow P_m = \frac{969}{323}$

$323P_m = 969$

$\boxed{P_m = 3}$

Put in equation.

$-2P_B + 36P_m = 98$

$-2P_B + 36(3) = 98 \Rightarrow -2P_B + 108 = 98$

$-2P_B = 98 - 108 \Rightarrow -2P_B = -10$

$P_B = \frac{-10}{-2}$

$\boxed{P_B = 5}$

to find Q:-

So,

$Q_{sB} = -5 + 15P_B$.

$= -5 + 15(5) \Rightarrow -5 + 75$

$\boxed{Q_B = 70}$

$Q_{sm} = -6 + 32P_m$

$= -6 + 32(3)$

$= -6 + 96 \Rightarrow 90$

$\boxed{Q_m = 90}$

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Question 3:-

$D_1 = 10 - P_1 + P_2$

$S_1 = 6 + P_1 + 2P_2$

&

$D_2 = 12 + 2P_1 - P_2$

$S_2 = 19 + 3P_1 - 5P_2$

$S_1 = D_1$

$6 + P_1 + 2P_2 = 10 - P_1 + P_2$

$P_1 + P_1 + 2P_2 - P_2 = 10 - 6$

$2P_1 + P_2 = 4 \longrightarrow (1)$

$S_2 = D_2$

$19 + 3P_1 - 5P_2 = 12 + 2P_1 - P_2$

$3P_1 - 5P_2 - 2P_1 + P_2 = 12 - 19$

$3P_1 - 5P_2 - 2P_1 + P_2 = 12 - 19$

$P_1 - 4P_2 = -7 \longrightarrow (2)$

equation (2) multiply by "2"

$2(P_1 - 4P_2 = -7) \Rightarrow 2P_1 - 8P_2 = -14$

Solving both equations

$2P_1 - 8P_2 = -14$

$\pm 2P_1 \pm P_2 = \pm 4$

$-9P_2 = -18$

$\boxed{P_2 = 2}$

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Put in equation.

$2P_1 + P_2 = 4$

$2P_1 + 2 = 4 \Rightarrow 2P_1 = 4 - 2$

$2P_1 = 2 \Rightarrow P_1 = \frac{2}{2} = 1.$

$\bar{P}_1 = 1$

to find $\bar{Q}$:

$S_1 = 6 + P_1 + 2P_2$

$= 6 + 1 + 2(2)$

$= 6 + 1 + 4 = 11$

$\bar{Q}_1 = 11$

$\bar{Q}_2 = 19 + 3P_1 - 5P_2$

$= 19 + 3(1) - 5(2)$

$= 19 + 3 - 10$

$= 12$

$\bar{Q}_2 = 12$

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"national Income"

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Question:-

Given the following modle:

$Y = C + I_0 + G_0$

$C = a + b(Y - T)$

$T = d + tY$

a). how many endogenous variable are thue?

(b) Find $\bar{Y}, \bar{T}, \bar{C}$.

a). There are three endogenous variables which are Y, C and T.

b). $Y = C + I_0 + G_0$

C = consumer. I_0

G_0 = Govt. expenditure.

Y = Income.

as $C = a + b(Y - T)$. put in eq.

$Y = a + b(Y - T) + I_0 + G_0$

$Y = a + bY - bt + I_0 + G_0$

$Y = a + bY - bt + I_0 + G_0$

$Y - bY = a - b(d + ty) + I_0 + G_0$

$Y - by = a - bd - bty + I_0 + G_0$

$Y - bY + btY = a - bd + I_0 + G_0$

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$Y - bY + btY = a - bd + I_0 + G_0$

$Y(1 - b + bt) = a - bd + I_0 + G_0$

$$\bar{Y} = \frac{a - bd + I_0 + G_0}{1 - b + bt}$$

$$\bar{Y} = \frac{a - bd + I_0 + G_0}{1 - b(1+t)}$$

$$\bar{Y} = \frac{a - bd + I_0 + G_0}{1 - b(1-t)}$$

∴ This is the value of $\bar{y}$.

Now substitute Y into $T = d + ty$.

$\bar{T} = d + ty$.

$$\Rightarrow d + t\left(\frac{a - bd + I_0 + G_0}{1 - b(1-t)}\right)$$

$$\Rightarrow d + t\left(\frac{a - bd + I_0 + G_0}{1 - b + bt}\right)$$

$$\Rightarrow \frac{d(1 - b + bt) + at - bdt + tI_0 + Gt}{1 - b + bt}$$

$$\Rightarrow \frac{d - bd + bdt + at - bdt + tI_0 + Gt}{1 - b + bt}$$

$$= \frac{d - bd + at + It + G_0t}{1 - b + bt}$$

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Taking common.

$$= \frac{d(1-b) + t(a + I_0 + G_0)}{1 - b + bt}$$

Now find $\bar{C}$:

$C = a + b(Y - t)$.

$= a + bY - bt$

⇒ put the values of $\bar{Y}$ and $\bar{T}$

$$= a + b\left(\frac{a - bd + I_0 + G_0}{1 - b + bt}\right) - b\left(\frac{d - bd + at + tI_0 + G_0t}{1 - b + bt}\right)$$

$$= \frac{a - ab + abt + ab - b^2d + bI_0 + bG_0 - bd + b^2d - abt - btI_0 - bG_0t}{1 - b + bt}$$

$$= \frac{a + bI_0 + bG_0 - bd - btG_0 - btI_0}{1 - b + bt}$$

$$= \frac{a - bd + bI_0 + bG_0 - btI_0 - btG_0}{1 - b + bt}$$

$$= \frac{a - bd + b(I_0 + G_0) - bt(I_0 + G_0)}{1 - b + bt}$$

$$= \frac{a - bd + (b - bt)(I_0 + G_0)}{1 - b + bt}$$

$$\bar{C} = \frac{a - bd + b(1-t)(I_0 + G_0)}{1 - b(1-t)}$$ Ans.

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Question # 02:-

$Y = C + I_o + G_o$

$C = a + b(Y - T_o)$

$G = gy$. Find national Incom.

(c) **Solution:-**

$Y = C + I_o + G_o$

Put the values of C and G

$Y = a + b(Y - T_o) + I_o + gy$.

$Y = a + bY - bT_o + I_o + gy$.

$Y - bY - gy = a - bT_o + I_o$

$Y(1 - b - g) = a - bT_o + I_o$

$\Rightarrow \bar{Y} = \frac{a - bT_o + I_o}{1 - b - g}$

National Income.

(a) **endogenous variables:**

Y, C and t are endogenous variables.

(b) **what is the meaning of Para. G_o.** (Parameter)

$G = gy$ is the govt. expenditure function.

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Question # 3:-

Find $\bar{Y}$ and $\bar{C}$ from the following:

$Y = C + I_o + G_o$

$C = 25 + 6Y^{1/2}$

$I_o = 16$, $G_o = 14$

Solution:-

$Y = C + I_o + G_o$

Substituting the values of C, I_o, G_o into this equation.

$Y = 25 + 6Y^{1/2} + I_o + G_o$

$Y = 25 + 6Y^{1/2} + 16 + 14$

$Y = 55 + 6Y^{1/2}$

$Y - 6Y^{1/2} = 55$

$Y - 6Y^{1/2} - 55 = 0$.

This is the quadratic equation so solve it by factorization.

$Y - 11Y^{1/2} + 5Y^{1/2} - 55 = 0$

$Y^{1/2}(Y^{1/2} - 11) + 5(Y^{1/2} - 11) = 0$

$(Y^{1/2} + 5)(Y^{1/2} - 11) = 0$

$Y^{1/2} + 5 = 0 \quad Y^{1/2} - 11 = 0$

25
16
14
55

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Let $Y^{1/2} = w$. So

$w - 11 = 0$ or $w + 5 = 0$

$w = 11$ or $w = -5$

as $Y^{1/2} = w$ and also positive

So $w = Y^{1/2} = 11$ and put in equation

to find $\bar{C}$:

$C = 25 + 6Y^{1/2}$

$C = 25 + 6(11)$

$C = 25 + 66 \Rightarrow \bar{C} = 91$

This is equilibrium consumption.

as $w = Y^{1/2} = -5$ is not acceptable in economics as it gives us negative value Now, taking

$Y^{1/2} = 11$

taking square on b/s.

$(Y^{1/2})^2 = (11)^2$

$\bar{Y} = 121$

$\bar{C} = 91$, $\bar{Y} = 121$.

This is equilibrium of national Income.