DELTA Pg No.

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Oligopoly

Q-1 $P = 200 - q_1 - q_2$

$MC_2 = 20 + 4q_2$

$q_2 = \frac{MC_2}{4} - 5$

$Q = (q_1 + q_2)$

$q_1 + q_2 = \frac{2MC_1 + MC_2 - 130}{4}$

$Q = \frac{3MC - 130}{4}$

$\frac{4Q + 130}{3} = MC$

$P = 200 - Q$

$MR = 200 - 2Q$

$MR = MC$

$600 - 6Q = 4Q + 130$

$10Q = 470$

$Q = 47$

$P = 153$

At $Q = 47$

$MC_1 \Rightarrow 106 = 55 + 2q_1$

$q_1 = 25.5$

$MC_2 \Rightarrow 106 = 20 + 4q_2$

$q_2 = 21.5$

$TC_1 = 1500 + 55q_1 + q_1^2$

$MC_1 = 55 + 2q_1$

$q_1 = \frac{MC_1 - 27.5}{2}$

$TC_1 = 358$

$TC_2 = 2554.5$

$TR_1 = P \times q_1 = 153 \times 25.5 = 3901.5$

$TR_2 = P \times q_2 = 153 \times 21.5 = 3289.5$

$\pi_1 = 348.75$

$\pi_2 = 735$

Cartel Profit $= 348.75 + 735 = 1083.75$

Q-2) $Q = 119 - 0.5P$ $\quad MC_1 = 6Q_1 + 48$ $\quad MC_2 = 12Q_2 + 18$

$\frac{MC_1 - 48}{6} = Q_1$

$\frac{MC_2 - 18}{12} = Q_2$

Demand eqn $\quad 0.5P = 119 - Q$

$P = \frac{119}{0.5} - \frac{Q}{0.5}$

$MR = 238 - 4Q$

$Q = Q_1 + Q_2 = \frac{2MC_1 + MC_2 - 96 - 18}{12}$

$MC = \frac{12Q + 114}{3} = 4Q + 38$

$MR = MC$

$238 - 4Q = 4Q + 38$

$8Q = 200$

$Q = 25$

$P = 188$

At $Q = 25$, $MR = 138$

$MC_1 = 6Q_1 + 48$

$138 = 6Q_1 + 48$

$Q_1 = 15$

$MC_2 = 12Q_2 + 18$

$138 = 12Q_2 + 18$

$Q_2 = 10$

Q-3) a) $P = 60 - Q$

$50 = 60 - Q$

$Q = 10$

$MR = 60 - 2Q$

$MR = 40$

$P = 80 - 3Q$

$50 = 80 - 3Q$

$Q = 10$

$MR = 80 - 6Q$

$= 20$

b) $MC = 20 + Q$

$MC = 30.$

$MC = 30 \therefore \quad Q = 10, P = ₹30$

c) Profit Max

$MC = 20$ to $MC = 40.$

when $MC = 20.$

$b = MC - Q$

$= 10.$

when $MC = 40$

$b = 40 - 10$

$= 30$