IIITB COMET FOUNDATION

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6. The minterm expansion of $f(P, Q, R) = PQ + QR + PR$ is

1. $m_2 + m_4 + m_6 + m_7$
2. $m_0 + m_1 + m_3 + m_5$
3. $m_0 + m_1 + m_6 + m_7$
4. $m_2 + m_3 + m_4 + m_5$

SOLUTION:

Given,
$f(P, Q, R) = PQ + QR + PR$

Expand each term:

$$PQ = PQ(R + \overline{R}) = PQR + PQ\overline{R}$$

$$QR = QR(P + \overline{P}) = PQR + \overline{P}QR$$

$$PR = PR(Q + \overline{Q}) = PQR + P\overline{Q}R$$

Combining distinct minterms:

$$f(P, Q, R) = \overline{P}QR + P\overline{Q}R + PQ\overline{R} + PQR$$

These correspond to:
m_3, m_5, m_6, m_7

Therefore,
$f(P, Q, R) = m_3 + m_5 + m_6 + m_7$

Final Answer: $\boxed{m_3 + m_5 + m_6 + m_7}$