IIITB COMET FOUNDATION

Name: K.Alekya
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GATE QUESTION
CSE 2010 Q6

6. The minterm expansion of $f(P,Q,R) = PQ + Q\overline{R} + P\overline{R}$ is

(A) $m_2 + m_4 + m_6 + m_7$

(C) $m_0 + m_1 + m_6 + m_7$

(B) $m_0 + m_1 + m_3 + m_5$

(D) $m_2 + m_3 + m_4 + m_5$

Solution:
We evaluate all input combinations of P, Q, R:

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

$$\begin{aligned} m_2 &: P = 0, Q = 1, R = 0 \Rightarrow f = 1 \\ m_4 &: P = 1, Q = 0, R = 0 \Rightarrow f = 1 \\ m_6 &: P = 1, Q = 1, R = 0 \Rightarrow f = 1 \\ m_7 &: P = 1, Q = 1, R = 1 \Rightarrow f = 1 \end{aligned}$$

Therefore, the minterm expansion is:

$$\boxed{f(P,Q,R) = m_2 + m_4 + m_6 + m_7}$$

Correct option: **(A)**