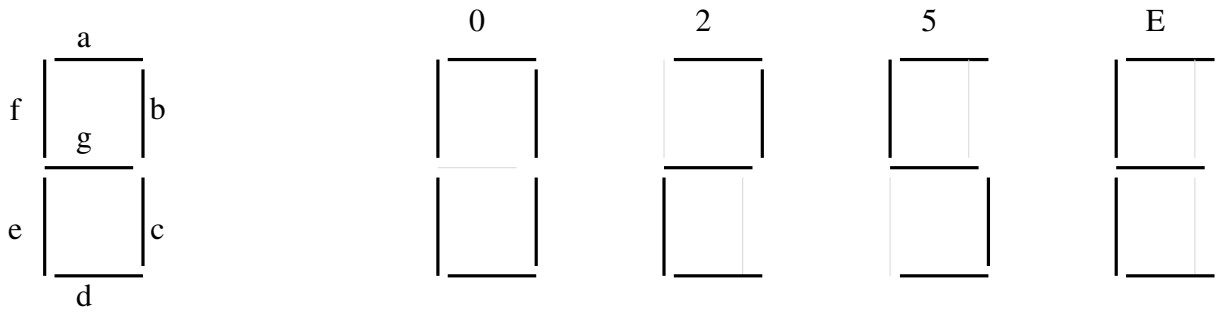
Two products are sold from a vending machine, which has two push buttons P_1 and P_2. When a button is pressed, the price of the corresponding product is displayed in a 7-segment display.

- If no buttons are pressed, '0' is displayed, signifying Rs. 0.
- If only P_1 is pressed, '2' is displayed, signifying Rs. 2.
- If only P_2 is pressed, '5' is displayed, signifying Rs. 5.
- If both P_1 and P_2 are pressed, 'E' is displayed, signifying "Error".

The names of the segments in the 7-segment display and the glow of the display for '0', '2', '5' and 'E' are shown below:



Consider:

(i) Push button pressed / not pressed is equivalent to logic 1 / 0 respectively.

(ii) A segment glowing / not glowing in the display is equivalent to logic 1 / 0 respectively.

Q.59 If segments a to g are considered as functions of P_1 and P_2, then which of the following is correct?

(A) $g = \overline{P_1} + P_2, \quad d = c + e$

(B) $g = P_1 + P_2, \quad d = c + e$

(C) $g = \overline{P_1} + P_2, \quad e = b + c$

(D) $g = P_1 + P_2, \quad e = b + c$

Solution:

- g segment glows for 2, 5, and E, but not for 0.
- That means:
$$g = \overline{P_1} \cdot P_2 + P_1 \cdot \overline{P_2} + P_1 \cdot P_2 = P_1 + P_2$$
- Only option (B) and (D) satisfy $g = P_1 + P_2$.
- For option (B), $d = c + e$ is consistent with the ON segments for all digits (0, 2, 5, E).

Therefore, the correct answer is: (B)