Question paper

0 A parallel plate capacitor with plate area A and separation between the plates J, is charged by a constant current i. Consider a plane surface of area all parallel to the plates and drawn simultaneously between the plates. The displacement current through this area is

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B) $i/2$

C) $i/4$

D) $i/8$

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Answers

0 **Correct Answer:** B
Solution :

[b] Charge on Capacitor plates at time t is, q=it Electric field between the plates at this instant. $E = \frac{q}{A\varepsilon_0} = \frac{it}{A\varepsilon_0}$ Electric flux through the given area $\phi_E = \left(\frac{A}{2}\right) E = \frac{it}{2\varepsilon_0}$ Therefore, displacement current $i_d = \varepsilon_0 \frac{d\phi_E}{dt} = \varepsilon_0 \frac{d}{dt}\left(\frac{it}{2\varepsilon_0}\right) = \frac{i}{2}$

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