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Q31

Consider the following statements: Statement I: Studies indicate that carbon dioxide emissions from cement industry account for more than 5% of global carbon emissions. Statement II: Silica-bearing clay is mixed with limestone while manufacturing cement. Statement III: Limestone is converted into lime during clinker production for cement manufacturing. Which one of the following is correct in respect of the above statements? (a) Both Statement II and Statement III are correct and both of them explain Statement I (b) Both Statement II and Statement III are correct but only one of them explains Statement I (c) Only one of the Statements II and III is correct and that explains Statement I (d) Neither Statement II nor Statement III is correct Official key: B.

UPSC Civil Services Prelims 2025 · General Studies · 2 marks · Environment and Ecology
Environment, ecology, climate, biodiversity - Prelims GS Paper I.

Explanation

(a)

Both II and III correct and both explain I. The official reading keeps both lines but does not let both explain the cement-CO₂ share.

(b) Official key

Both II and III are correct, but only one explains I. Clay in the raw mix is real kiln chemistry; calcination of limestone to lime is the process-CO₂ step that explains cement's large share of global emissions.

(c)

Only one of II and III is correct. The paper keys both as true statements.

(d)

Neither. Both process lines are scored.

Summary

Official Set A key is (b). Cement is a large CO₂ source (I). Silica-bearing clay is mixed with limestone in the raw meal (II) - true, but that mixing is not why cement dominates process emissions. In the kiln, limestone is calcined to lime and CO₂ (III) - that process gas, plus fuel, is why I holds. So II and III are both correct, and only III (one of them) explains I.

Related possible facts

These can be asked in a future Prelims paper.

Cement process emissions

Calcination of limestone to lime releases CO₂ even before the fuel is burned. That is why cement is hard to abate.

Clinker

The nodular product of the kiln. Ground with gypsum to make Portland cement.

Supplementary cementitious materials

Fly ash, slag and calcined clay can cut clinker factor and therefore process CO₂.

LC3 (limestone calcined clay cement)

A lower-clinker blend in the news as a cement-decarbonisation route.

Global cement CO₂ share

Industry estimates put cement at about 7-8% of global CO₂, which is why Statement I is in the paper.

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