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Q50

Consider the following statements: Statement I: Activated carbon is a good and an attractive tool to remove pollutants from effluent streams and to remediate contaminants from various industries. Statement II: Activated carbon exhibits a large surface area and a strong potential for adsorbing heavy metals. Statement III: Activated carbon can be easily synthesized from environmental wastes with high carbon content. 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: A.

UPSC Civil Services Prelims 2025 · General Studies · 2 marks · Environment and Ecology

Environment, ecology, climate, biodiversity - Prelims GS Paper I.

Explanation**(a) Official key**

Both Statement II and Statement III are correct and both explain Statement I. **Activated carbon** has a very large surface area and adsorbs heavy metals (II) - that is why it pulls pollutants from effluent. It can be made from high-carbon wastes such as coconut shell or rachis (III) - that is why it is a cheap, attractive tool. I follows from both.

(b)

- **Both II and III are correct but only one explains I. Both do:** adsorption chemistry and cheap feedstock are two reasons it is used.

(c)

Only one of II and III is correct and that explains I. Both II and III hold.

(d)

Neither II nor III is correct. Both hold, and both support I.

Summary

- **Official key is (a):** both II and III are correct and both explain I. **Activated carbon's** huge surface adsorbs metals, and it can be made from high-carbon wastes - that is why it is used on effluent.

Related possible facts

These can be asked in a future Prelims paper.

Activated carbon

Carbon processed for huge internal surface area. Used in water, air and industrial effluent treatment.

Adsorption vs absorption

Adsorption is onto a surface. Absorption is into the bulk. Activated carbon works by adsorption.

Physical vs chemical activation

Steam or CO₂ (physical) versus acids or bases (chemical). Two industrial routes to activated carbon.

Coconut rachis activated carbon

A Kerala research example: activated carbon from coconut waste. Same idea as coconut-shell carbon.

Biochar

Charred biomass, less processed than activated carbon. A neighbour in soil and carbon-credit questions.

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