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Q70

Tides occur in the oceans and seas due to which among the following? 1. Gravitational force of the Sun 2. Gravitational force of the Moon 3. Centrifugal force of the Earth Select the correct answer using the code given below (a) 1 only (b) 2 and 3 only (c) 1 and 3 only (d) 1, 2 and 3 Official key: D.

UPSC Civil Services Prelims 2015 · General Studies · 2 marks · Geography

Physical, Indian and world geography - Prelims GS Paper I.

Explanation**(a)**

The Sun's gravity does contribute to tides (especially spring and neap inequality), but the Moon and Earth's rotation/centrifugal effect also act. Statement 1 alone is incomplete. This option is not the key.

(b)

Moon and centrifugal effect matter, but omitting the Sun drops a real tide-raising force. This option is therefore wrong.

(c)

Sun plus centrifugal force without the Moon omits the principal tide-raising body. This option is not the key.

(d) Official key

Tides arise from the gravitational pull of the Moon and the Sun and from the centrifugal force due to the Earth-Moon system's rotation about the **barycentre**. All three statements are therefore correct. This option is the official key.

Summary

Official key is (d) 1, 2 and 3. Lunar gravity is the main tide-raising force; solar gravity modulates spring and neap tides. A centrifugal component in the Earth-Moon system completes the equilibrium-tide picture used in this question. No statement can be dropped. Options 1 only or any pair are incomplete.

Related possible facts

These can be asked in a future Prelims paper.

Spring tide

Sun and Moon aligned (new/full moon); higher high tides

Neap tide

Sun and Moon at right angles (quarters); smaller range

Barycentre

Earth-Moon centre of mass about which both move

Tidal bulge

Two bulges: one toward the Moon, one on the opposite side

Coriolis

Affects tidal currents, not listed here as a primary cause of tides

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