Feedback, stability, and hydrostatic pressure — review sheet

Use this after attempting the worked examples and practice. Explain each claim in words before calculating.

Key ideas

- Name stimulus, measurement, target, error and action separately.
- A result depends on what is held fixed.
- Negative feedback can reduce error, but gain and bounds matter.
- Hydrostatic pressure is not itself a prediction of circulation flow.
- Submit the required project idea by this meeting.

Common errors and repairs

Lower resistance always doubles output. Output changes depend on pump behavior and control assumptions; state what is fixed.

More updates always achieve the target. A rate bound can leave a persistent error.

The recurrence models standing because gravity was discussed. Height and venous storage are absent from the recurrence.

Retrieve without your notes

- Why is the measurement at step n used for rate at step n+1?
- Which units convert stroke volume times rate to L/min?
- What distinguishes verification from validation?

Readiness check

- Separate stimulus, measured response, target, error and feedback action.
- Calculate cardiac output and pressure in a stated fixed-stroke-volume model.
- Update a discrete feedback rule by hand and identify actuator saturation.
- Explain a hydrostatic pressure difference without equating it with net circulation flow.
- Submit a bounded project idea with a comparison and validation plan.