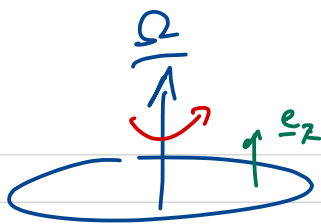
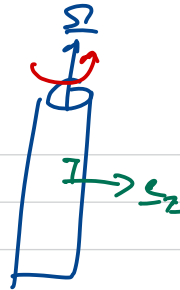


21
a)



or



local vertical axis either parallel or perpendicular to $\underline{\Omega}$, so no changes in angle and no planetary β .

! diagram
for explanation of no β

[2]

L) Either way we have as before but $\beta = 0$



$\beta = 0 \Rightarrow$ no Sverdrup balance
 \Rightarrow no bulk flow away from boundary layers
 \Rightarrow no intensification implied

[4]

$$c) \quad \omega = \frac{-\beta k}{k^2 + l^2} = 0 \quad \text{for } \beta = 0$$

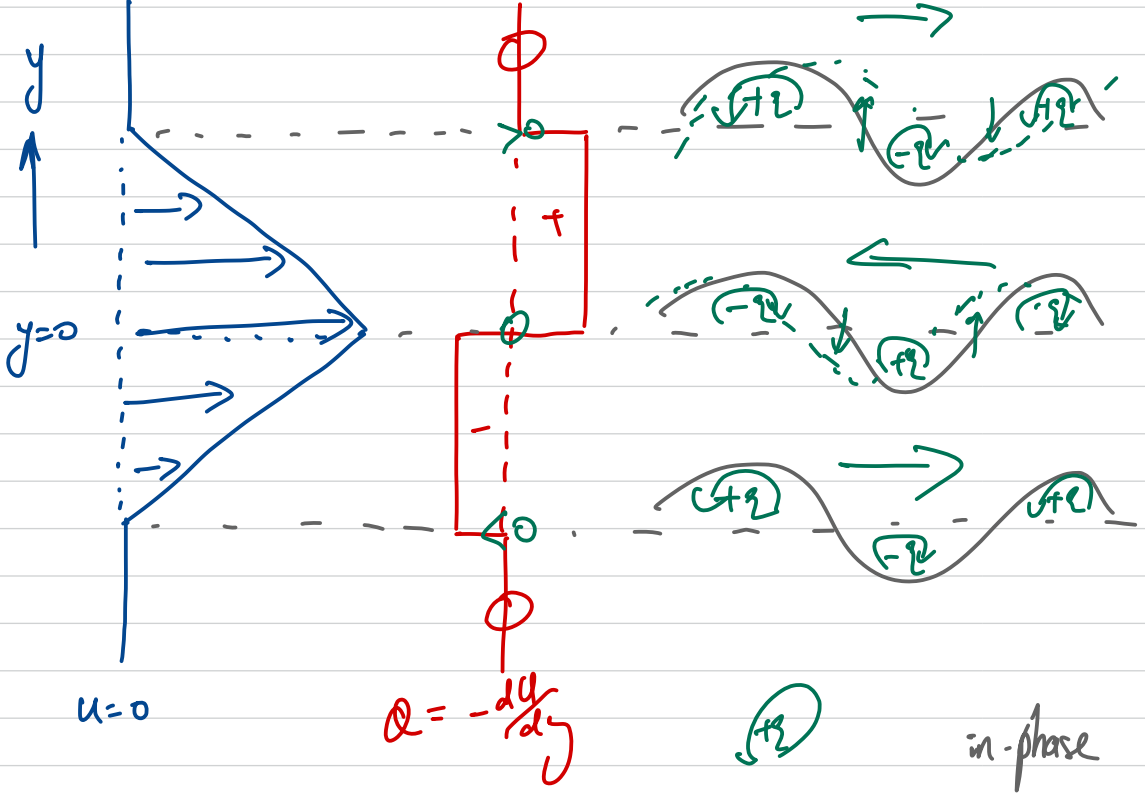
or

2 for either/both
explanation

no background vorticity gradient, no restoring force, no waves

[2]

Q2
a)



Vorticity profile : 2

In phase : 1

Anomalies + prop : 3

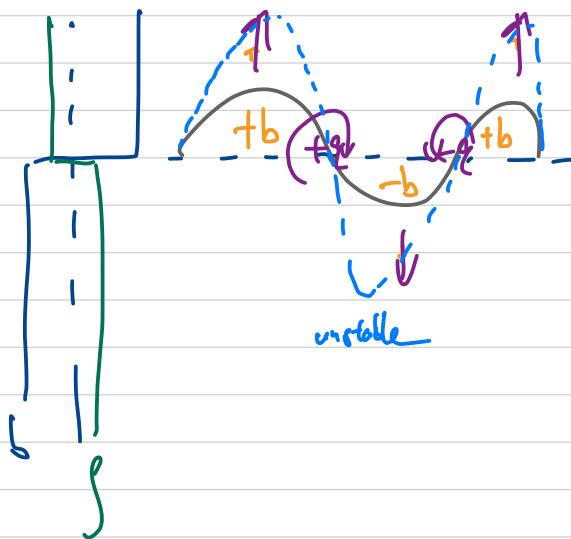
(middle wave goes left,
Gunter propagate



- 4

c) I'm going to use buoyancy:

$$N^2 < 0$$



$$b < 0 \quad (g = g_0 + \delta g)$$

less buoyant more dense

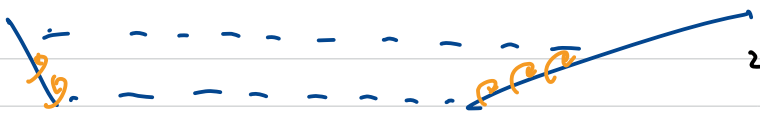
$$b > 0 \quad (g = g_0 - \delta g)$$

more buoyant less dense

- | $N^2 < 0$ config
- | anomalies in b
- | implied g anomalies at nodes
- | implied waveform increasing in displacement

a3

a)



small in-crop
area

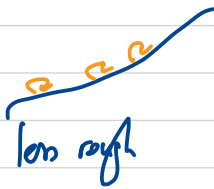
large in-crop
area

(could of course have dynamical
consequence due to steepness;
allow for sensible speculations)

\Rightarrow more area exposed per unit of height
more volume per unit height upwelled

[4]

b)



less rough



more rough

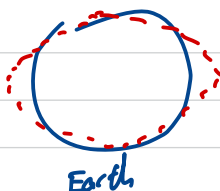
more rough \Rightarrow more instabilities/turbulence
 \Rightarrow larger effective K_d and
upwelling

(roughness may lead to trapping of
water of course)

[4]

Q4

a) Previously,



Earth

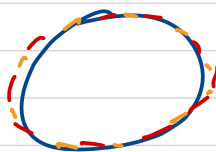
○

Mon, M_{Mon}

two bulges form, tide generating force

Now

Δ
 $M_{\text{Mon}}/2$



Δ
Mon, $M_{\text{Mon}}/2$

(for opposite end)

2 Half of the tide generating force / effect each
2 Linear, added together, gives the same effect

[6]

Q5

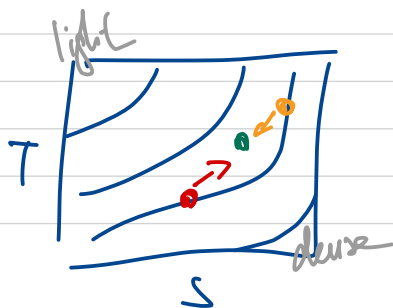
a)



1 two water masses (red dot, orange dot) of some density (on some isoline)
1 mixing leads to (green dot) but on some isoline for linear EE, no cabbelling

[2]

b)



exaggerated example, but something like this will do it

[2]