

Open books, notes, laptop, epad, calculator. (Communications with other people is NOT allowed.)

OK to separate all the sheets. Put your Name & ID on all sheets. Do NOT re-staple. ChatGPT and similar AI tools are NOT allowed. Turn in all question sheets, thermo diagrams, and bubble sheet.

Please use the bubble sheet to indicate your answers. Only the bubble sheet will be marked.

Total of 17 questions (worth 51 points, including 1 bonus point). Roughly 1 point per minute.

Plot this sounding on the attached thermo diagram. Then use it for the following 9 questions.

P (kPa)	T (°C)	Td (°C)
20	-30	
30	-30	
75	25	
85	30	
90	30	
100	40	25

Question

(points)

- 1 (3) Approximately at what pressure (kPa) is the lifting condensation level (LCL)?

A	B	C	D	E
100	95	90	85	80

- 2 (3) Approximately at what pressure (kPa) is the level of free convection (LFC)?

A	B	C	D	E
70	60	50	40	30

- 3 (3) Approximately at what pressure (kPa) is the equilibrium level (EL)?

A	B	C	D	E
37	30	27	23	20

- 4 (3) Approximately at what pressure (kPa) is the top of the mixed layer (i.e., the boundary layer)?

A	B	C	D	E
100	95	90	80	70

- 5 (3) Approximately at what pressure (kPa) is the tropopause?

A	B	C	D	E
30	27	23	20	17

- 6 (3) Suppose that the total area for CAPE $\approx 50,000 \text{ K}\cdot\text{m}$. What is the approx. value of CAPE (J / kg)?

A	B	C	D	E
-32,700	1,900	19,000	32,700	50,000

- 7 (3) What is the static stability of the environment at the 95 kPa pressure level?

A	B	C	D
stable	neutral	unstable	(not enough info to answer)

- 8 (3) For the air parcel at its LCL, what is its approximate relative humidity (%)?

A	B	C	D	E
20	40	60	80	100

- 9 (3) What is the approx. potential temperature (°C) of the environmental air (not the rising air parcel) at P = 30 kPa?

A	B	C	D	E
-30	-17	23	45	70

Exam **A**

Fall 2025

- 10 (3) Given the N. Hemisphere Doppler radar display below (Fig 1), where is the radar located if this graphic display is associated with a downburst at location E?

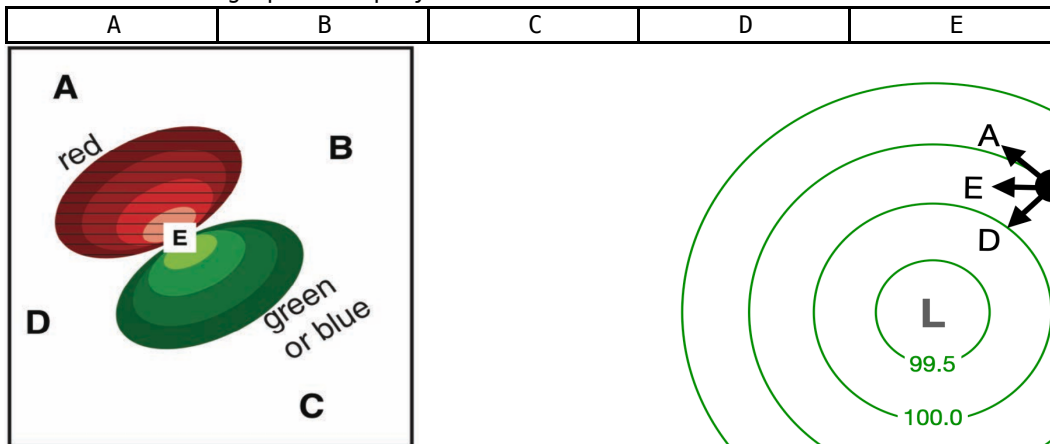


Fig. 1.

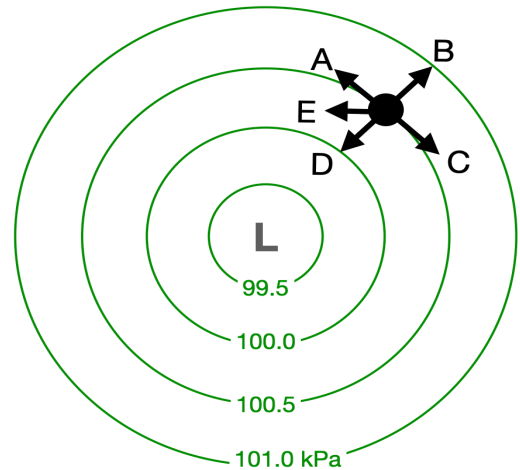


Fig. 2.

- 11 (3) In the Fig. 2 sketch of a mid-latitude cyclone in the Southern Hemisphere, for frictionless flow, which vector represents the likely direction of Coriolis force for the sketched air parcel (black dot)?

A	B	C	D	E
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- 12 (3) Figure 3 shows a/an _____ radar display.

A	B	C	D	E
PPI	RHI	CAPPI	Doppler	broken

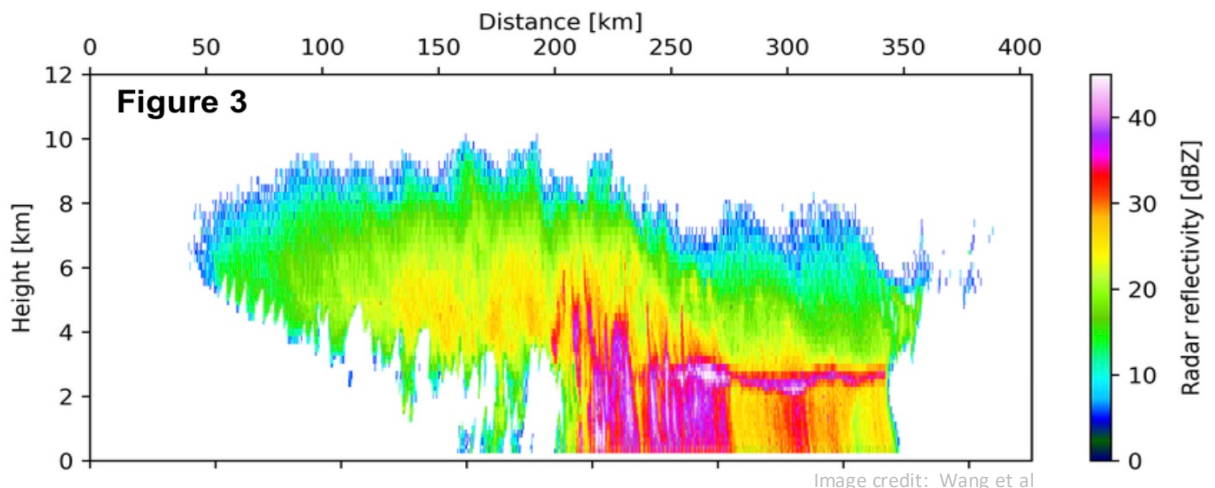


Image credit: Wang et al

- 13 (3) The weather shown in Figure 3 is most likely a/an ____ .

A	B	C	D	E
tornado	derecho	mammatus	LP supercell	MCS

- 14 (3) In Figure 3, the approximate altitude of the melting level is at _____ km.

A	B	C	D	E
2	6	10	200	290

- 15 (3) Given a column of air over Vancouver with a negative initial relative vorticity. If the column thickness is constant as the column moves eastward, then its relative vorticity

A	decreases and becomes more negative
B	increases but stays negative
C	increases to near zero
D	increases and becomes positive
E	doesn't change

- 16 (3) If a thunderstorm forms in an environment having a wind profile is as plotted in Figure 4, then what is the likely normal storm motion (direction, speed)?

A	B	C	D	E
293° @ 22 m/s	110° @ 22 m/s	203.5° @ 10.9 m/s	260° @ 25 m/s	320° @ 22.5 m/s

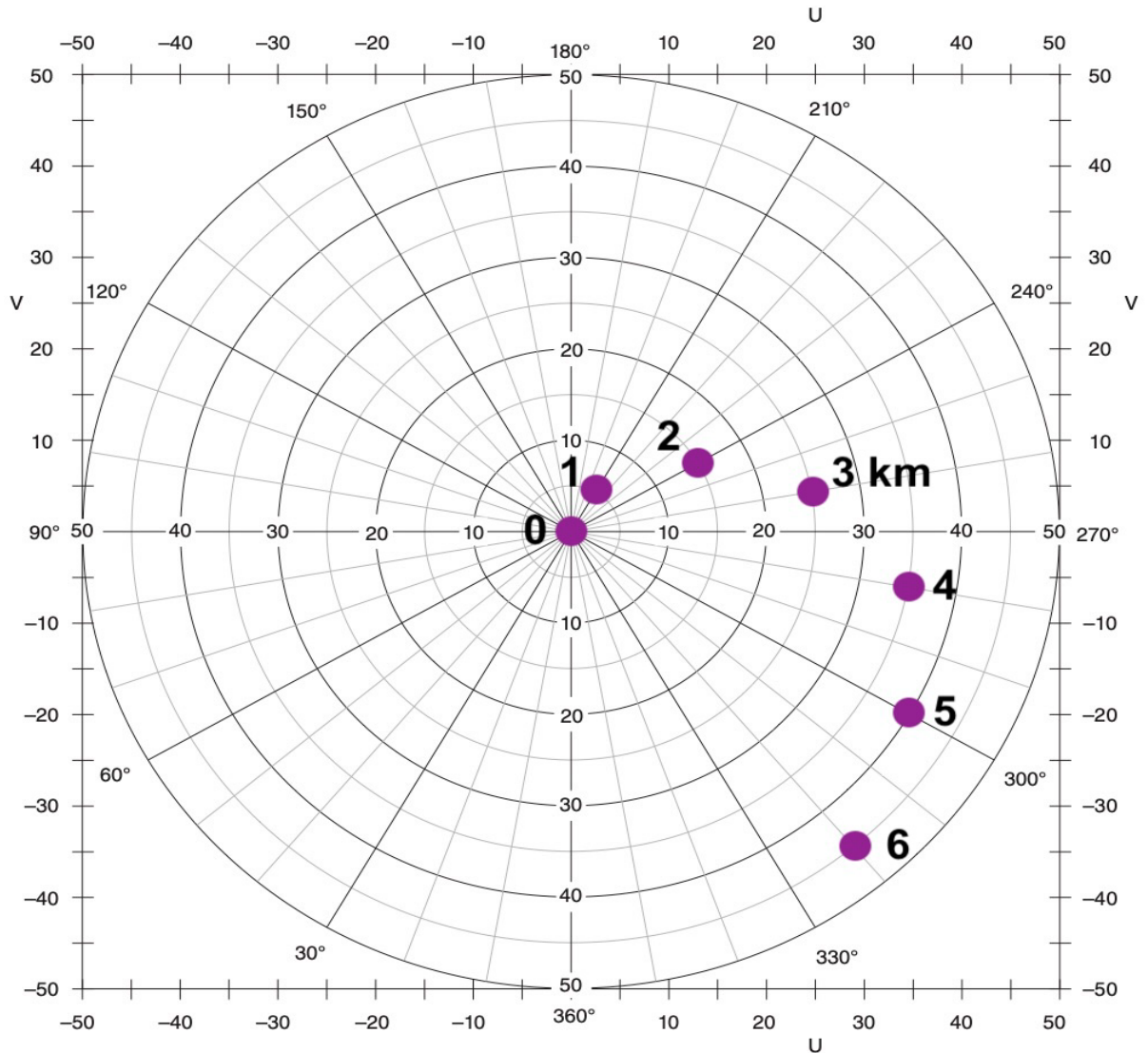


Figure 4. Hodograph speed units are m/s.

- 17 (3) If a tornado looks like a rope, then it is probably in its ____ life-cycle stage.

A	B	C	D	E
formation	developing	mature	weakening	dissipating

-- end of exam --

