

Professor: J.D. WilsonTime available: 20 minsValue: 7%

Instructions: For all 14 questions, choose what you consider to be the best (or most logical) option, and use a pencil to mark that choice on the answer form.

1. According to the three-cell model of the mean global atmospheric circulation, the mid-latitude cyclones occur ____
 - (a) at the boundary of the Ferrel cell and the Polar cell ✓✓
 - (b) at the boundary of the Hadley cell and the Ferrel cell
 - (c) at the boundary of the Hadley cell and the Polar cell
 - (d) in the belt of the sub-tropical highs
 - (e) in the ITCZ
2. The depth of a sea-breeze circulation would typically be about ____
 - (a) 10 - 20 m
 - (b) 100 - 200 m
 - (c) 1 - 2 km ✓✓
 - (d) 5 - 10 km
 - (e) the entire troposphere
3. You are camped in a narrow mountain valley during a period of light synoptic-scale winds due to an anticyclonic system. Overnight, you are likely to experience ____
 - (a) thunderstorms
 - (b) calm wind
 - (c) up-valley (ie. upslope) wind
 - (d) down-valley (ie. downslope) wind ✓✓
 - (e) cumulus forming above the ridges
4. A wintertime continental polar (cP) airmass that is advected (ie. blown) onto the north Pacific will be transformed into a(n) ____ airmass due to ____ exchange of sensible and latent heat with the ocean.
 - (a) unconditionally stable mP; convective
 - (b) conditionally unstable mP; convective ✓✓
 - (c) conditionally stable cA; conductive
 - (d) absolutely unstable cA; conductive
 - (e) conditionally unstable mE; radiative

5. Soon after the passage of a cold front through central Alberta, one may ideally observe which of the following signs.
- (a) rapid cooling; rising pressure; post-frontal wind barb rotated anticlockwise relative to pre-frontal wind barb
 - (b) rapid cooling; falling pressure; post-frontal wind barb rotated clockwise relative to pre-frontal wind barb
 - (c) rapid warming; rising pressure; winds dropping to calm
 - (d) rapid cooling; falling pressure; post-frontal wind barb rotated clockwise relative to pre-frontal wind barb
 - (e) rapid cooling; rising pressure; post-frontal wind barb rotated clockwise relative to pre-frontal wind barb ✓✓
6. Pick the correct association. (Quiescent means: inert, dormant, inactive)
- (a) quiescent weather - meridional pattern
 - (b) quiescent weather - zonal pattern ✓✓
 - (c) active weather - zonal pattern
 - (d) zonal pattern - strongly meridional flow
 - (e) meridional pattern - strongly zonal flow
7. Factors tending to deepen a storm are _____ aloft, which often occur in the outlet region of an upper _____
- (a) convergence and warm advection; ridge
 - (b) divergence and cold advection; trough
 - (c) convergence and cold advection; ridge
 - (d) divergence and warm advection; trough ✓✓
 - (e) divergence and warm advection; ridge
8. A “dryline” is a special type of front, identified by a region with a sharp gradient in _____
- (a) dewpoint ✓✓
 - (b) temperature
 - (c) pressure
 - (d) wind direction
 - (e) all of the above

9. Kinked height contours in the region of a mountain chain are given the name “lee trough”. When there is a lee trough, near the mountains the height contours will run _____ the mountain chain and the winds will blow _____ the height contours.
- (a) parallel to; parallel to
 - (b) parallel to; perpendicular to ✓✓
 - (c) perpendicular to; parallel to
 - (d) perpendicular to; perpendicular to
 - (e) anticlockwise to; parallel to

For the remaining questions, please refer to the attached meteorological analyses (all valid 12Z Nov 26, 2004)

10. On the surface chart the (°latitude, °longitude) coordinates of the centre of the mid-latitude cyclone are about _____
- (a) 50, 60
 - (b) 60, 50
 - (c) 54, 62 ✓✓
 - (d) 62, 54
 - (e) 973, 66
11. Judging from the surface pressure tendencies, this system is most likely to move towards the _____
- (a) northwest or west
 - (b) west or southwest
 - (c) southwest or south
 - (d) south
 - (e) north, northeast or east ✓✓
12. On the 850 mb chart, a hint for the direction of the surface low is seen in the form of _____ temperature advection in the general region around _____
- (a) warm; **A** ✓✓
 - (b) cold; **A**
 - (c) warm; **B**
 - (d) negligible; **B**
 - (e) zonal; 60° latitude & 50° longitude

13. On the 500 mb chart, a large blank circle indicates the location of the low at the surface.
The surface low lies beneath a _____
- (a) trough entry region
 - (b) trough exit region ✓✓
 - (c) ridge exit region
 - (d) quasi-stationary upper-low
 - (e) shortwave
14. In the region covered by these maps, in general terms the atmosphere can be described as
being _____ and the flow _____
- (a) barotropic, zonal
 - (b) barotropic, meridional
 - (c) baroclinic, zonal
 - (d) baroclinic, meridional ✓✓
 - (e) stable, quasi-stationary





