AVALANCHE INSTRUCTOR'S MANUAL

TAB: TEST BANK
CHAPTER 9

UPDATED VERSION
AVALANCHE TEST BANK
(without answers)

January 1999

This document replaces the October 1995 version in Chapter 9 of your *Avalanche Instructor's Manual*, (Tab: Test Bank).

The January 1999 Test Bank was developed by
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Printed Version with answers mailed to: Current Avalanche Instructor and Division Avalanche Supervisors. Also available on Avalanche Instructor's Secured Web Page.

Chapter 9

TEST BANK
(printed version has page numbers)

Notes for Instructors

Avalanche Hazard and Nomenclature

Terrain

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NOTES FOR INSTRUCTORS

General

Testing is a key step in the formal learning process. A good examination serves to amplify the key aspects of the subject being taught. Additionally, it provides instructors with tangible feedback regarding how well the students understood the information presented.

For an examination to be successful it must present the questions unambiguously and demand only information presented during the course. The NSP avalanche test bank questions are drawn from multiple sources. The references simply indicate that the book cited discusses the subject at the page indicated. The references address each topic at a different level of detail and fidelity. Instructors must compare the book being used to support their course with the questions selected, and ensure all material required to answer the questions is covered either in the reading, lecture, or practical exercise.

How to Use This Test Bank

- The questions are loosely organized in line with the modules of the NSP Basic Avalanche and Advanced Avalanche courses. Some questions appear in more than one category. Some questions ask for the same information in different ways or at different levels of detail. There is no longer any discrimination in the test bank between the questions for the basic or advanced courses; instructors must select questions to test the subjects for the level at which they were taught.

- Organization by module assists instructors with ensuring the test covers all subject matter. An effort should be made to include questions from all topical areas.

- The answers for questions are in available through the secured Avalanche web site or from the paper copy mailed to each avalanche instructor. The answers were drawn from a composite of all six references.

- The references are coded by number (see below). An entry such as (2:13) means the answer is discussed in "Snow Sense" on page 13. The reference codes are as follows:

  1 = Daffern, T., 1992, *Avalanche Safety for Skiers*, 2nd ed., Seattle, WA: Cloudcap, 192 pp.

  2 = Fredston, J and Fesler, D, 1994, *Snow Sense*, 4th ed., Anchorage, AK: Alaska Mountain Safety Center, Inc., 116 pp.

  3 = LaChapelle, E.R., 1985, *The ABC of Avalanche Safety*, 2nd ed., Seattle, WA: The Mountaineers Books, 112 pp.

  4 = Atkins, D., Ballard, L. and Hotchkiss, W., 1996, *Avalanche Rescue Fundamentals*, Lakewood, CO: National Ski Patrol, 51 pp.

  5 = McClung, D. and Schaerer, P., 1993, *The Avalanche Handbook*, Seattle, WA: The Mountaineers Books, 271 pp.

  6 = NSP, 1985, *The Avalanche Rescue Quick Guide*, Lakewood, CO: National Ski Patrol, 23 pp.

- An additional 175 questions are currently being reviewed for validity, clarity redundancy and references before adding them to this Test Bank. Individuals wishing to submit questions for inclusion may do so by forwarding them to the NSP education department, jover@nsp.org or emailing them directly to shepsnow@micron.net.

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AVALANCHE HAZARD AND NOMENCLATURE

1. What two main factors need to be present before an avalanche will occur? (1:80) (2:41) (3:28)

2. List three physical requirements for an avalanche to occur? (2:10)

3. Name the different types of avalanches. Name some variations to the different types. (1:79-87) (2:3-9) (3:19-27) (5:61-88)

4. What are the two principle types of avalanches? Briefly explain the differences between each. (1:83-85) (2:5) (3:21) (5:77)

5. Characteristics common to all types of avalanches are:

a.	Trigger	b.	Point of origin
c.	Slide path	d.	Loud noise
e.	Steep terrain	f.	Terminus/debris
g.	Fracture line	h.	Presence of snow
i.	Chain reaction	j.	Blocks of snow

(1:90) (2:3-9) (3:19-24) (5:91-98)

6. List the two basic types of release. (1:91) (3:26) (5:81)

7. What causes most natural avalanches? (1:90) (2:68) (3:26) (5:82)

8. What is the distinction between direct action and delayed action avalanches? (1:85) (3:9) (5:80-81)

9. What is a climax avalanche? (1:93) (3:9)

10. A climax avalanche is:
    a. Caused as a result of a single, heavy storm
    b. Involves the full depth of the snow cover to the ground
    c. The result of a sequence of meteorological causes
    d. A freak avalanche that only occurs at intervals of several years
    e. a and b above
    f. b and c above

    (1:94) (3:93)

11. A climax avalanche can be a major or large slide. The cumulative factors develop from a longer interval than single storms; thus it may slide to bare ground. True or False? (1:93) (3:9)

12. How can hard slab avalanches be distinguished from soft slab avalanches? (1:83-85) (2:5) (3:21)) (5:77)

13. Which of the following is evidence of slab avalanches:
    a. A well-defined fracture line
    b. A definite sliding layer
    c. Large areas move at once
    d. All of the above
    (1:83-84) (2:4-5) (3:21) (5:61-75)

14. List the characteristics of hard slab avalanches. (1:83-85,186) (2:4-5) (3:9-10,21) (5:8,22)

15. Define "hard slab avalanche," and give its characteristics. (1:83-85,186) (2:4-5) (3:9-10,21) (5:61-62)

16. What type avalanche is most dangerous? Why? (1:85) (2:3-4) (3:22) (5:61)

17. Diagram a slab avalanche. Label the type of stress on the (a) crown fracture line, (b) the right and left flanks, (c) the bed surface, and (d) stauchwall. (1:83-87) (2:42) (3:23) (5:75)

18. Loose snow avalanches can be recognized by:
    a. Their origin as a single point
    b. Lack of cohesion of the snow particles
    c. The slide gaining in width as it falls
    d. All of the above
    (1:80) (2:3) (3:19-21) (5:61-69)

19. Loose snow avalanches are caused by:
    a. Deposition of snow under windy conditions
    b. Increase in snowpack cohesion from metamorphism
    c. Snow accumulation on slopes greater than the angle of repose
    d. All of the above
    (1:80) (3:21) (5:72)

20. The most probable time of occurrence for soft snow avalanches is:
    a. During and after big winter storms
    b. After a day or two of settlement
    c. Following prolonged cold periods
    d. In late winter following extensive TG metamorphism
    (1:81,85,90) (2:4,68) (3:26) (5:70)

21. List the three parts of an avalanche path. (1:90) (2:14) (3:8) (5:89)

22. Most avalanche accidents involve the unexpected release of snow slabs triggered by the victims themselves. True or False? (1:11) (2:1) (3:26) (5:15)

23. What are the avalanche size classifications for the United States and Canada? (1:189) (5:252-253)

TERRAIN

1. What are the slope angles at which avalanches most commonly occur? *(1:85,116) (2:17) (3:29) (5:75-76)*

2. Most slab avalanches occur on slopes between what angles? (1:85,116) (2:17) (3:29) (5:75-76)

   List two unseen terrain features that increase avalanche potential. (1:124) (2:21) (3:29) (5:95)

3. Draw the following contour slopes: concave, convex, straight, combination of concave and convex, a cornice. Draw an arrow to indicate anchor or support area. Draw an X to indicate release points. (1:116-117) (2:8,22) (3:27)

4. Rough ground surfaces inhibit avalanches:
   a. Throughout winter
   b. Until TG metamorphism is well established
   c. In spring, when water lubricates the surface
   d. Until ground obstructions are covered by snow
   (1:124) (2:21) (3:29) (5:94)

5. List feature of the terrain surface that may have stabilizing influences on the snowpack? (1:124-125) (2:21-22) (3:29) (5:94)

6. Describe in detail the terrain features and other considerations involved in recognizing avalanche paths. Include factors observed during both summer and winter. (1:116-130) (2:14-24) (3:27-30) ((15:102-103)

7. The five key elements of a slope to be considered when evaluating avalanche potential are: (1:116-117) (2:16-24) (5:91-102)

8. Why is the aspect of a particular slope important? (1:127) (2:19) (5:101-102)

9. Why is the elevation of a particular slope important? (2:24) (5:95)

10. Why is the shape of a particular slope important? (1:117) (2:22) (5:95)

WEATHER

1. At what snowfall rate should avalanches be anticipated, especially if accompanied by wind? (1:37,137) (3:39) (5:156)

2. At what wind speed does avalanche danger develop? (2:72) (3:39) (5:157)

3. What weather factors are strong indicators of slab avalanche conditions? (1:37,108,137) (2:72,78) (3:39,47-49) (5:156-157)

4. Overnight snowfall of _____, or precipitation intensity greater than _____, and winds of over _____, result in avalanche potential. (1:37,108,137) (2:72,78) (3:39, 47-49) (5:156-157)

5. What is the special danger associated with "inverted" storms (start cold, end warm)? (2:76,78) (3:40) (5:70)

6. The direct action slab danger from warm snowstorms is usually of short duration. True or False? Why? (1:68-69) (2:28,73) (3:47) (5:156)

7. The two weather factors most important for predicting avalanche potential are: (1:37,108,137) (2:72,78) (3:39,48-49) (5:156-157)

8. What does a snow plume indicate, and what is occurring snow-wise? (1:40-44,128) (2:49,21-22) (5:25-30,157)

9. Storms that begin with cold temperatures then become progressively warmer normally increase the stability of the snowpack. True or False? (1:138) (2:78)

10. The general notion that south facing slopes are more stable in midwinter and north facing slopes in spring is based, at least in part, on consideration of:
    a. Depth hoar formation
    b. Terrain pattern
    c. Solar radiation
    d. Geothermal heat
    (1:127) (2:19-21) (5:101-102)

11. As the temperature rises near the freezing point

a. Snow settlement increases
b. Metamorphic changes within the snowpack are more rapid
c. Snow settlement decreases
d. a and b above
e. b and c above
(3:38)

12. In the northern hemisphere, air flows around a low pressure area:
a. Counter clockwise and inward
b. Clockwise and inward
c. Clockwise and outward
d. Counterclockwise and outward
(1:36) (5:21-22)

13. Blowing snow:
a. Can begin to transport significant amounts of snow at 15 mph
b. Transports snow from windward to leeward slopes
c. Leads to denser, slabbier deposits
d. All of the above
(1:39-41) (2:72) (3:39) (5:157)

14. Surface hoar:
a. Forms at night (or low sun angles) under clear skies
b. Is a deposition of water molecules from the air to the snow surface and solid objects
c. Becomes a weak layer when buried in the snowpack
d. All of the above
(1:59) (2:35-36) (3:25) (5:44)

15. Rime forms:
a. At night under clear skies
b. On warm, sunny days
c. When the mountain is immersed in clouds
d. All of the above
(1:57-58) (5:155-159)

16. Which of the following is *not* a lifting mechanism that can produce rain or snow?
a. Cyclonic
b. Orographic
c. Chinook
d. Frontal
(1:35-36) (5:21-22)

17. A rising parcel of air:

a. Compresses and warms
b. Compresses and cools
c. Expands and warms
d. Expands and cools
(1:52) (5:20)

18. The significance of rain falling on the snowpack is that it:
a. Results in a cold snowpack
b. Adds weight without adding strength
c. Erodes much of the snow cover
d. Produces small, well-bonded grains
(2:68) (3:40)

SNOWPACK

1. The term "settlement" refers to:
a. The displacement of the entire snow cover along the ground surface
b. Lack of cohesion of the snow particles
c. Snow cover that slowly accelerates with widening cracks
d. Compression of the snow perpendicular to the slope under its own weight
(1:68-69,188) (5:65)

2. Because of its low thermal conductivity, snow is a good _____. This results in the temperature at the snow-ground interface being very close to 32 F, 0 C, in most cases. (1:62) (3:17) (5:45)

3. What distinctions exist between wind pack and wind slab? (1:44) (2:70-72) (3:40) (5:157-158)

4. What kind of metamorphism results in weakened layers within the snowpack? What is another name for the crystals so formed? Does this metamorphism increase or decrease with increasing snow density? Why? (1:71-73) (2:30-33) (3:14-15) (5:49-54)

5. Are you more likely to find temperature gradient metamorphism in thick or thin snowpacks? Why? (1:71-73) (2:30-33) (3:14-15) (5:49-54)

6. The more the compressive force, the _____ the shear strength of a snowpack. (1:66-67) (2:33) (5:70-71)

7. Explain how faceted grains (squares) are formed. (1:71-73) (2:30-33) (3:14-15) (5:49-54)

8. Explain how rounded grains (rounds) are formed. (1:68-70) (2:29-30) (3:14) (5:49,52-58)

9. Describe the process of melt-freeze metamorphism. (1:75) (2:33) (5:54-60)

10. Metamorphism:
    a. Is a continuous process
    b. Is influenced by temperature
    c. Can be accomplished through a process called sublimation
    d. All of the above
    (1:68-69) (2:28) (3:38) (5:46-49)

11. Identify the following as being associated with equitemperature (rounding) or Temperature Gradient (faceting) metamorphism.
    a. Stops below -40° F
    b. Proceeds rapidly at 32°F
    c. Forms crystals that have edges and faces
    d. Strongly affected by temperature gradients
    e. Requires air permeability in the snowpack
    f. Forms rounded grains
    g. Forms weak layers
    h. Most common in early winter
    (1:69-74) (2:30-31,37) (3:14-15) (5:48-49)

12. The following are examples of meteorological conditions that cause high temperature gradients in the snowpack (circle correct answer).
    a. Radiation loss through clear night skies
    b. Low air temperature with wind
    c. Cold snow deposited on warm snow layer
    d. Warm snow deposited on cold snow
    e. All of the above
    f. a and c only
    (1:71-74) (2:30-32) (3:14-15) (5:48-54)

13. Instability in slab snowpacks may increase because of:
    a. Decreased bonding strength between layers
    b. Snow loads that increase more rapidly that settlement
    c. Decreased strength of all anchorages
    d. All of the above
    (1:84-85) (2:5) (3:23-24) (5:71)

14. The reason avalanche danger persists longer at lower temperature is:
    a. Cold snow flows rapidly

b. Cold snow becomes stiffer, settles less, and creep tension is more persistent
c. Cold snow redistributes stresses by internal deformation
d. The rate of metamorphism slows as temperatures decrease
e. All of the above
f. b and d above
g. c and d above
(2:28) (3:25) (5:71)

15. What is the primary cause of slabs? (1:39-41,65) (2:70) (3:49) (5:157)

16. Storms starting at low temperatures develop small simple forms of snowflakes and generally leave an unstable deposit that forms a poor bond with the old surface. True or False? (1:77) (2:76)

17. Why do north slopes remain unstable for longer periods of time during mid-winter than do other exposures? (1:69) (2:20,73)

18. The general notion that south facing slopes are more stable in midwinter and north facing slopes in spring is based, at least in part, on consideration of:
a. Depth hoar formation
b. Terrain pattern
c. Solar radiation
d. Geothermal heat
(1:127) (2:19-21) (5:101-102)

19. The property determining whether an avalanche will be loose snow or slab is:
a. Inter-granular strength
b. Sublimation
c. Saltation
d. Cohesion
(1:83) (2:4) (3:21) (5:69)

20. As the temperature rises near the freezing point
a. Snow settlement increases
b. The rate of metamorphism increases
c. Snow settlement decreases
d. a and b above
e. b and c above
(1:69) (2:28) (3:38) (5:49)

21. Sublimation is the process by which:
a. Surface hoar grows

b. A substance goes from a solid state to a gaseous phase without becoming liquid
c. The tensile strength of the snowpack is increased
d. The compressive strength of the snowpack is increased
(1:46,53)

22. The process of sintering results in:
a. Weaker snow
b. Stronger snow
c. Larger grains
d. Surface hoar
(1:70) (2:29-30) (5:57-59)

23. A sustained strong temperature gradient across a snow layer will create:
a. Stronger layer
b. Weaker layer
c. Harder layer
d. Denser layer
(1:71-73) (2:30-31) (3:14-15) (5:54-59)

24. Melt-freeze snow metamorphism can result in:
a. Weak snow that will almost certainly avalanche
b. Strong snow that will almost certainly not avalanche when in the freeze cycle
c. Conditionally stable snow that might avalanche
d. All of the above
(1:75) (2:33) (5:54-60)

SNOW MECHANICS/AVALANCHE DYNAMICS

1. Loose snow avalanches are caused by:
a. Deposition of snow under windy conditions
b. Increase in snowpack cohesion from metamorphism
c. Snow accumulation on slopes greater than the angle of repose
d. All of the above
(1:80) (3:21) (5:72)

2. Give four basic triggers of avalanches. (1:91) (2:40) (3:23-24) (5:81)

3. Instability in slab snowpacks may increase because of:
   a. Decreased bonding strength between layers
   b. Snow loads that increase more rapidly that settlement
   c. Decreased strength of all anchorages
   d. All of the above
   (1:84-85) (2:5) (3:23-24) (5:71)

4. The reason avalanche danger persists longer at lower temperature is:
   a. Cold snow flows rapidly
   b. Cold snow becomes stiffer and creep tension more persistent
   c. Cold snow redistributes stresses by internal deformation
   d. The rate of metamorphism slows as temperatures get colder
   e. All of the above
   f. b and d above
   g. c and d above
   (2:28) (3:25) (5:71)

5. The more the compressive force, the _____ the shear strength of a snowpack. (1:66-67) (2:33) (5:70-71)

6. Sunballs are an indication of:
   a. Mid-pack TG crystal layers
   b. Snow glide
   c. Settlement
   d. A potential for wet snow avalanches
   (2:75,78) (3:51-52)

7. True or False?
   a. _____ Homogeneous snowpacks are more likely to slide than those are with discontinuities in the layers
   b. _____ Snow surfaces exposed to prolonged weathering offer poor bonding surfaces for subsequent snowfalls
   c. _____The most common avalanche trigger is fresh snow
   (3:25) (3:46-47) (1:91) (2:68) (3:38)

8. The most probable time of occurrence for soft snow avalanches is:
   a. During and soon after big winter storms
   b. After a day or two of settlement
   c. Following prolonged cold periods
   d. In late winter following extensive TG metamorphism
   (1:81,85,90) (2:4,68) (3:26) (5:70)

9. Name the ten contributory factors for avalanches.
   (Multiple references)

10. Ten factors have been identified which contribute to an avalanche hazard. Describe each in one or two sentences. Which two have been shown to have some value in predicting avalanches?
(Multiple references)

11. What is the distinction between direct action and delayed action avalanches? (1:85) (3:9) (5:80-81)

12. What kinds of stresses in the snowpack do creep cause? (1:67) (2:5) (3:11,16,24) (5:63-64)

13. Fracture type in the bed surface boundary of a slab is:
    a. Shear
    b. Tension
    c. Compression
    (2:42)

14. The importance of slope angle in assessing stability is that:
    a. The potential of shear failure increases with slope angle
    b. Avalanches are only possible within a given range of slope angles
    c. As the slope angle increases, the stress increases in the snowpack and along the slab boundary regions
    d. All of the above
    (1:82,85,116) (2:16-17) (3:28-29) (5:72-76)

ROUTE SELECTION/HAZARD IDENTIFICATION

1. Rank the following from most dangerous to safest routes in avalanche terrain (1 = safest, 5 = most dangerous):
    a. _____ Midway up the gully
    b. _____Across the crown of a convex slope
    c. _____On windward side of the ridge line
    d. _____Through heavy timber
    e. _____Along the valley floor
    (1:26,118-123) (2:92-93) (5:98,102)

2. List safe routes in descending order of reliability. (1:26,118-123) (2:92-93) (3:55) (5:98-102)

3. Number routes in descending order of safety, with safest first.
    a. "U-" shaped valley floor
    b. Ridges or over top
    c. Sparse trees
    d. Thick trees

e. Middle of open slopes
(1:26,118-123) (2:92-93) (5:98-102)

4. List three danger signs that could be observed while skiing. (1:144) (2:46-49) (3:32)

5. List three forms of evidence of previous avalanche activity. (1:130) (2:23-24,46) (3:32) (5:102-103)

6. Describe in detail the terrain features and other considerations involved in recognizing avalanche paths. Include factors observed during both summer and winter. (1:116-130) (2:14-24) (3:27-30) (15:102-103)

7. Sunballs are an indication of:
   a. Mid-pack faceted layers
   b. Snow glide
   c. Settlement
   d. A potential for wet snow avalanches
   (2:75,78) (3:51-52)

8. What weather factors are strong predictors of slab avalanche conditions? (1:37,108,137) (2:72,78) (3:39,47-49) (5:156-157)

9. What is the special danger associated with "inverted" (cold to warm) storms? (2:76,78) (3:40) (5:70)

10. What does a snow plume indicate, and what is occurring snow-wise? (1:40-44,128) (2:49,21-22) (5:25-30,157)

11. Which of the following is *not* a general rule for backcountry travel?
   a. Expose only one person at a time
   b. Timbered areas are generally safe in the Rocky Mountains
   c. Do not ski on lee areas
   d. Carry transceivers
   (1:146) (2:93) (3:55-56) (5:173-175)

12. Contrast "glide" and "creep." (1:67) (2:5) (3:24) (5:63-67)

13. The best indicator of widespread snow instability is:
   a. Widespread hard slab
   b. Extensive depth hoar development
   c. Recent avalanche activity on slopes of similar orientation
   d. Sudden temperature changes
   (1:138) (2:46) (3:32,40) (5:128)

STABILITY EVALUATION

1. List two characteristics associated with each class of stability evaluation.
   Class I Class II Class III
   (3:31) (5:162)

2. List two traits you would especially check for when digging a snow pit to evaluate stability. (1:110,144) (2:56-59) (3:33-35) (5:33)

3. Which class of stability evaluation is most accurate?____ (3:32) (5:124,162)

4. Which is used at developed ski areas? _____*(3:31-35,42) (5:70,162)*

5. List at least three critical pieces of information that may be obtained from a hasty pit. (1:110,144) (2:56-59) (3:33-35) (5:33)

6. Hard slab avalanches are difficult to predict because:
   a. It is difficult to measure slab strength as a function of load or stress
   b. Shovel tests are impractical
   c. Ordinary ski testing does not reveal hard slab danger
   d. All of the above
   (1:84) (2:26,40) (3:48-49)

7. The best indicator of widespread snow instability is:
   a. Widespread hard slab
   b. Extensive depth hoar development
   c. Recent avalanche activity on slopes of similar orientation
   d. Sudden temperature changes
   (1:138) (2:46) (3:32,40) (5:128)

8. Which of the following snow tests allows you to directly test layer to layer bonding?
   a. Rutschblock
   b. Ski pole test
   c. Resistance (credit card) tests
   d. Hand hardness tests
   (1:105) (2:58-61) (5:131)

DECISION MAKING

1. Which of the following is *not* a rule when you must cross an avalanche path?
   a. Wear an avalanche cord

b. Loosen clothing
c. Remove wrist straps
d. Unhitch safety straps and rucksack straps
e. Take terrain protection
f. Cross one member at a time
(1:155-156) (2:96) (3:59) (5:174-175)

2. When you are about to cross an avalanche path, what should you do in preparation? (1:152-157) (3:59-60) (5:174-175)

3. Before crossing a dangerous, avalanche prone, slope a backcountry traveler should: (1:152-157) (2:96) (3:59-60) (5:174-175)

4. When you are about to cross an avalanche path, you should do this in preparation:

a.	Remove pole straps from wrist	____True ____ False
b.	Make sure safety straps are attached	____True ____ False
c.	Zip up all pockets and button up	____True ____ False
d.	Remove excess clothing	____True ____ False
e.	Tie avalanche cord around neck to keep it high	____True ____ False
f.	Switch avalanche transceiver to "receive"	____ True ____ False
g.	Cross one person at a time	____ True ____ False
h.	Have first man carry shovel	____ True ____ False

(1:152-157) (2:96) (3:59-60) (5:174-175)

5. If you are the sole survivor in a backcountry avalanche, should you take time to make a thorough search or go immediately for help?
(1:164) (2:102) (3:63) (4:20) (5:179)

6. List the ten mountaineering essentials and items of personal equipment you should have if you are called to go on an extended, out-of-area, winter, rescue. (1:27-32,166) (2:102) (3:68-76) (4:32) (5:173-174,184) (6:7,12)

RESCUE/MEDICAL

1. If you are caught in an avalanche:
   a. Try to retain skis and poles
   b. Remain silent but wave your arms around about so others can see you
   c. Try to swim in order to remain on the surface
   d. Keep your arms at your side as the avalanche comes to rest
(1:158-159) (2:104) (3:61) (4:9) (5:178)

2. If you are caught in an avalanche, what are you going to do?
(1:158-159) (2:104) (3:61) (4:9) (5:178)

3. Arrange the following steps in order of priority for sole survivors of a backcountry avalanche accident where help is one hour away.
   a. _____ Go for help
   b. _____ Probe slide with ski pole or ski for buried victim
   c. _____ Mark last-seen point
   d. _____ Initiate transceiver search
   e. _____ Conduct a thorough search, probing all possible areas
   (1:177) (3:62-63) (4:19-21) (5:179-180)

4. If you are the sole survivor in a backcountry avalanche, should you take time to make a thorough search or go immediately for help?
(1:164) (2:102) (3:63) (4:20) (5:179)

5. What is the title of each of the people responsible for the following?
   a. Overall rescue operation
   b. Accident site
   (1:166) (3:68-69) (412-13) (5:182,183) (6:5)

6. What is the rescue title of the person who has primary responsibility for rescue activity at the base and overall? (1:166) (3:67) (4:12-13) (5:182) (6:5)

7. What is an "avalanche guard?" When and how is this person used?
(1:177) (3:72) (4:27) (5:184) (6:9)

8. The most important component of an organized avalanche rescue is:
   a. Equipment
   b. Discipline
   c. Proper organization
   d. Speed
   (3:68) (4:6)

9. The essential factor of Stage I is _____ with _____.
(1:166) (3:68-69) (4:13-14) (5:184) (6:7)

10. The witness to an avalanche should be (indicate whether true or false):
   a. Sedated to keep excitement down
   b. Kept warm
   c. Kept in sight at all times
   d. Asked to donate money to NSP
   e. Kept ready to go back out on hill

f. Check breath on witness
g. Accompanied by a calm, empathetic, rescuer
h. Returned to the accident site as soon as possible
(1:166) (3:68) (4:13, 38-39) (5:182,184)

11. What is the immediate action taken by any trained person receiving report of an avalanche? (1:166) (3:68) (4:11-14) (5:182)

12. Give a very basic outline for an organized rescue starting when the eyewitness reports. Include timeline. (1:166) (3:68-75) (4:15) (5:184-186) (6:13)

13. Outline the basic organization for a rescue, starting with the eyewitness reports. (1:166) (3:68-79) (4:15) (5:182-190) (6:3)

14. Completely describe an avalanche rescue operation. Assume three stages are required. The avalanche is in an area but out of sight of main buildings. (1:166) (3:67-76) (4:14-15) (5:182-186) (6:3)

15. In a patrol organized rescue, Stage I columns should be dispatched ____ ; Stage II columns should be dispatched _____ , Stage III columns should be dispatched _____ .
(1:166) (3:68-75) (4:15) (5:182-183) (6:3)

16. As a general rule, the Stage I columns should include how many rescuer? (4:14,32) (6:7)

17. Who is in charge at the scene of the avalanche? (4:13) (5:184) (6:7)

18. As first column leader of Stage I, you are _____ until _____ .
(4:13) (5:184) (6:7)

19. You arrive with a Stage I, first column rescue team. What will your actions be after selecting an escape route and posting an avalanche guard? (1:166) (3:67-76) (4:14-15) (5:182-186) (6:3)

20. Which of the following would not ordinarily be a function of the immediate (hasty) party, or first group to be dispatched to an avalanche rescue scene?
a. Bring oxygen to help treat suffocation
b. Search debris for clues and mark last scene point
c. Direct electronic search
d. Initiate probing
(1:166) (3:72) (4:14-15) (5:185-186)

21. Give the main duties of the advance party. (1:166) (3:68-69) (4:13-14)

(5:184) (6:7)

22. Locating the last seen point (area) is important because?
(1:166) (2:107) (3:68) (4:6) (5:179, 187)

23. Name five probable places an avalanche victim might be found on the initial fast probing. (1:169) (2:108) (3:69) (4:6-7) (5:180)

24. What does Stage III provide? (1:166) (3:75) (4:15-16) (5:182-190)

25. Match the following: a. fine probing b. coarse probing
a. _____ Spaced elbow to elbow with one probe between legs
b. _____ Spaced fingertip to fingertip with probes in front of each foot
c. _____ Insures victim will be found
d. _____ Gives best chance of finding victim alive
e. _____ Spaced forward by one step
f. _____ Spaced forward by two boot lengths
g. _____ Probed in front of both feet and center
h. _____ Spaced forward by one boot length
(1:170-171) (2:108-109) (3:69-71) (4:28-31) (5:191) (6:11)

26. Draw a diagram with measurements of the coarse probe. (2:108-109) (3:70) (4:30-31) (5:191) (6:11)

27. What does a "systematic probe mean" and who does it? (1:170-171) (3:69-71) (4:27-31) (5:190-191) (6:10-11)

28. What are three important things a member of a probe line should do? (1:170-171) (2:108-111) (3:70-71) (4:29) (5:192)

29. Coarse probing gives approximately a _____ chance of finding a victim, everything else being equal. (1:164) (3:69-70 (4:29) (5:193)

30. What is the purpose of a rescue transceiver?
(1:27) (2:102) (3:86) (4:43) (5:174)

31. Selection of equipment is based on what objective for each of the three rescue stages? (1:166) (3:68-69) (4:15) (5:182-190) (6:3)

32. What type and how much equipment does the advanced party take with them on an out-of-area rescue? (1:166) (2:102) (3:68,76) (4:14) (5:184) (6:7)

Same for the follow-up party? (1:166) (3:72,76) (4:14-15) (5:182)

33. List five pieces of avalanche rescue equipment. (1:27-32) (2:101-104) (3:76-77) (4:17) (5:173-174) (6:12)

34. List at least six items you might expect to find in a Stage I pack/cache? (3:76) (4:17) (6:17)

35. List the locations of Column I avalanche rescue pacts at your ski area: *(Answers need to be specific to your area.)*

36. What does the hasty search pack in your area contain? *(Answers need to be specific to your area.)*

37. List the ten mountaineering essentials and items of personal equipment you should have if you are called to go on an extended, out-of-area, winter rescue. (1:27-32,166) (2:102) (3:68-76) (4:32) (5:173-174,184) (6:7,12)

38. What records are kept of a rescue operation? (3:79) (4:13) (5:182-183) (6:9)

39. The primary purpose of the avalanche accident report is? (3:79) (6:5,14-19)

40. What records are kept as part of a rescue operation? (3:79) (6:5,14-19)

41. In case of an avalanche tragedy involving personal injury or property damage, what officials are notified? (1:166,175) (4:13,23-25) (5:173,183) (6:5,23)

42. What organizations are available for support if the rescue operation lasts longer than a few hours? (1:166,175) (4:13,23-25) (5:173) (6:5,23)

43. Where at my area are copies of the avalanche rescue plan located? *(Answers need to be specific to your area.)*

44. Avalanche transceivers should be:
    a. Turned from receive mode to transmit mode when starting to cross an avalanche path
    b. Left in the transmit mode at all times during an outing, except when being used in a rescue
    c. Used only in true rescue situations

    (1:30) (2:102) (3:89) (4:44) (5:174,188)

45. From now on, all avalanche rescue transceivers used by the general public should be able to transmit and receive on at least:
    a. The old “low” frequency of 2275 Hz

b. The new “high” frequency of 457 kHz
c. Both frequencies
(1:27) (3:87) (5:187)

46. For most efficient rescue, a searcher should have:
a. Avalanche rescue transceiver
b. Shovel
c. Probe
d. All of the above
(1:27-31) (2:102) (3:85-88) (4:43-44) (5:173-174)

47. The factor(s) that influence the strength of the signal received are:
a. Distance from the transmitter
b. Alignment of the receiver core
c. Battery condition
d. All of the above
(1:27-28) (4:43) (5:187)

48. A trained avalanche dog:
a. Is easy to keep working at peak efficiency during the season
b. Is not distracted by urine or food odors
c. Must be a Saint Bernard
d. Can search about 8 times as fast as a 20 rescuer probe line
(1:78) (3:82-83) (4:44) (5:193-194)

49. What are the two most common injuries to an avalanche victim?
(1:180-181) (2:10) (3:65) (4:45) (5:177)

50. What is the most common injury to the victim of an avalanche?
(1:180-181) (2:10) (3:65) (4:45) (5:177)

51. The probability of locating an avalanche victim alive after being buried for 30 minutes is:
a. 25 percent
b. 75 percent
c. 50 percent
d. 15 percent
(1:178) (2:106) (3:65) (4:4) (5:177)

52. The most common cause of death in avalanches is:
a. Fright
b. Shock
c. Suffocation
d. Mechanical injuries
(1:180-181) (2:10) (3:65) (4:45) (5:177)

53. Emergency care for hypothermia includes:
    a. Adding heat to victim's extremities
    b. Prevent further heat loss – shelter, blankets
    c. Remove and replace wet clothes
    d. Add heat to whole body
    e. Give small amounts of alcohol
    f. Give warm fluids
    g. Feed candy or sweet foods
    h. Brush teeth after feeding candy
    i. Handle gently to avoid fibrillation
    (1:181) (2:111) (3:74) (4:45-46) (5:181)

54. Name three major causes of death in an avalanche.
    (1:180-181) (3:65,72-75) (4:45-46) (5:177)

55. After what time interval is a buried person's chance of survival reduced to 50 percent? (1:13) (2:106) (3:66) (4:4) (5:178)

CONTROL STRATEGIES/PROTECTION

1. Which class of stability evaluation is most accurate?
   (3:32) (5:124,162)

   Which is used at developed ski areas?
   (3:31-35,42) (5:70,162)

2. Slope closure is employed as the last control measure resorted to when other effective, timely, measures have been either exhausted or deemed not feasible. True or False? (5:200-201)

3. Name three stabilization methods for avalanche control. (5:207-220)

4. Briefly state the difference between "avalanche stabilization" and "avalanche defense." (5:225-237)

5. A _____ *is* the best and most economical avalanche barrier from a long-range viewpoint. (5:234-235)

6. What is the objective of using explosives in avalanche hazard control? (5:207-218)

7. Describe the advantages and disadvantages of test skiing as a control measure. (1:100) (2:53) (3:32) (5:130)

8. Ways to lessen avalanche hazards are:
   a. Forbid the use of the area
   b. Remove all triggers
   c. Restrict the use of the area
   d. Use artificial snow
   e. Control hazard
   f. Educate and train
   g. Regulate temperature in snowpack
   (5:173,200,207)

9. Describe the advantages and disadvantages of each of the types of control measures. What is the basic reason any one of them is used?
   a. Test Skiing
   b. Protective Skiing
   c. Hand Charges and Explosives
   d. Artillery
   e. Avalauncher
   (1:100) (2:53) (3:32) (5:130,207-218)

10. What are the avalanche size classifications? United States and Canada (1:189) (5:252-253)

11. Define and give examples of the two types of protective installations.
   a. Diversionary barriers
   b. Stabilization barriers/Supporting structures
   (5:226-238)

12. The optimal solution for protection from avalanches (although not always possible) is: (5:235-236)

13. Compaction of snow slopes:
   a. Reduces bonding and so increases avalanche potential
   b. Increases avalanche potential due to formation of glide planes
   c. Increases density and causes greater strength, reducing avalanche potential
   (1:66-67) (2:33) (5:207)