

Smoke on the Section

Problem Booklet

Instructions

Read the problem situation described on the next page. Study the map until you understand the location of the miners and equipment in the problem. Next, answer each of the 10 questions. Do them one at a time. Don't jump ahead, but you may look back to earlier questions and answers. For most of the questions, choose only one answer unless you are told to "Try again!". A few questions ask you to select as many answers as you think are correct. Follow the instructions for each question.

After you have selected a choice to a question, look up its number on the answer sheet. Select your answer to each question by rubbing the developing pen between the brackets on the answer sheet. A hidden message will appear and tell you if you are right. When you have finished, you will learn how to score your performance.

Background

The mine, which is above the water table, is wet and has a 52 inch seam.

This is an 8 entry super section, with 2 continuous miners, and 2 shuttle cars.

You (Cecil) are a continuous miner operator on the West Mains Section.

You are slim, strong, and in good shape (5' 10" and 145 lbs). Big Tim, your helper, is overweight and in poor physical condition (6' 2" and 275 lbs.).

The shuttle car roadway is littered with a large accumulation of loose coal and coal dust.

Problem

You and Big Tim have just trammed the continuous miner to the face of the #1 entry. Your boss comes by and tells you that one shuttle car with a damaged cable is stalled between #3 and #4 in the last open crosscut, and the other is stuck near the feeder. You and Big Tim decide to replace a few worn bits while waiting. While pulling the bits, you smell something burning. Tim tells you the smell is probably just from heat shrinking the boot over the splice on the shuttle car cable. After installing the bits, you go to the mouth of the #1 entry to establish face ventilation. Your eyes begin to burn and water. You look down #1 and across to #2 and see a cloud of thick, black smoke. The smoke is going by the mouth of #1 and out the return. You immediately yell to Tim and tell him about the smoke. After studying the map on the next page, turn the page and answer the first question.

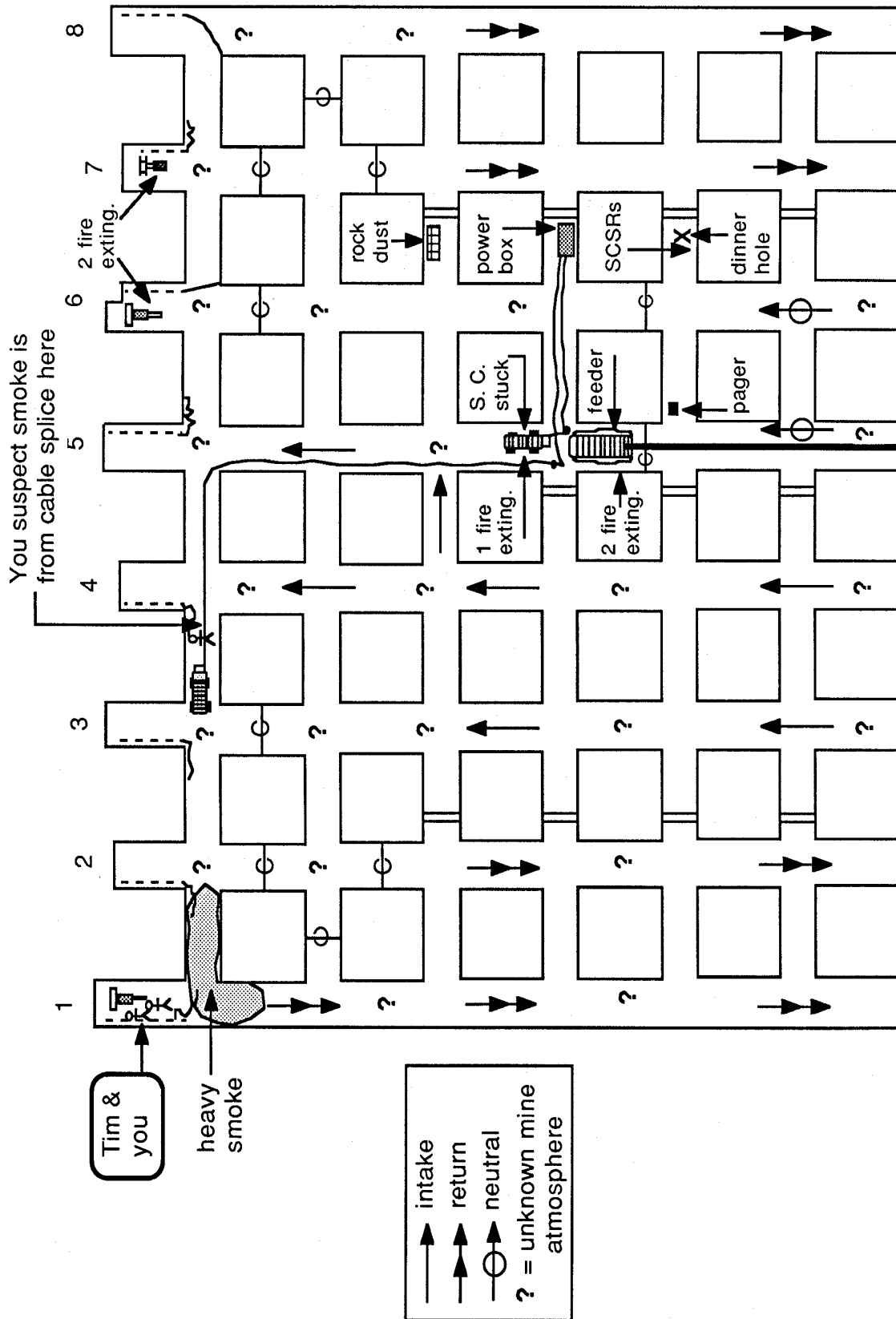


Figure 1: Your and Tim's position on the section, with the smoke cloud you can see and the possible locations of smoke marked with question marks

Question A

After telling Tim about the smoke, what should you do first? (Choose only ONE unless you are told "Try again!")

1. Take your filter self-rescuer off your belt and have it ready in case you need it.
2. Sit down and wait for instructions from your face boss.
3. Put on your filter self-rescuer and tell Tim to do the same.
4. Take a deep breath and head for intake air quickly.

Question B

As you are putting on your filter self-rescuer (FSR), Big Tim tells you that he has left his FSR on the other miner, which is broken down in the #6 entry. What would you do now? (Choose only ONE unless you are told to "Try again!")

5. Finish putting on your FSR, but stop and think before taking further action.
6. Share your FSR with Tim by taking turns breathing through it, and dash through the smoke.
7. Tell Tim to stay put. Finish putting on your FSR and go across the section to get Tim's FSR.
8. Leave your FSR off and wait for help with Tim.
9. Offer your FSR to Big Tim and have him go for help.

Question C

Smoke is slowly drifting toward the #1 face where you and Tim were working. You must act quickly. What would be the best thing for you to do now? (Choose only ONE unless you are told to "Try again!")

10. Give Tim your FSR. You're in better physical condition than he is. You can take more smoke than he can.
11. Have Tim put a damp rag over his nose and mouth. Lead him through the smoke to fresh air.
12. Leave Tim in the entry while you go through the smoke for help.
13. Drag the line curtain at the mouth of #1 to Tim. Have him hang it across the entry near the end of the miner boom and stay behind it. You go for help.

Question D

To limit his exposure to smoke and carbon monoxide (CO), what should Tim do as he waits for help? (Select as MANY as you think are correct.)

14. Stay as near the floor and as close to the face as is safely possible.
15. Climb on top of the miner to get above the smoke.
16. Stay next to the rib.
17. Hang a second line brattice just in by the first one.
18. Stay near the curtain(s). Lift the curtain(s) often to check for smoke.
19. Use the wash down hose to spray the curtain(s).

When you have made your selection(s), do the next question.

Question E

As you step into the smoke to go for help, your eyes begin to burn and water. Look at Figure 2 on the next two pages. Which path would you take? (Choose only ONE unless you are told to "Try again!")

20. Route A

21. Route B

22. Route C

23. Route D

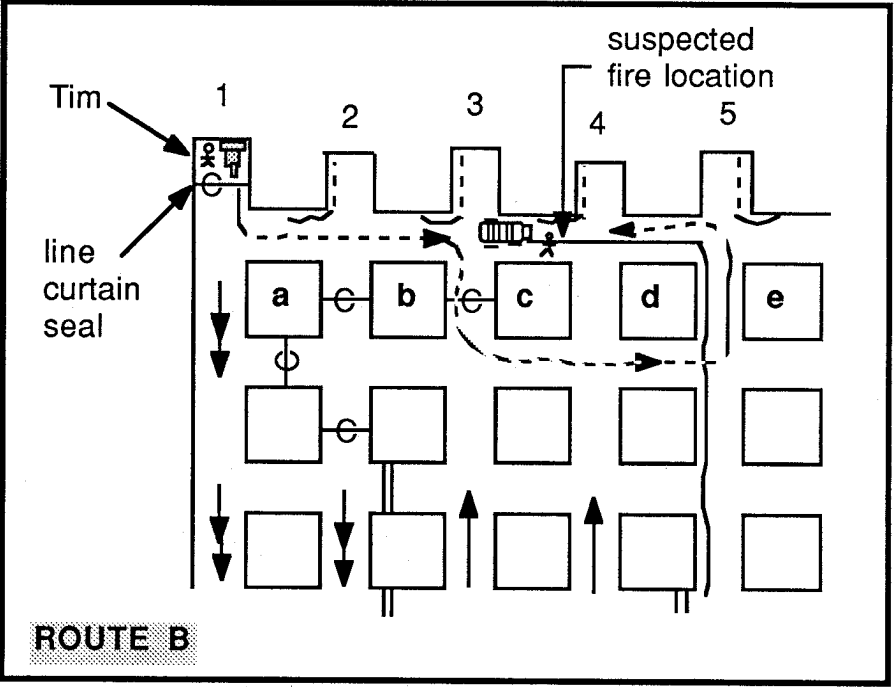
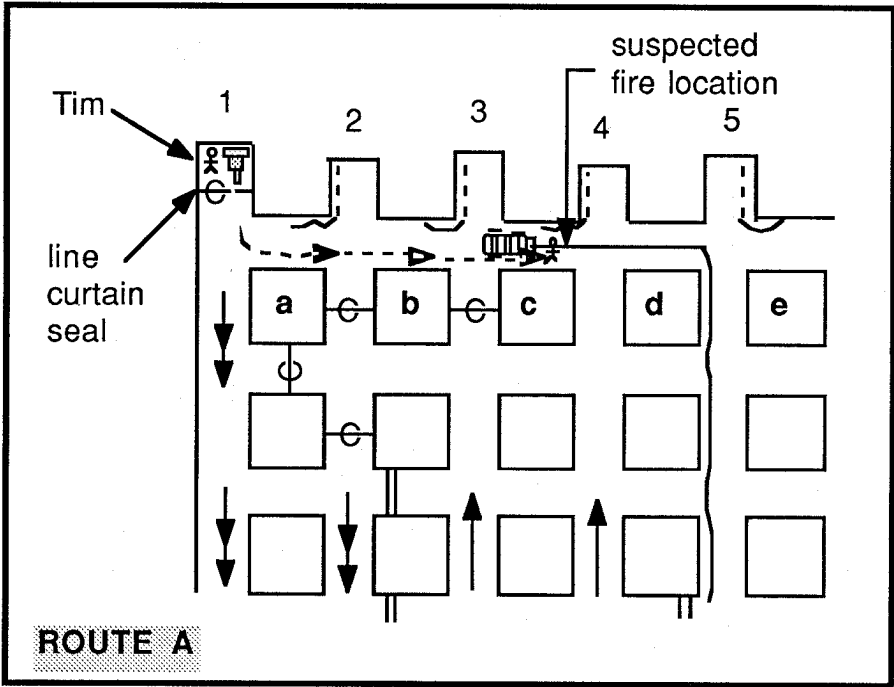


Figure 2: Four alternative routes

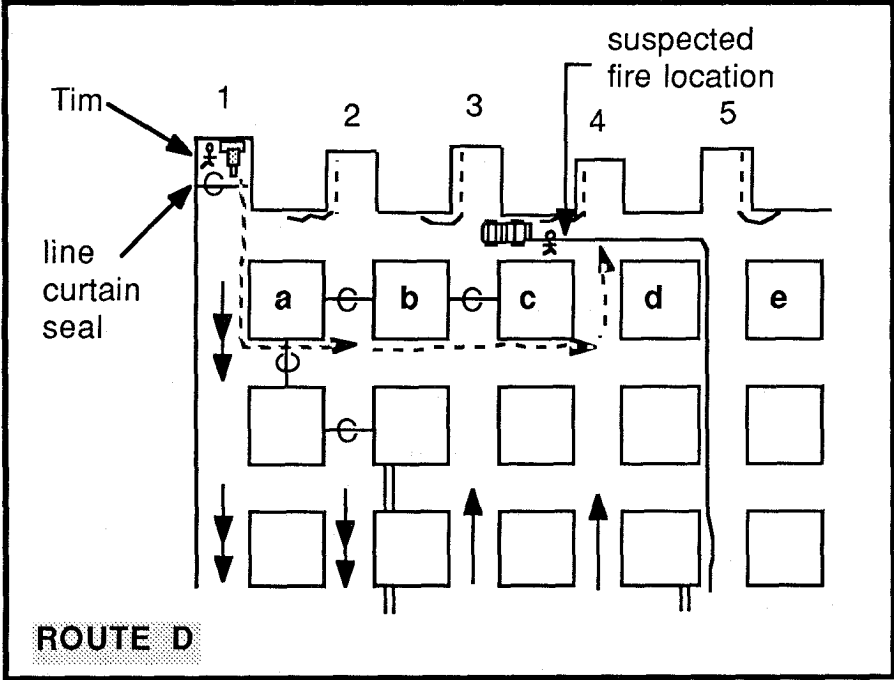
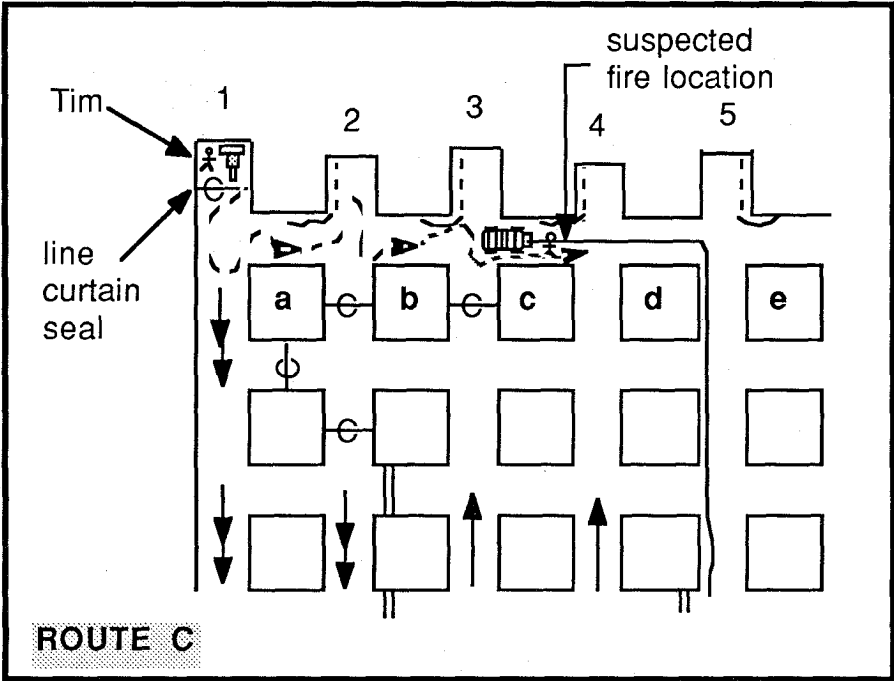


Figure 2: (continued)

Question F

As you look up the #4 entry (see Figure 3 on the next page) on your way for help, you see a fire. You continue along the pathway shown in Route D in Figure 2 on page 10. You see Matt Mitchell, the repairman, lying on his back on the fresh air side of the fire. His hard hat is off and is lying beside a slab of roof rock. A propane torch lies burning in a large puddle of hydraulic oil, caused by a burst roof bolter hose. The oil, cable, loose coal, and the rib are burning. The fire looks fairly small, but you can't be sure. The smoke blocks your view. You quickly examine Matt. As you do, he comes to and tells you he's OK. Matt has a large lump and small laceration on his forehead. His arm is crooked. Using a clothing drag you pull him a safe distance from the fire. At this point, what would you do? (Choose only ONE unless you are told to "Try again!")

24. Fight the fire.
25. Take Matt's FSR and go back to give it to Tim so he can escape to fresh air.
26. Begin treating Matt's injuries.
27. Go toward the dinner hole for help.
28. Leave Matt and get Tim's FSR off the miner in the #6 entry.

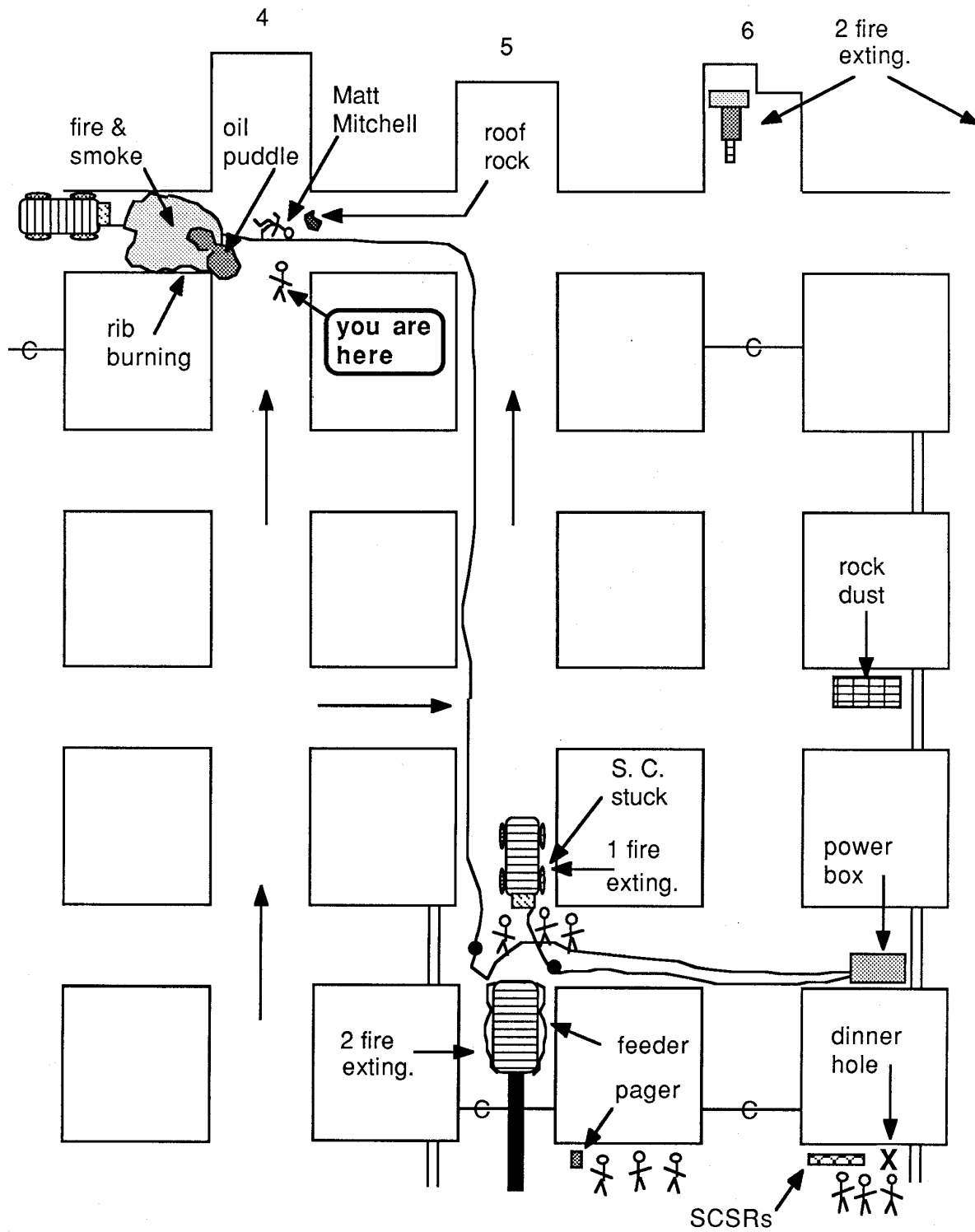


Figure 3 Location of fire, Matt, and you

Question G

You tell the section foreman what you've seen and done. What should he do now?
(Select as MANY as you think are correct.)

29. Tell four of you to grab fire extinguishers and rock dust and go fight the fire.
30. Account for all crew members.
31. Send one miner to call outside and report the fire.
32. Tell two of you to put on SCSRs, take one with you, and go for Tim.
33. Send someone to give first-aid to Matt.
34. Send one miner to check to see that the power to the shuttle car whose cable is on fire has been knocked.
35. Send two miners to start taking apart the water line to the continuous miner in #6, and getting a hose ready to attack the fire with water from the fresh air side, in case this becomes necessary.
36. Tell two miners to short-circuit the air and direct the smoke away from the #1 face where Tim is waiting for help.
37. Send all of you to the dinner hole, to meet up with the others, and exit the mine.
38. Send one miner to get extra fire extinguishers and rock dust.

When you have made your selection(s), do the next question.

Question H

You get the fire out. The air soon clears. You go over to #1 entry in fresh air. Big Tim is fine. He says his double, wet line brattices kept out the smoke. Your quick thinking and actions saved him and the mine section from harm. Big Tim says from now on he is going to carry his FSR.

Now think about the whole problem. What do you think were the major errors that contributed to this fire? (Select as MANY as you think are correct.)

- 39. Using a propane torch to help make a splice.
- 40. Matt's failure to check the top at the place he was working.
- 41. Failure to clean up the puddle of hydraulic oil from the roof bolter.
- 42. Allowing excess loose coal and coal dust to accumulate.
- 43. Using a flammable trailing cable.

When you have made your selection(s), do the next question.

Question I

The poisonous gas in this problem was carbon monoxide (CO). Which of the following statement(s) about CO are true? (Select as MANY as you think are correct.)

- 44. CO displaces the oxygen normally carried by the hemoglobin of the blood.
- 45. CO has an acid taste in high concentrations.
- 46. CO is slightly heavier than air and therefore is found next to the floor.
- 47. CO is explosive.
- 48. CO is produced by combustion (e.g., by mine fires and explosions, blasting, smoldering materials, and internal combustion engines).
- 49. You can survive approximately 90 minutes in a concentration of 0.5% CO.
- 50. CO is not toxic.
- 51. CO is sometimes called "white damp."
- 52. CO will irritate eyes, nose, and throat at high concentrations.

When you have made your selection(s), do the next question.

Question J

List all the violations of state and federal laws and your company rules that you can find in this problem.

Scoring your performance

1. Count the total number of responses you colored in that were marked "correct." Write this number in the first blank on the answer sheet.
2. Count the total number of "incorrect" responses you colored in. Subtract this number from 30. Write the difference in the second blank on the answer sheet.
3. Add the numbers on the first and second blanks. This is your score.

The best possible score of 52 results from selecting all the correct answers and no wrong answers. The worst possible score of zero results from selecting all the wrong answers and no correct answers.