

Audel™

**Questions and Answers
for Plumbers'
Examinations**

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for Plumbers'
Examinations**

All New 4th Edition

Rex Miller
Mark Richard Miller
Jules Oravetz



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Foreword

Plumbing and pipefitting play a major role in the construction of every residential, commercial, and industrial building. Of all the building trades, none is as essential to the health and well-being of the community in general, and to the building occupants in particular, as the plumbing trade. It is the obligation and responsibility of every plumber to uphold this vital trust in the installation of plumbing materials and equipment.

All plumbing installations are governed by rules and regulations set forth in plumbing codes that have been adopted from standards established at either the local, state, or national level. In addition, each installation is subject to inspection by a licensed inspector to ensure that all rules and regulations have been completely satisfied.

This book is offered as a guide in the preparation for plumbers' license examinations—for apprentice, journeyman, or master. These examinations are given periodically by local licensing authorities, that is, by municipal, county, state, or other agencies having legal jurisdiction over the licensing and inspection work done by plumbers.

In most localities, a plumber is required by law to secure a license from the enforcing authority in his or her area. This book supplies the license applicant with the required theoretical knowledge and a thorough understanding of the definitions, specifications, and regulations of the recommended minimum requirements for plumbing by the National Bureau of Standards and by a variety of state plumbing codes.

Numerous examples in the form of questions and answers are presented throughout this book, thereby enabling the license applicant to gain a complete knowledge of the types of questions asked in the plumbers' examinations. The importance of careful study to master the fundamental principles underlying each question and answer should be thoroughly impressed on all candidates for licenses in the various grades. Only through this process can the license applicant prepare himself or herself to solve any new or similar problem on the examination.

The interpretations of the various national, state, and local plumbing codes are those of the authors and are not necessarily the official observations of the various plumbing code committees, officials, and representatives.

Rex Miller, Ed.D.
Mark R. Miller, Ph.D.
Jules Oravetz, P.E.

Acknowledgments

No book can be written without the aid of others. It takes a great number of persons to put together, between two covers, the information available about any particular technical trade. The trade of plumbing is no exception. Many firms have contributed to the illustrations and the text of the book. Those involved with the editing and production are listed on the copyright page.

The authors would like to thank everyone involved for his or her contributions. Some of the firms that supplied technical information and illustrations are listed here:

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Josam Manufacturing Company
Jet, Inc.
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About the Authors

Rex Miller was a Professor of Industrial Technology at The State University of New York, College at Buffalo for more than 35 years. He has taught on the technical school, high school, and college level for more than 40 years. He is the author or coauthor of more than 100 textbooks ranging from electronics through carpentry and sheet metal work. He has contributed more than 50 magazine articles over the years to technical publications. He is also the author of seven Civil War regimental histories.

Mark Richard Miller finished his B.S. degree in New York and moved on to Ball State University, where he obtained his master's and went to work in San Antonio. He taught in high school and went to graduate school in College Station, Texas, finishing the doctorate. He took a position at Texas A&M University in Kingsville, Texas, where he now teaches in the Industrial Technology Department as a Professor and Department Chairman. He has coauthored seven books and contributed many articles to technical magazines. His hobbies include refinishing a 1970 Plymouth Super Bird and a 1971 Roadrunner.

Jules A. Oravetz was a professional engineer and the author of numerous books for the plumbing and pipefitting trades, as well as those for building, grounds, and garden maintenance.

Introduction

In a question-and-answer format, the first question would be what is *plumbing*? It is something that has been with us since birth. We have been using it without giving it a thought, that is, unless something goes wrong. This complicated system, like any system, requires periodic time and effort expended on it to maintain and repair system-wide problems. In most cases, these problems are in need of immediate attention. This is where the plumber becomes the key to the proper operation of the more widespread system.

Plumbing can be defined as a system of pipes and fixtures installed in a building for the distribution and use of potable (drinkable) water and the removal of water-borne wastes. It is usually distinguished from water and sewage systems that serve a group of buildings or a city. Each building has its own system of pipes and fixtures designed to serve the purpose assigned to that building.

Historically

The greatest problem of every civilization in which the population has been centralized in cities and towns has been the development of adequate plumbing systems. In certain parts of Europe, the complex aqueducts built by the Romans to supply their cities with potable water can still be seen. However, the early systems built for the disposal of human wastes were less elaborate. Human wastes were often transported from the cities in carts or buckets, or else discharged into an open, water-filled system of ditches and that led from the city to a lake or stream. In rural areas, people dug a hole and used it for the disposal of human waste. Some of these still exist. For privacy, they usually put some kind of shelter, or outhouse, over the hole. However, these outhouses were sometimes built on a hill above the living quarters. Drainage from the waste disposal worked its way to the water supply (well water) that served the family down the hill. This created many cases of diphtheria and other diseases that sickened and killed those using the well water.

Improvements

Plumbing system improvements were very slow in coming. Virtually no progress was made from the time of the Romans until the nineteenth century. Relatively primitive sanitation facilities were inadequate for the large, crowded population centers that sprang up during the Industrial Revolution. This gave way to outbreaks of typhoid fever and dysentery that often spread. The consumption of water contaminated with human wastes was widespread. Eventually, the

epidemics were curbed by the development of separate, underground water and sewage systems that eliminated open sewage ditches. In addition, plumbing fixtures were designed to handle potable water and water-borne wastes within buildings.

Modern Systems

Methods of water distribution vary. For towns and cities, municipally or privately owned water companies treat and purify water collected from wells, lakes, rivers, and ponds, and distribute it to individual buildings. In rural areas, water is commonly obtained directly from individual wells.

In most cities, water is forced through the distribution system by pumps. In rare instances, the source of water is located in mountains or hills above a city, and the pressure generated by gravity is sufficient to distribute water throughout the system. In other cases, water is pumped from the collection and purification facilities into elevated storage tanks and then allowed to flow throughout the system by gravity. But in most municipalities, water is pumped directly through the system. Elevated storage tanks may also be provided to serve as pressure-stabilization devices and as an auxiliary source in the event of pump failure or of a catastrophe (such as fire) that might require more water than the pumps or the water source are able to supply.

Water Pressure

The pressure developed in the water supply system and the friction generated by the water moving through the pipes are the two factors that limit both the height to which water can be distributed and the maximum flow rate available at any point in the system.

Waste Disposal

A building's system for waste disposal has two parts: the *drainage system* and the *venting system*. The drainage portion comprises pipes leading from various fixture drains to the central main, which is connected to the municipal or private sewage system. The venting system consists of pipes leading from an air inlet (usually the building's roof) to various points within the drainage system. It protects sanitary traps from siphoning or blowing by equalizing the pressure inside and outside the drainage system.

Fixtures

Sanitary fixture traps provide a water seal between the sewer pipes and the rooms in which plumbing fixtures are installed. The most commonly used sanitary trap is a U bend, or dip, installed in the

drainpipe adjacent to the outlet of each fixture. A portion of the waste water discharged by the fixture is retained in the U, forming a seal that separates the fixture from the open drainpipes.

A Career as a Plumber

When considering a career as a plumber, keep in mind the following:

- Job opportunities should be excellent, because not enough people are seeking training.
- Most workers learn the trade through 4 or 5 years of formal apprenticeship training.
- Pipelayers, plumbers, pipefitters, and steamfitters make up one of the largest and highest paid construction occupations.

The Plumber's Work

Most people are familiar with plumbers who come to their home to unclog a drain or install an appliance. In addition to these activities, however, plumbers install, maintain, and repair many different types of pipe systems. For example, some systems move water to a municipal water treatment plant and then to residential, commercial, and public buildings. Other systems dispose of waste, provide gas to stoves and furnaces, or supply air-conditioning. Pipe systems in power plants carry the steam that powers huge turbines. Pipes also are used in manufacturing plants to move material through the production process.

Plumbers are considered as being in a trade, generally specializing in one of four areas. *Pipelayers* lay clay, concrete, plastic, or cast-iron pipe for drains, sewers, water mains, and oil or gas lines. Before laying the pipe, pipelayers prepare and grade the trenches either manually or with machines. *Plumbers* install and repair the water, waste disposal, drainage, and gas systems in homes and commercial and industrial buildings. Plumbers also install plumbing fixtures, bathtubs, showers, sinks, and toilets in heating and cooling buildings. They also install automatic controls that are increasingly being used to regulate these systems. Some *pipefitters* specialize in only one type of system. *Steamfitters*, for example, install pipe systems that move liquids or gases under high pressure. *Sprinklerfitters* install automatic fire sprinkler systems in buildings.

Pipelayers, plumbers, pipefitters, and steamfitters use many different materials and construction techniques, depending on the type of project. For example, residential water systems incorporate copper, steel, and plastic pipe that can be handled and installed by one or two workers. Municipal sewerage systems, on the other hand, are

made of large cast-iron pipes; installation normally requires crews of pipefitters. Despite these differences, all pipelayers, plumbers, pipefitters, and steamfitters must be able to follow building plans or blueprints and instructions from supervisors, lay out the job, and work efficiently with the materials and tools of the trade. Computers often are used to create blueprints and plan layouts.

When construction plumbers install piping in a house, for example, they work from blueprints or drawings that show the planned location of pipes, plumbing fixtures, and appliances. They first lay out the job to fit the piping into the structure of the house with the least waste of material and within the confines of the structure. They then measure and mark areas in which pipes will be installed and connected. Construction plumbers also check for obstructions such as electrical wiring and, if necessary, plan the pipe installation around the problem.

Sometimes plumbers must cut holes in the walls, ceilings, and/or floors of a house. For some systems, they may hang steel supports from ceiling joists to hold the pipe in place. To assemble a system, plumbers (using saws, pipe cutters, and pipe-bending machines) cut and bend lengths of pipe. They connect lengths of pipe with fittings, using methods that depend on the type of pipe used. For plastic pipe, plumbers connect the sections and fittings with adhesives. For copper pipe, they slide a fitting over the end of the pipe and solder it in place with a torch.

After the piping is in place, plumbers install the fixtures and appliances and connect the system to the outside water or sewer lines. Finally, using pressure gages, they check the system to ensure that the plumbing works properly.

Working Conditions for Plumbers

Because plumbers frequently must lift heavy pipes, stand for long periods, and sometimes work in uncomfortable or cramped positions, they need physical strength as well as stamina. They also may have to work outdoors in inclement weather. In addition, they are subject to possible falls from ladders, cuts from sharp tools, and burns from hot pipes or soldering equipment.

Plumbers engaged in construction generally work a standard 40-hour week. Those involved in maintaining pipe systems (including those who provide maintenance services under contract) may have to work evening or weekend shifts, as well as be on-call. These maintenance workers may spend quite a bit of time traveling to and from work sites.

Details of Employment

Plumbers constitute one of the largest construction occupations, holding about 568,000 jobs in the year 2000. About 52 percent worked for plumbing, heating, and air conditioning contractors engaged in new construction, repair, modernization, or maintenance work. Others did maintenance work for a variety of industrial, commercial, and government employers. For example, those working as pipefitters were employed as maintenance personnel in the petroleum and chemical industries, where manufacturing operations require the moving of liquids and gases through pipes. About one of every seven pipelayers, plumbers, pipefitters, and steamfitters was self-employed.

Jobs for this trade consisting of plumbers, pipelayers, pipefitters, and steamfitters are distributed across the country in about the same proportion as the general population.

Training, Other Qualifications, and Advancement

Virtually all pipelayers, plumbers, pipefitters, and steamfitters undergo some type of apprenticeship training. Many programs are administered by local union-management committees made up of members of the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada, and local employers who are members of the Mechanical Contractors Association of America, the National Association of Plumbing-Heating-Cooling Contractors, or the National Fire Sprinkler Association.

Nonunion training and apprenticeship programs are administered by local chapters of the Associated Builders and Contractors, the National Association of Plumbing-Heating-Cooling Contractors, the American Fire Sprinkler Association, or the Home Builders Institute of the National Association of Home Builders.

Apprenticeships (both union and nonunion) consist of 4 or 5 years of on-the-job training, in addition to at least 144 hours per year of related classroom instruction. Classroom subjects include drafting and blueprint reading, mathematics, applied physics, chemistry, safety, and local plumbing codes and regulations. On the job, apprentices first learn basic skills, such as identifying grades and types of pipe, using the tools of the trade, and safely unloading materials. As apprentices gain experience, they learn how to work with various types of pipe and how to install different piping systems and plumbing fixtures. Apprenticeship gives trainees a thorough knowledge of all aspects of the trade. Although most pipelayers,

plumbers, pipefitters, and steamfitters are trained through apprenticeship, some still learn their skills informally on the job.

Applicants for union or nonunion apprentice jobs must be at least 18 years old and in good physical condition. Apprenticeship committees may require applicants to have a high school diploma or its equivalent. Armed Forces training in pipelaying, plumbing, and pipelining is considered very good preparation. In fact, persons with this background may be given credit for previous experience when entering a civilian apprenticeship program. Secondary or postsecondary courses in shop, plumbing, general mathematics, drafting, blueprint reading, computers, and also physics are good preparation.

Although there are no uniform national licensing requirements, most communities require plumbers to be licensed. Licensing requirements vary from area to area, but most localities require workers to pass an examination that tests their knowledge of the trade and of local plumbing codes.

Some pipelayers, plumbers, pipefitters, and steamfitters may become supervisors for mechanical and plumbing contractors; others go into business for themselves.

Job Outlook for Plumbers

Job opportunities are expected to be excellent, as increased demand for skilled pipelayers, plumbers, pipefitters, and steamfitters is expected to outpace the supply of workers trained in this craft. Employment of pipelayers, plumbers, pipefitters, and steamfitters is expected to grow about as fast as the average for all occupations through the year 2010. In addition, many potential workers may prefer work that is less strenuous and has more comfortable working conditions. Well-trained workers will have especially favorable opportunities.

Demand for plumbers will stem from building renovation, including the increasing installation of sprinkler systems; repair and maintenance of existing residential systems; and maintenance activities for places having extensive systems of pipes (such as power plants, water and wastewater treatment plants, pipelines, office buildings, and factories). However, the growing use of plastic pipe and fittings (which are much easier to install and repair than other types) increasingly efficient sprinkler systems, and other new technologies will restrict the number of new jobs. In addition to those resulting from employment growth, many positions will become available each year from the need to replace experienced workers who retire, die, or leave the occupation for other reasons.

Traditionally, many organizations with extensive pipe systems have employed their own plumbers to maintain equipment and keep systems running smoothly. But, to reduce labor costs, many of these firms no longer employ a full-time, in-house plumber. Instead, when they need a plumber, they rely on workers provided under service contracts by plumbing contractors.

Construction projects provide only temporary employment. So, when a project ends, plumbers working on the project may experience bouts of unemployment. Because construction activity varies from area to area, job openings, as well as apprenticeship opportunities, fluctuate with local economic conditions. However, employment of pipelayers, plumbers, pipefitters, and steamfitters generally is less sensitive to changes in economic conditions than is that of some other construction trades. Even when construction activity declines, maintenance, rehabilitation, and replacement of existing piping systems, as well as the increasing installation of fire sprinkler systems, provide many jobs for plumbers.

Plumber Earnings

Plumbers, pipelayers, pipefitters, and steamfitters are among the highest paid construction occupations; in the year 2000, median hourly earning of plumbers, pipefitters, and steamfitters was \$18.19. The middle 50 percent earned between \$14.00 and \$24.24. The lowest 10 percent earned less than \$10.71, and the highest 10 percent earned more than \$30.06. Median hourly earnings in the industries employing the largest numbers of plumbers in 2000 are shown here:

Plumbing, heating, and air-conditioning	\$18.20
Nonresidential building construction	\$17.80
Heavy construction, except highway	\$17.26
Local government	\$17.12
Miscellaneous special trade contractors	\$16.92

In 2000, median hourly earning of plumbers was \$13.20. The middle 50 percent earned between \$10.17 and \$17.71. The lower 10 percent earned less than \$8.61, and the highest 10 percent earned more than \$23.16.

Apprentices usually begin at about 50 percent of the wage rate paid to experienced plumbers. Wages increase periodically as skills improve. After an initial waiting period, apprentices receive the same benefits as do experienced plumbers.

Many plumbers are members of the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada.

Occupations Related to Plumbing

Other occupations in which workers install and repair mechanical systems in buildings are boilermakers; electricians; elevator installers and repairers; heating, air-conditioning, and refrigeration mechanics and installers; industrial machinery installation, repair, and maintenance workers; sheet-metal workers; and stationary engineers and boiler operators.

Sources of Additional Information on Plumbing

For information about apprenticeships or work opportunities in pipelaying, plumbing, pipefitting, and steamfitting, contact local plumbing, heating, and air-conditioning contractors; a local chapter of the National Association of Plumbing, Heating, and Cooling Contractors; a local chapter of the Mechanical Contractors Association; a local chapter of the United Association of Journeymen and Apprentices in the United States and Canada; or the nearest office of your state employment service or apprenticeship agency.

For information about apprenticeship opportunities for pipelayers, plumbers, pipefitters, and steamfitters, contact the following:

- United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry, 901 Massachusetts Ave. NW, Washington, DC 20001.

For more information about training programs for plumbers, pipefitters, and steamfitters, contact the following:

- Associated Builders and Contractors, 1300 N. 17th St., Arlington, VA 22209. (www.abc.org)
- National Association of Home Builders, 15th and M St., NW, Washington, DC 20005. (www.hbi.org)

For general information about the work of pipelayers, plumbers, and pipefitters, contact the following:

- Mechanical Contractors Association of America, 1385 Piccard Dr., Rockville, MD 20850. (www.mcaa.org)
- National Association of Plumbing-Heating-Cooling Contractors, 180 S. Washington St., P.O. Box 6808, Falls Church, VA 22040.

For general information about the work of sprinklerfitters, contact the following:

- American Fire Sprinkler Association, Inc., 12959 Jupiter Rd., Suite 142, Dallas, TX 75238-3200. (www.firesprinkler.org)

- National Fire Sprinkler Association, Robin Hill Corporate Park, Rt. 22, Box 1000, Patterson, NY 12563. (www.nfsa.org)

Studying and Test-Taking

Following is a list of key points to keep in mind when preparing yourself to take a certification exam:

- *Make yourself a study schedule*—Assign yourself a period of time each day to devote to preparing for the exam. A regular time is best. But, the important thing is to study every day.
- *Study alone*—You can concentrate better when you work alone. Keep a list of questions you find puzzling. Mark the points you are unsure of so you can talk them over with a friend who is preparing for the same exam. Then, exchange ideas at a joint review session just before the test.
- *Remove all distractions*—Find a quiet, well-lit spot as far as possible from cell phones, telephones, televisions, and family activities. Arrange not to be interrupted.
- *Start at the beginning*—Read and underline points that you consider important. Make notes on the study page. Mark the pages that you think are important.
- *Pay particular attention to the instructional chapters*—Study the *Plumbing Code Definitions*, the *Dictionary of Plumbing Terms*, and the *Scrambled Dictionary of Equipment and Usage*. Study and learn the language of the field. Pay particular attention to the technique of eliminating wrong answers. This information is important to answering all multiple-choice questions.
- *Be sure to answer all the practice questions chapter by chapter*—Make notes on your weaknesses. Then, use textbooks to brush up.
- *Take previous exams*—When you think that you are ready, move on to the exams that were used in previous tests. If possible, be sure to answer an entire exam in one sitting. However, if you must divide your time, divide it into no more than two sessions per exam.

When taking the practice exams, treat them respectfully. Treat each as a dress rehearsal for the real thing. Time yourself accurately. Do not peek at the correct answer. Remember, you are taking these for practice. They will not be scored. They do not count. So, learn from them.

Important

Do not memorize questions and answers. Any question that has been released to the public will not, in most instances, be used again. Some of the questions may be very similar, but you will not be tested with these *exact* questions. These types of questions will give you good practice, but they will not have the same answers as any of the questions on your exam.

Taking an Exam

- *Arrive at the examination room early*—Getting a good start begins with being familiar with the room. If the room is too cold, too warm, or not well-ventilated, call these conditions to the attention of the person in charge.
- *Read the instructions carefully*—Test-takers lose points because they misread some important part of the directions. (Reading the incorrect choice instead of the correct choice is a good example.)
- *Don't be afraid to guess*—The best policy is to pace yourself, so that you can read and at least consider each question. Sometimes this does not work. However, most civil service exam scores are based only on the number of questions correctly answered. This means that a wild guess is better than a blank space. There is usually no penalty for a wrong answer. You just might guess right. If time is about to run out, mark all the remaining spaces with the same answer. According to the law of averages, some will be right. You have bought this book for practice questions. Part of your preparing for the test is learning to pace yourself so that you need not answer randomly at the end. Of course, far better than a wild guess is an educated guess. You make this kind of guess not when you are pressed for time but when you are not sure of the correct answer. Usually, one or two of the choices are obviously wrong. Eliminate the obviously wrong answers and try to reason among those remaining. Then, if necessary, guess from the smaller field. The odds of choosing a right answer increase if you guess from a field of two instead of from a field of four. When you make an educated guess or a wild guess in the course of the exam, you might want to make a note next to the question number in the test booklet. Then, if there is time, you can go back for a second look.
- *Reason your way through multiple-choice questions*—However, do it carefully and methodically.

Tips on Multiple-Choice Questions

Consider the following sample question:

1. On the job. Your supervisor gives you a hurried set of directions. As you start your assigned task, you realize that you are not quite clear on the directions given to you. The best action to take would be to _____.
 - a. continue with your work, hoping to remember the directions and do the best you can.
 - b. ask a coworker in a similar position what he or she would do.
 - c. ask your supervisor to repeat or clarify certain directions.
 - d. go on to another assignment.

In this question you are given four possible answers to the problem described. Though the four choices are all possible actions, it is up to you to choose the *best* course of action in this particular situation.

Choice (a) will likely lead to a poor result. Given that you do not recall or understand the directions, you would not be able to perform the assigned task properly. Keep choice (a) in the back of your mind until you have examined the other alternatives, though, because it could be the best of the four choices given.

Choice (b) is also a possible course of action, but is it the best? Consider that the coworker you consult has not heard the directions. How could he or she know? Perhaps his or her degree of incompetence is greater than yours in this area. Of choices (a) and (b), the better of the two is still choice (a).

Choice (c) is an acceptable course of action. Your supervisor will welcome your questions and will not lose respect for you. At this point, you should hold choice (c) as the best answer and eliminate choice (a).

The course of action in choice (d) is decidedly incorrect, because the job at hand would not be completed. Going on to something else does not clear up the problem; it simply postpones your having to make a necessary decision.

Now that you have made a careful consideration of all the choices given, choice (c) stands out as the best possible course of action. You should select choice (c) as your answer.

Every question is written about a fact or an accepted concept. This sample question indicates the concept that, in general, most supervisory personnel appreciate subordinates questioning directions

that may not have been fully understood. This type of clarification precludes subsequent errors on the part of the subordinates. On the other hand, many subordinates are reluctant to ask questions for fear that their lack of understanding will detract from their supervisor's evaluation of their abilities.

The supervisor has the responsibility of issuing orders and directions so that subordinates will be encouraged to ask questions. This is the idea on which the sample question was based.

Of course, if you were familiar with this concept, you would have no trouble answering this question. But, if you were not familiar with it, the method used here for eliminating incorrect choices and selecting the correct one should prove successful for you.

Now that you have seen how important it is to identify the concept and the key phrase of the question, you must understand that equally (or perhaps even more) important is identifying and analyzing the key word or words (the qualifying word) in a question. This word is usually an adjective or adverb. Some of the most common key words are as follows:

always	least	never
average	lowest	only
best	mainly	or
but	maximum	smallest
chiefly	minimum	sometimes
easiest	most	tallest
greatest	most likely	
highest	most nearly	

Knowing these key words is usually half the battle in understanding and answering all types of exam questions.

Next, you could use the elimination method on some additional questions. Consider this example:

2. On the first day you report for work after being appointed as a plumber's helper, you are assigned to routine duties that seem to you to be simple and easy that anyone can do. You should _____.
 - a. do your assignment in a routine manner while conserving your energies for more important work in the future.
 - b. say to your superior that you are capable of greater responsibility.
 - c. see these duties as an opportunity to become thoroughly familiar with the workplace.

- d. try to get someone to take care of your assignment until you have become thoroughly acquainted with your new associates.

Choice (a) will not lead to getting your assigned work done in the best possible manner. It would be your responsibility as a newly appointed plumber's helper to do a good job. The likelihood of getting to do more important work in the future following the approach stated in this choice is remote. However, since this is only choice (a), keep it in mind, because it may turn out to be the best of the four choices given.

Choice (b) is better than choice (a), because your superior may not be familiar with your capabilities at this point. Now you can drop choice (a) and retain choice (b), because, once again, it may be the best of the four choices.

The question clearly states that you are newly appointed. Would it not be wise to perform whatever duties you are assigned in the best possible manner? In this way, you would not only use the opportunity to become acquainted with procedures, but also to demonstrate your abilities. Choice (c) suggests a course of action that will benefit you and the location in which you are working. That is because it will get needed work done. Now drop choice (b) and retain choice (c). It is by far the better of the two choices.

The course of action in choice (d) is not likely to get the assignment completed. And, it will not improve your image with fellow apprentice plumbers. Choice (c), when compared to choice (d), is far better and, therefore, should be selected as the best choice.

Consider another multiple choice question:

- 3. An off-duty police officer in civilian clothes is riding in the rear of a city bus and notices two teenage boys tampering with the rear emergency door. The most appropriate action for the officer to take would be to _____.
 - a. tell the boys to discontinue their tampering, pointing out the dangers to life that their actions may create.
 - b. report the boys' actions to the bus operator and let the bus operator take whatever action is deemed best.
 - c. signal the bus operator to stop, show the boys his or her officer's badge, and then order them off the bus.
 - d. show the boys his or her officer's badge, order them to stop their actions, and take down their names and addresses.

Before considering answers to this question, you must accept the well-known fact that a police officer is always on duty to uphold the law, even though he or she may be technically off-duty.

In choice (a), the course of action taken by the police officer will probably serve to educate the boys and get them to stop their unlawful activity. Since this is only the first choice, we will hold it aside.

In choice (b), you have to realize that the authority of the bus operator in this instance is limited. He can ask the boys to stop tampering with the door, but that is all. The police officer can go beyond that point. Therefore, we drop choice (b) and continue to hold choice (a).

Choice (c) as a course of action will not have a lasting effect. What is to stop the boys from boarding the next bus and continuing their unlawful action? We therefore drop choice (c) and continue to hold choice (a).

Choice (d) may have some beneficial effect, but it would not keep the boys from continuing their actions in the future. When choice (a) is compared with choice (d), it appears that choice (a) is the better one overall, and therefore it is the correct answer.

The next question illustrates a type of question that has gained popularity in recent examinations and that requires a two-step evaluation. First, the reader must evaluate the condition in the question as being desirable or undesirable. Once the determination has been made, you are then left with making a selection from two choices instead of the usual four.

4. A visitor to an office in a city agency tells one of the office clerks that he has an appointment with the supervisor of the office, who is expected back shortly. The visitor asks for permission to wait in the supervisor's private office, which is unoccupied at the moment. For the office clerk to allow the visitor to do so would be _____.
- a. desirable. The visitor would be less likely to disturb the other employees or *to be* disturbed by them.
 - b. undesirable. It is not courteous to permit a visitor to be left alone in an office.
 - c. desirable. The supervisor may wish to speak to the visitor in private.
 - d. undesirable. The supervisor may have left confidential papers on the desk.

First of all, evaluate the course of action on the part of the office clerk of permitting the visitor to wait in the supervisor's office as being very undesirable. There is nothing mentioned of the nature of the visit. It may be for a purpose that is not friendly or congenial. There may be papers on the supervisor's desk that he or she does not want the visitor to see, or, for that matter, to even know about. Therefore, at this point, you have to decide between choices (b) and (d).

Courtesy is definitely not a question here. All visitors should be treated with courtesy as a general policy, but permitting the visitor to wait in the supervisor's office is not the only possible act of courtesy. Another comfortable place could be found for the visitor to wait.

Choice (d) contains the exact reason for evaluating this course of action as being undesirable, and when compared with choice (b), choice (d) is a far better answer.

Marking Your Answers

You should read all the choices before you mark your answer. It is statistically true that most errors are made when the last choice is the correct answer. Too many people mark the first answer that seems correct without reading through all the choices to find out which answer is *best*.

Read the following suggestions and review them before you take the actual exam. Become familiar with the suggestions. This will make you feel more comfortable with the exam and you will find them all useful when you are marking your choices.

- Mark your answers by completely blackening the answer space of your choice.
- Mark only *one* answer for each question, even if you think that more than one answer is correct. You must choose only one. If you mark more than one answer, the scoring machine will consider you wrong, even if one of your answers is correct.
- If you change your mind, erase completely. Leave no doubt as to which answer you have chosen.
- If you do any figuring on the test booklet or on scratch paper, be sure to mark your answer on the answer sheet.
- Check often to be sure that the question number matches the answer space number and that you have not skipped a space by mistake. If you do skip a space, you must erase all the answers after the skip and answer all the questions again in the right places.

- Answer every question in order, but do not spend too much time on any one question. If a question seems to be impossible, do not take it as a personal challenge. Guess and move on. Remember that your task is to answer correctly as many questions as possible. You must apportion your time so as to give yourself a fair chance to read and answer all the questions. If you guess at an answer, mark the question in the test booklet so that you can find it easily, if time allows.
- Guess intelligently, if you can. If you do not know the answer to a question, eliminate the answers that you know are wrong and guess from among the remaining choices. If you have no idea whatsoever of the answer to a question, guess anyway. Choose an answer other than the first. The first choice is generally the correct answer less often than the other choices. If your answer is a guess (either an educated guess or a wild one), mark the question in the question booklet so that you can give it a second try if time permits.
- If you happen to finish before time is up, check to be sure that each question is answered in the right space and that there is only one answer for each question. Return to the difficult questions that you marked in the booklet and try them again. There is no bonus for finishing early, so use all your time to perfect your exam paper.

With the combination of techniques for studying and test-taking, as well as the self-instructional course and sample examinations in this book, you are given the tools you need to score a high mark on your exam.