



Larson Design Group®

## Professional Engineering Exam Study Guide

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This study guide was created to help anyone seeking to pass the Professional Engineering Exam in the United States. Please share it with anyone you know who's interested in taking the exam, and pass it on to encourage and prepare future engineers.

Consider this guide a thorough starting point; it is a compilation of input and advice from Professional Engineers and their individual experiences. Everyone's study habits, approach, and experience of the exam is different. Therefore, please use this to supplement your own knowledge. Take into account your history in similar situations, time availability, and knowledge of yourself to develop a successful strategy that works for you.

Many of your questions will be answered while some may require supplemental information. Sections of this guide will need updating as time goes on and the exam evolves. However, the message of encouragement and persistence should remain the same. The engineering world is a small one and we need to ensure that safety and quality comes before all else. Fostering excellence in future generations of engineers is how we ensure a bright future for our profession.

Good luck and stay positive.

Jesse R. Calkins, PE

### Application Process

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This section is tailored for applicants taking the exam in Pennsylvania. However, the information provided is relevant for those applying in other states as well. Pennsylvania applications for professional licensure can be found here: <https://pcshq.com/?page=engineeringandrelatedfields.PA-main>

The first and most important piece of advice about applying to take the PE exam is to do it as early as possible. Most Professional Engineers suggest taking the exam as soon as you are eligible because relevant material becomes harder to remember with every year after college. If possible, it's also suggested that you take the exam independent of other large time commitments, such as having kids; this way you're not struggling to balance time between studying and other tasks. Getting your PE license will be a major life accomplishment, and putting all of your effort into it will be very rewarding.

Apply well before the application cutoff date. The application has a lot of parts to it and individual state application reviewers can vary in preference to the level of detail and format in which you need



to present your information, especially regarding the Amplified Record. Because of this, an application can go through multiple revisions and multiple reviews before being accepted and presented to the state board for approval. This is important to keep in mind because sign-ups to sit for the exam (after you are approved to do so) usually occur two months after the application due date.

Application due dates are **July 1<sup>st</sup>** and **December 1<sup>st</sup>** for the October and April exams respectively. Most engineers polled submitted their applications at least one month before the due date. Some of those who waited until the due date had to defer to the next exam date because one or more revisions were needed. Here are some points to remember when completing your application:

### References

- Let your references know you will be sending them a request for a reference. It's usually best to ask, "Would you be comfortable giving me a positive recommendation?" that way you can make sure you have the best references going to the board.
- Have all your information filled out when you send your reference forms to ensure everything is correct and matches your application.
- Your references will need to send the forms in on their own, so make sure you send them your request early. Give them about two weeks to complete it and check back in with them to make sure they sent it in.
- At least three (3) of your references must be licensed Professional Engineers. However, any RLA, PLS, Professional Geologist, or similarly qualified individual (as determined by the Board) can be listed for your remaining references if they provide a resume of their work showing their experience in an engineering field. Many companies have project managers keep an updated resume that they can include in proposals. This resume is usually enough to accompany a reference letter. Note that you will have to let your references know that they need to send this information along with their completed form.

### Amplified Record

- Your Amplified Record will take the most time to complete. It is best to keep a record of all the projects you work on and your role for each as soon as you receive your EIT certification, because recalling everything you worked on in four years is very difficult. If you haven't kept up with this, your company might keep a record in a timesheet program, such as Vision, that can list all the projects you've worked on since you started. If so, use that and limit it to the ones you worked ~50 or more hours on. If you worked on a lot of projects, this will help keep it to the most pertinent ones.
- Ask colleagues for help in how to detail your work experience.
- Every reviewer is different, but the most common reasons for needing to revise an Amplified Record are page formatting, not providing enough detail, and copy and pasting descriptions for projects. Be specific about what your role was on a project, the analyses and engineering



processes you used, standards and permits you had to follow and complete, and any unique engineering challenges that had to be solved. However, do not fluff it up with subjective phrases and stories to increase length; a short but concise record will get you a lot farther.

- Your Amplified Record must account for four (4) complete years of experience or equivalent education experience under the supervision of a Professional Engineer. Make sure you have every month in those four years accounted for with a project, especially if they are not consecutive. You do not need to list the specific months you spent working on each project, just make sure they are in a generalized chronological order.
- You cannot have more than one (1) year or more than one (1) employer represented on any one page of the Amplified Record. This is one of the more confusing rules about the Amplified Record. What it means is that on the side bar of the page, you cannot list more than 12 consecutive months, but you can use multiple pages to list several projects for one set of 12 consecutive months. Here is an example:
  - If you were with Company A from June 2014 to August 2015, put “From June 2014” and “To June 2015” in the side bar of page one, list Company A, and all the projects you worked on in those 12 months; use as many pages as needed. Then make the next set of pages read “From June 2015” and “To August 2015” with Company A and all the projects from those few months. When you start to list projects from when you moved to Company B, start a new page and use the same month that ended the last sheet, “From August 2015”, regardless of whether you started in the beginning, middle or end of the month. Continue this process of overlapping the last month of the previous page to the first month of the next page after every set of 12 months.
- When you go to list “# of Years & Months of Experience” on the other side of the page, if one range of months listed on the page (i.e. June 2014 to June 2015) has several pages of projects associated with it, only place the number of years and months on the first page of that set.
- Always make sure you have the most up-to-date application from your state’s website. Required information and formatting rules may change from year to year.

### Post-Application Process

- Submit your application to the PA Engineer Board with the application fee. All application organization, verification, and fee handling, as well the fee for the exam itself, is handled by Professional Credential Services (PCS). This is a third-party company hired by the state to handle and organize professional certifications. When your application is accepted, you will be contacted to make a profile on their website to track your application’s progress and payments.
- After submitting your application or revisions, it can take up to a month to hear an update. If you do not receive any updates, call the service line and they will tell you what part of your application they are waiting on or if it was submitted to the board for review. Differences in



marital status in the time between FE and PE applications have been known to cause some issues; also, unresponsive references and sometimes, though rarely, lost applications.

- The board may take a month or more to organize and approve all applications, which reinforces the recommendation of submitting the application as early as possible.
- After you are approved to take the PE exam, you will be directed to sign up for an exam date and location on the NCEES website. Create an NCEES login and pay the exam fee through your PCS account. If your exam specification is in Civil, Electrical and Computer, or Mechanical, you will be asked to specify an afternoon depth section on your NCEES account at a later time.
- When selecting a depth section, it is strongly recommended that you select the depth you have the most experience in. Do not select your depth because someone else said it was the easiest section or because you did better in those specific classes in college. Passing rates for every section change from exam to exam and have fluctuated from being the highest to the lowest rate in that discipline. The biggest advantage you will have when taking the exam is knowing how to use your references. Experience gets you used to using certain references, and if you can take the exam in that discipline, you are better off. For example, it is not recommended to try to learn OSHA standards for the Construction depth or highway design for the Transportation depth if you've never used the manuals before.

Always ask your colleagues for assistance and examples, and work with other applicants to determine the best way to execute the application process in your state.

## Studying for the Exam

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When studying for the exam, you have two main options: study on your own or take a review course. But there are many strategies, supplements, and combinations of each that can help develop the strategy that will work best for you. Everyone should generate a method that caters to their abilities, existing knowledge, time available, etc. Use this section to get a sense of the different approaches that make successful and unsuccessful study practices. Remember, things that work for one person may not work for another.

### Exam Format

The exam consists of 40 multiple choice questions in the morning section and 40 multiple choice questions in the afternoon section; however, some disciplines may vary in the number of questions (e.g. the Environmental exam currently consists of 50 morning and 50 afternoon questions.) Each section is 4 hours long with a one-hour lunch break in between them. For those taking a Civil, Electrical, or Mechanical specific exam, the morning section, called the general section, will pertain to all disciplines of that field, and the afternoon section will pertain only to the depth section you choose during registration. The information in this section of the guide is pooled mainly from those who have taken the exam in the current format.



Some variations in the number of questions in the morning and afternoon exist within different disciplines; however, the 4-answer multiple choice format remains constant. Also, there is no increase in difficulty from the morning to afternoon sections of any exam discipline. The disciplines without a depth selection will just cover different topics in the afternoon and the exams with depth sections will dive into those depth topics only.

A syllabus for each exam discipline is available on the NCEES website at the link below. They are fairly detailed about the topics covered on each exam as well as the number of questions that may be devoted to each topic. NCEES also specifies how many questions you can expect in each exam discipline. Print this out first to determine what topics you need to focus on before you start studying. You should use the syllabi to help you determine which depth section you should register for based on your experience. <http://ncees.org/exams/pe-exam/>

### **Taking a PE Review Course**

Here are some stats collected from those who took the current exam structure and passed. Of the people that passed the exam the first time, 60% had studied only by self-study and 40% had taken a PE review course. The passing rate for first-time examinees was 59% for those who used the self-study method and 100% for those who took a PE review course. In addition, of those who took the exam multiple times after having used only self-study, 29% switched and took a review course and passed on the next attempt.

In short, the stats do suggest a better result for those who take a PE review course. This is mostly because PE review courses are designed to help you focus on studying what you actually need to know for the exam. They cut out information that some study guides and reference materials include that is not contained in the exam so that your study time can be better utilized. They teach you how to think about exam questions, shortcuts for certain types of problems, and how to use your resources to solve a problem.

Most courses will have you purchase a specific reference book for the class that will help you study and that you can take into the exam for references and equations; self-study people should also get this book. For Civil Engineers it's the Civil Engineering Reference Manual (CERM) by Michael Lindeburg. This book will cover pretty much everything you learned in college including calculus, differential equations, and physics. However, these sections, as well as some parts of engineering-specific sections, don't need to be reviewed because they do not show up on the exam. A PE review course will give you topic-specific notes and let you know what types of problems always come up, which ones sometimes come up, and which ones will likely never show up on the exam. A course will also get you used to using the manual and other references to find necessary charts, tables, equations, etc. with valuable practice problems. These practice problems can likewise help identify the areas you need to focus on and learn as you go.



With most courses, you will get a different teacher for each major section of the exam syllabus. They will have years of experience teaching these topics to exam-takers, will know what problems you can expect to find, and will give you plenty of practice with those types of problems. Teachers also receive feedback from their students after the exam telling them what was on the exam and what they should change in their classes so that the next review course can be even more thorough. This constant refreshing of information helps future students maximize their time and learn more efficiently.

Here is a list of some review courses that people have taken in the past. There are many others available but these will give you a sense of when, where, and how you can take the course or find one that is best suited for your schedule. Times are subject to change.

- School of PE – Classes are available for several exam disciplines and can be taken on weekdays (M-Th 7-10:30pm) or weekends (Saturday and Sunday 10am-6pm). Onsite classes are located all over the country with varying meeting times. They do provide live online classes on weekends and weekdays that are separate from onsite classes. There is also an on-demand option that allows you to watch recorded lessons at your convenience. School of PE is a “guaranteed” course; if you attend every class and workshop and do not pass the exam, you can retake the course for free within the next year. Total class time ranges from 60-80 total hours depending on the exam discipline. For disciplines with depth sections, classes start reviewing the morning general sections, then you are assigned to a separate section which teaches, in more detail, your chosen afternoon depth exam. Free basic math and calculator training classes are also provided. 2016 prices range from \$1,290-1,490 depending on the exam discipline. Receive up to \$300 off the course fee if you register early.  
<http://www.schoolofpe.com/>
- ASCE Webinars – These live webinars are specific to the Civil exam and last 14 sessions, each two hours long and running twice a week from 3-5pm. You can also access each session via the on demand option at your own convenience. Total class time is 28 hours. 2016 prices are \$1,495 for ASCE members, \$2,045 for non-members.  
[http://www.asce.org/pe\\_exam\\_review/](http://www.asce.org/pe_exam_review/)
- PPI – These courses are available in several exam disciplines and occur as live webinars two times a week (specific days vary) from 7-10:20pm. Total class time ranges from 50-80 hours depending on the exam discipline. All lectures are made available on demand as well. This course is also a guaranteed course; if you attend every class and workshop and do not pass the exam, you can retake the course for free for the next exam. 2016 prices range from \$2,245-2,645 depending on the exam discipline and includes all required materials. Register early and receive up to \$550 off the package fee.  
<http://www.ppi2pass.com>

While you may have an easier time studying and taking the exam after attending a review course, without proper preparation outside of class, you might still struggle on exam day. That’s why it is



important to do the homework before every class so you can ask specific questions. The teachers select questions because they have shown up on the exam before. At the end of each week of classes, go through your notes and spend time highlighting, tabbing, or consolidating them into organized sets so you become familiar with the content. This will help you speed up the process of looking up information when you do practice problems as well as during the time-restricted exam.

Most courses provide a few weeks between the last class and the exam. Use this time to carry over the class schedule into a regular studying schedule. In the first week, redo as many homework problems from the course as you can, and remember to sample them from every class. This will help summarize all the course material and let you experience the most likely question types again in a more exam-like setting. Devote the rest of the time to doing as many practice problems and whole exams as you can. As you do so, keep your class notes tabbed and organized so you can find what you need to faster. If you need to, take some time off from work and focus on practicing questions and knowing your material front to back.

Note that your company may cover the tuition necessary for your PE course and possibly pay you for your class time. It's always a good idea to check with your HR to see what benefits they offer to their employees. This may also include covering the cost of your exam registration.

### **Self-Study**

While review courses may work for some people, others don't have the time to invest in a pre-scheduled course or simply don't learn well in a classroom setting. This section is a collection of successful self-study strategies which. They have been consolidated into three prevailing methods.

- **Problems First** - Start by working through practice problems and go through the reference manual, solution booklet, and other resources to find explanations and examples for how to solve them. Take note of the sections containing the equations, definitions, tables, and figures you use and organize them with tabs. It is more important to understand the concepts behind solving the problems than the values in the problems. As you do more problems, you will become more familiar with each style of question. Test yourself with practice exams until you feel comfortable with your knowledge and the pace at which you can solve each problem.
- **Read Everything** – This strategy focuses on reviewing your entire reference manual and equation book. You can generally skip the chapters on calculus, physics, etc., and start with the engineering-specific chapters. Set a pace to review a chapter a day or something comparable; calculate how much time you need to review everything and have time for practice problems and exams at the end. As you review each topic, take note of the topics you are familiar with and the ones you aren't as familiar with, then glance through the easier topics and spend more time on the latter. At the end of each chapter, do the practice problems for that section. Do not rush or run out of time as you will be giving yourself an avoidable disadvantage.



- Study Guides – Some people use study guides bought from NCEES or guides from review courses that provide an organized path of study for the exams. Some can be found on Amazon and can provide general and/or depth-specific help depending on your needs. You can use these to identify your weakest areas and learn what's relevant to the exam while not spending time or money on a course.

Most of those surveyed used a combination of all of the methods. Review each method to find out which one would be best for you. As you learn more about what you're comfortable with, adjust the amount of time you spend on reading your references, doing problems, and focusing on each section to get a well-rounded understanding of all the topics on your exam syllabus. Review your syllabus often to make sure you are covering each topic.

When developing your study plan, the best course of action is to start as early as possible, set a schedule, and stick to it. Plan what you're going to study, set deadlines, and if you are spending too much time on a subject, move on. You can find a lot of solutions to questions by recognizing the type of problem it is and remembering where to go to find the information you need to solve it.

References can be the biggest help or biggest detriment during the exam. To avoid the latter, you should know where to find equations, charts, definitions, and example problems in your references. When you use an equation or table more than once, tab it in the reference book. When you're done, you will know what is relevant in your reference material. If you're do lots of problems and finding that you're not using certain references, don't bother bringing them. Try to consolidate them into the most pertinent information only. College textbooks, for example, historically aren't used during the exam by those who bring them and only provide more material to waste time flipping through. If you've been solving problems with your industry standard references and PE guide books, then that's all you need. Going into the exam not knowing where to find a solution to a problem will result in a lot of wasted time and frantic searching. If you do find yourself running out of time, quickly review the table of contents in your books and focus on doing problems in your weakest areas. This is not an ideal spot to end up in, however, so when you make a schedule try to stick to it.

Some examples of schedules people have set for themselves include studying one hour a night every night after work, studying 6-10 hours every Saturday and Sunday, or studying 3-4 hours every other night. Of those surveyed, 88% polled started studying at least 2 months before the exam, and the average time spent studying was 100 hours total. Of the people who took an exam with a general and depth section, 33% split their study time evenly between the two. The rest estimated they spent 60-75% of their study time on the depth section. Some people can do more with less time and some are not as lucky, but if you give yourself enough time and stick to your schedule, you can learn what you need to pass the exam.



## Practice Problems

After you secure your exam-specific reference manual (i.e. CERM, EERM, etc.), practice problems are the most important resource you will have when you start studying for the exam. Try to scrounge up as many problem sets, workbooks and practice exams as you can and do as many as you have time for. Here are some resources to look into and how they compare to actual exam questions.

- NCEES Practice Exam – All those surveyed say these best mimic the exam problems and structure. This is because NCEES moderates the exam, so old exam questions show up in these practice exams. They come out with a new exam every year, so try to get a hold of the ones from the most recent years, too. They can be found in any discipline and depth. Another great part about these exams is that the solutions tell you what reference book was used to solve the problem. If you notice the same three books being used for all the solutions, think about taking them to the exam.
- Review Course Problems – Usually, you have to take the course to get the homework or workshop problems, but some courses list books they are using, as long as the problems are not being developed by the instructors directly. These problems tend to be more involved than the exam because they try to teach every study point in one problem. However, the instructor will usually tell you if a problem is likely to come up on the exam as it is, in pieces, or only in the morning or afternoon sections. They can also guide you through these problems and provide office hours to answer specific questions you may have.
- Six-Minute Solution – These series of workbooks can be bought online for any discipline and depth. Not everyone uses them, as they are historically harder and more involved than the actual exam problems. However, many people find this beneficial, as being overly prepared makes the exam questions seem easier.
- Reference Book Problems – You can find these problems as examples in each chapter and as a separate companion book containing just problems and solutions. These tend to be more difficult than the exam problems, but they are meant to cover all of the topics in the book. In actuality, there are many specific details the exam will never cover. For example, if you're taking the Structures depth of the Civil exam, you will likely not have to know all of the specific weir equations that would be reserved only for the Water/Wastewater depth.

**Note:** When doing practice problems, only use the calculator you will be using for the exam. Try to use it for all work related calculations, too. This will make you familiar with it, which will save you time on exam day. Go here for an NCEES list of approved calculators:

<http://ncees.org/exams/calculator-policy/>

There are only so many types of problems that can be used to construct an exam, and most practice problems come from previous exams. They are designed to either mimic the level of difficulty of the exam or make sure you're over-prepared so the exam seems easier than what you've been working on. As a result, nothing will prepare you better than doing practice problems, and everyone surveyed



for this guide emphasized this point specifically. If you do problems early and were using them for studying the material, do them again near the end to make sure you understand the process. Do enough practice problems, and you will see iterations of the same problems on the exam with something as simple as the switching of a sign or modification of a starting value. Doing practice problems is by far your best strategy when preparing for the exam.

## Exam Day

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When exam day comes, you want to walk into the room knowing you've done everything you possibly could to pass, that there is nothing left to study or review, and that all that is left is to take the exam. Being confident is your best defense; it will keep you calm and focused. Here is a compilation of recommendations from previous examinees.

### Before the Exam

On the days leading up to the exam, some people recommend taking time off of work to study and run through practice exams. However, every previous examinee recommends taking off only the day before the exam. Do not run through pages and pages of problems or look at anything new, as you might get frustrated and spend time concerning yourself with things you don't know. Instead, nurture the knowledge you already have by reviewing references or problems you've done before. Try to keep this time short and reserved only for the morning. Pack up your materials and triple check that you have everything you need for the exam, especially your calculator. Then use the rest of the day to relax in your favorite way.

If you have to travel a distance to get to your testing location, many people recommend arriving the day before and staying in a hotel. Depending on how early you like to get up, this may be a good option. Regardless of what you do, make sure you get plenty of sleep; aim for eight solid hours. When you wake up, make sure you have plenty of time to get ready and get to the testing location.

### Exam Day

Here are a list of things to take into the exam with you.

- Calculator – Do not forget your calculator! Make sure it is on the approved list and working properly. Most of the approved calculators come with a battery and solar source so you shouldn't have to worry about losing power, but some people like to bring a spare just in case.
- Reference Material – See below for specific tips on how to prepare and use your references.
- Legal Identification – You will need a driver's license or other approved photo ID to enter the exam room. It has to be on the table next to your nametag for the duration of the exam.
- Watch – Bring a watch so you can keep a close eye on the time. Make sure all alarms and sounds are turned off. It must remain on your wrist or on the floor; you cannot keep it on the table. Consider using the stopwatch feature to keep track of the time remaining by seeing how



close to four hours you are rather than calculating the time left until you reach the time the proctor will write on the board or wondering if your watch matches the clock time. Start the stopwatch when the proctor says begin and make sure you give yourself about five minutes of leeway at the end in case the proctor's time is not exact. DO NOT use the timer feature in case you lose track of time and the beeper goes off, distracting other examinees.

- Straight Edge – Any compact, inert item can be used as a straight edge for charts and tables. It is best to bring a small ruler for easy manipulation, and a normal engineering scale for large charts.
- Jacket – Many sites have been reported as being comfortable, but just in case, bring a light jacket or sweater and wear light, comfortable clothes in layers so you can adjust to the room.
- Ear Plugs – If you are prone to sound distractions, use ear plugs to drown out ambient room noise. Do not use headphones in case it is construed that you are listening to music, which is not allowed.
- Tissues – A small pack will suffice.
- Water – Bring lots of water and stay hydrated. Canned liquids may not be allowed due to the distraction of opening the container; however, bottles and travel mugs are allowed. Coffee and soda may be an option, but remember the effects on your body drinking these beverages might have.
- Snacks – You are allowed to eat small items during the exam, so bring a few quiet snacks to give you a boost midway through the morning and afternoon sections. Try to avoid crunchy foods or noisy packaging so you don't disturb your fellow examinees.
- Tylenol – Make sure to have non-drowsy pain medicine for any headaches or other bodily pain that may arise when sitting for too long.

DO NOT bring your cell phone or any other electronic devices into the exam room. Only your calculator and watch are allowed; all other devices will be confiscated. It is best to leave it in your car glove box. You will also not be allowed to bring in any pencils or other outside writing utensils or erasers. You will be given one mechanical pencil with an eraser to use for the exam. If you run out of lead or eraser, you can ask for another pencil.

Regarding references, there are some specific tips and rules to follow on exam day.

- Try to use the tips explained earlier when selecting which references to bring. Make sure they are adequately tabbed for quickly thumbing through and try to limit them to what you used for practice problems and exams.
- The most common ways to bring references into the exam are in crates on a dolly, handcart, rolling suitcase, or backpack. It's a good idea to have them organized so you can pull the one you need easily.
- While you are able to place individual books on the table, you are not allowed to keep all your references on the table. This is so the proctors have a clear line of sight while you work.



Therefore, make your references easy to access from the container while on the floor; crates and suitcases work best.

- Everything must be bound at all times; no loose papers will be allowed on the table, in binder sleeves, or in your container. You can bring all your practice problems, solutions, and notes into the exam, but make sure they are hole-punched and bound in a binder. It is recommended that you have a separate small binder that contains a photocopy of the conversion tables, table of contents for all your references, and any other equation sheets, charts, or tables you are likely to use frequently. This will allow you to reference common pages quickly and easily before diving into a large, cumbersome book.
- DO NOT write in your references during the exam. All work must be done on the scrap paper provided or in the exam booklet. This is to prevent examinees from leaving the premises with exam problems or specifics. If you do not follow this or any other rule, they may take your reference material or you may be immediately disqualified from the exam. It is recommended that you keep all notes in the exam booklet near the problem associated with them. With no more than two problems per page, there is plenty of space around each problem, and it will prevent you from needing to shuffle through extra pages of scrap paper when recalling what you did on previous problems.

### Taking the Exam

The recommended strategy for taking the exam is fairly universal for previous examinees. Those who didn't follow the following formula found themselves struggling to keep up, running out of time, and even leaving questions blank on the answer sheet. Every person is different in how they learn and study, but it is highly recommended that in order to have a calm and controlled exam experience, all examinees follow this general strategy.

The prevailing phrase to keep in mind throughout the exam is: **Do the easier problems first.** If you keep this foremost in your mind, the rest will fall into place. Here are some detailed steps you can implement to help keep you on track.

When you are told to begin, take 10-15 minutes to quickly read every question in the booklet. As you identify each question, mark it with a 1, 2, or 3 based on its apparent difficulty. This will help you quickly identify which problems are the easiest when you go back to do them. A 1 should indicate that you can do the problem easily and that it won't take up much time. A 2 indicates that you recognize the problem type but may need some time to look up the solution, or that the solution will take some time-consuming calculations. A 3 identifies any problem you do not immediately recognize or remember how to solve and you should wait to attempt it until after the 1s and 2s. NOTE: Many problems you mark as 3s may actually be easier than you initially think; still, wait to attempt your 3s at a later time. But, as you flip through your 1s and 2s, take another look at your 3s to make sure you're not missing out on an easier problem.



If your general exam discipline has a lot of different topics, or includes a general and depth section, you may consider noting, with a simple initial, the topic the problem relates to. For example, earthwork problems in the general portion of the Civil exam may be solved with either Construction (C) or Geotechnical (G) equations. There is some overlap at first glance, but only one section will truly help you. Therefore, if you can immediately identify which section to use on your first pass through the questions, you can save time trying to figure it out later.

Once you've identified all the problems, go through and do all the 1s first. These may include definitions or equation lookups that take less than a minute or slightly more, but they shouldn't take more than six minutes (a 40-question section allows six minutes per problem in four hours). Problems marked with 2s will probably take a little longer, but should still average 6 minutes per. The goal is to bank time on the easier problems so that you have time to spend on the harder ones.

If at any point you are spending more than 10 minutes on a problem and the answer is not in sight, move on and come back to it if you have time. Getting wrapped up in a problem and losing track of the time spent on it is the most common pitfall for examinees. You should practice this when doing practice exams; if you get into the habit during your studying, you'll be able to move on when you need to during the exam.

There are also some techniques to think about when analyzing individual problems. To start, as you read the problem, identify what question it is actually asking. Lot of problems will be bloated with additional information and red herring sentences that aren't useful. Find the question in the problem and underline it. Then reflect on the information needed to answer only that question and find that information in the rest of the problem. Underline or cross out information that is or is not relevant to the question at hand, then solve. This will keep the problem simple and easy to follow, especially if you have to leave it and come back to it later.

Some people reported covering up the answers and trying to work through the problem with no influence on what the answer should look like. If you can get the answer organically, then seeing your answer among the choices will give you a confidence boost. Be mindful, however, because the exam will contain answers that you would get if you made a common mistake in your calculations, didn't use the right units, or read the question wrong. Try to remember these common errors as you work through the problem so you don't have to look over it again later.

On a similar note, a lot of problems are easier than they seem and may have a short way and a long way to the correct answer. You should be aware of common assumptions and shortcuts for certain types of problems. If you're familiar enough with certain types of problems, you can use the process of elimination to dismiss answers based on the signage, units, or order of magnitude. You should be able to recognize problems like these by doing practice problems and exams. These kinds of problems are



meant to balance the time required to complete the exam and will save you a lot of time if you can recognize them.

As time winds down, remember to remain calm. Make sure you're productively working on a problem and working toward an answer. When you inevitably find yourself with a few questions unanswered, review them again and try to narrow down the choices to an educated guess. Look for hints, such as differences in signs, orders of magnitude, and your knowledge of the material, to better your odds of choosing the right answer. If you are stuck with no other options, guess and fill in the answer sheet.

**DO NOT LEAVE ANY BLANK ANSWERS!** There is no penalty for wrong answers, so make sure to fill in every circle. When there are 15 minutes remaining, which the proctor should call out, stop working on all problems and go through your test booklet and answer sheet and make sure they match. Then, with 10 minutes or so left, pick a single letter and fill in all the empty problems.

There's no avoiding the question you really want to know—how many questions can you miss and still pass the exam? This number has never and will never be officially released. It changes every year based on how the exam is constructed and curved, the discipline, and if there are any questions thrown out after the fact (which is very rare). But, forums of people online who compile their own failed test scores have best guessed a passing score of about 70%. This means that in an exam of 80 questions, you can get roughly 24 questions wrong and still pass. Be confident when tackling the exam, and try not to let that number affect your focus. Remember, some answers you actually calculate may be wrong, but by the same logic, some answers you guessed will be right. The best you can do is study hard, stay calm, and answer all the questions to the best of your ability.

## Post Exam and Results

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Relax. For the rest of the day, do something to relieve the last eight hours of stress. Try to schedule an activity that will take your mind off of the exam. The last few months are behind you and you can now take back your life.

Dates for releasing the results vary from year to year and from state to state. NCEES will say 8-10 weeks, but it's usually on the lower end of that range or sooner, about 40-60 days. When you finish the exam, NCEES collects and scores all the exams. Final results will then be sent to each state's review board and released once the state collects the information, approves the results, and organizes it in their system.

For Pennsylvania, the process is complicated by PCS's process. They take the NCEES results, organize and verify them, and present them to the PA licensing board for approval. Once approved, PCS calls NCEES to release the results on the examinees' NCEES online profile, they in turn release the results on



the examinee profiles on the PCS website, then update the PA License Verification website. This whole process adds additional time to the wait for results.

Those who fail will receive a detailed packet in the mail detailing their score and the passing rate in each topic of their specific exam. This can be used to focus studying in the future on the weaker areas.

When you pass the exam, notify your supervisor immediately. You will eventually get a license number, which shows up first on the license verification website. This will be followed by mailings of a state specific PE certificate, official license, and directions on how to order your PE stamp. Display your certificate and license at your workstation and have your pocket license card laminated for safe keeping.

For more information on the results, other steps in the process, or contact info, you can visit the Pennsylvania NCEES summary page listed below. Or, you can select your state from the drop down menu for your state's specific information.

<http://ncees.org/exams/state-pages/pennsylvania-exam-registration/>

Another great resource is Engineer Boards. This is a forum anyone who is taking the FE or PE exams should visit. There are threads discussing everything about the PE exam, including application questions, discipline-specific strategies, recommended reference material, study guides, general exam knowledge, reviews on courses, books, and practice problems, and everything related to exam day.

<http://engineerboards.com/>

## Words of Encouragement

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Here are some last words of advice and encouragement from those who have been in your shoes, have studied, worked hard, struggles at times, but ultimately passed the PE exam. Use them as you prepare for the next big leap into your career as a future Professional Engineer.

"Diligently prepare but do not stress or worry too much. Treat it like an approaching deliverable deadline; prepare yourself but don't over-study."

"Do it early! As soon as you can! Life gets in the way, so the earlier in your career you can take it, the better."

"Get a good night's sleep. Don't take too much to the exam and be very familiar with that you do take. It's not as bad as you think."

"Take it as early as you can, before you forget everything that you learned in school and before you get married and have kids."



"Relax. Don't do anything out of the ordinary the day ahead of the exam. Get a good night's sleep, and have all of your materials ready to go in the morning."

"Arrive early and be relaxed. Prepare well in advance!"

"Don't psych yourself out. For the most part, if there's a simple answer, it's probably the right answer. Questions can be tricky, but if you are confident you did the problem correctly, and your answer is in the list, take it and move on."

"Don't over-stress, don't over-study, don't over-prepare with too many reference materials. Thorough practice should make you confident."

"After the exam, go home and relax! Don't even think about the exam. Go see a movie, treat yourself to dinner out, etc. Enjoy the exam! If you fail, keep trying. Make sure you get away from work and family to study. Distractions can hinder your preparation. Happy Studying!"

"It's important to keep a record of your experience from day one of your employment after passing the FE exam. I'd recommend keeping a diary in the same format as presented in the NCEES Amplified Record of Experience. Put in time studying and you can go in confident that you have done what you could to prepare."

"It sucks and it's terrible, but there is a reason for that. It will be one of the most memorable accomplishments of your Civil career. Make your effort worth it."