

**PRACTICE**  
*of*  
**Professional  
Engineering  
Examination  
2010**

**Information for Applicants**



**professional engineers board singapore**  
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# Professional Engineers Registration Examination Practice of Professional Engineering Examination 2010

## Information for Applicants

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# **Professional Engineers Registration Examination Practice of Professional Engineering Examination 2010 Information for Applicants**

## **1 INTRODUCTION**

The mission of the Professional Engineers Board is to safeguard life, property, and welfare of the public by setting and maintaining high standards for registering professional engineers and by regulating and advancing the practice of professional engineering.

The Professional Engineers Board registers professional engineers in the branches of civil, electrical and mechanical engineering. A person applying for registration as a professional engineer to the Professional Engineers Board is required to hold an approved degree or qualification listed in the [Professional Engineers \(Approved Qualifications\) Notification](#) and acquired not less than 4 years of relevant practical experience. He is also required to sit and pass examinations prescribed by the Board. The applicant is required to sit and pass the Fundamentals of Engineering Examination and following that, to sit and pass the Practice of Professional Engineering Examination. In addition, the applicant is required to attend an interview.

The following sections set out the requirements and details for the Practice of Professional Engineering Examination 2010 while details on other application requirements are available on the PEB website at [www.peb.gov.sg](http://www.peb.gov.sg).

## **2 DESCRIPTION OF EXAMINATIONS**

The Practice of Professional Engineering Examination tests the applicant's ability to apply his knowledge and experience in professional engineering practice, and his knowledge of the rules and regulations regulating the practice of professional engineering in civil, electrical or mechanical engineering.

## **3 ELIGIBILITY TO SIT FOR EXAMINATION**

A person may apply to sit for the Practice of Professional Engineering Examination after he has-

- (a) completed 4 years of practical experience relevant to the branch of engineering that he seeks to be registered in; and
- (b) sat for and passed the Fundamentals of Engineering Examination.

#### 4 FEE

The fee for an application to sit for the Practice of Professional Engineering Examination is \$450.

#### 5 DATE OF EXAMINATION

The Practice of Professional of Engineering Examination 2010 shall be held on 12 May 2010.

#### 6 VENUE

The venue would be determined by PEB and successful applicants would be informed of the details of the venue.

#### 7 APPLICATION FORM

Application forms can be downloaded from the PEB website at <http://www.peb.gov.sg>. All applications are to be submitted to PEB with applicable fees and documents by 12 Mar 2010. Applicants are advised to send in their applications early to allow time for processing. They would be informed of the status of their applications and other details by post at least two weeks before the examinations.

#### 8 STRUCTURE OF EXAMINATION

A summary of the structure of the Practice of Professional of Engineering Examination 2010 is shown in the table below. The examination is 'open book' and further details are given in [Annex A: Format and Syllabus](#).

Subjects	Time Allocated	Format
<u>PPE Part 1</u> Common paper	2 hours (9 am - 11 am)	<ul style="list-style-type: none"> <li>• Answer 10 compulsory Multiple Choice Questions</li> <li>• Answer 3 out of 5 essay questions</li> </ul>
<u>PPE Part 2</u> Civil/Mechanical/Electrical engineering	4 hours (1 pm - 5 pm)	<ul style="list-style-type: none"> <li>• Answer 1 compulsory question plus 4 out of 6 questions (Civil, Electrical)</li> <li>• Answer 1 compulsory question plus 4 out of 7 questions (Mechanical)</li> </ul>

## **9 FINAL RESULTS AND NOTIFICATION**

Examination results will be given to candidates on a Pass/Fail basis. A candidate is required to obtain a pass score in both Parts 1 and 2 respectively. No examination scores or marks will be given to candidates. Examination results are mailed to the candidates within twelve weeks after the examination.

## **10 EXAMINATION APPEALS**

A candidate who has failed the examination may submit a written appeal to review his/her performance together with a payment of \$25. The appeal is to be made within 2 weeks after the receipt of results and late appeals would not be considered. The result of the appeal/review will be sent by written mail to the appeal candidate.

## **11 REVIEW COURSES**

The Board does not endorse any review course or material provided as study aids.

## **12 REFUND OF FEE**

Where an applicant who has been accepted is unable to sit for the examination subsequently, the Board may, at its discretion, refund \$150 to the applicant if the applicant informs the Board at least a week before the examination or submit a medical certificate within 2 weeks after the examination. There will be no refund if the applicant informs the Board less than a week before the examination.

## **Annex A: FORMAT AND SYLLABUS**

### **I Professional Practice Examination Part 1 (Common)**

Professional conduct and ethics are important areas because most of the disciplinary actions taken by the Professional Engineers Board are in the area of ethics and not technical matters. Professionalism and ethics are closely related and inseparably bound as professional status and recognition are based on public interest. A professional engineer's judgment and decisions can have great impact on public health and safety. He is expected to uphold the dignity, standing and reputation of the profession. He shall practise ethically in relation to his clients, employers, fellow professionals and the public at large.

#### **Format**

This is a common paper which has two sections on the Professional Engineers Act and Professional Conduct and Ethics. The paper comprises 10 multiple choice questions (MCQs) and 5 essay type questions based on hypothetical case studies. The candidates must answer all the 10 compulsory MCQs (25 marks) and can choose to answer any 3 out of the 5 essay questions (75 marks) during the 2-hour examination period.

#### **Syllabus**

The paper will focus on the latest revisions of the following Professional Engineers Act and Rules:

- Professional Engineers Act
- Professional Engineers (Code of Professional Conduct and Ethics) Rules
- Professional Engineers Rules

References will also be made to past disciplinary actions taken by the Professional Engineers Board arising from complaints against professional engineers.

Questions will be set to test the candidates' understanding and interpretation of the provisions in the act and rules as well as how they will tackle hypothetical cases involving the clients, the employers, fellow professionals and the public at large.

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## **II Professional Practice Examination Part 2 (Civil)**

The paper aims to examine the candidates on their proficiency in the practice of civil/structural engineering at a professional level. Candidates are expected to have a good working knowledge and experience of civil/structural engineering design and practices in Singapore. In particular, knowledge is required in the areas of regulatory framework, submission and approval procedures, statutory acts and regulations, practices guidelines and codes of practice.

The examination will place emphasis on the Professional Engineer's role in building projects in the local context either acting as the Qualified Person for the project or Professional Engineer for the civil and structural engineering works.

### **Format**

This is a 4 hour paper and a candidate is required to answer 1 compulsory question covering the design of concrete and steel structures and choose 4 out of 6 questions covering areas of design, codes of practice, acts and regulations, submission/approval procedures & site supervision. The candidates may bring along their own reference materials and calculators as necessary.

### **Syllabus**

The list of reference literature, codes, acts, regulations, etc appended below is meant as a guide and is not exhaustive.

- **Acts and Regulations**
  - Professional Engineers Act and Regulations
  - Building Control Act and Regulations
- **Publications**
  - **URA**
    - Planning Control Handbooks and Guidelines for Building Works
  - **SCDF**
    - Code of Practice for Fire Precautions in Buildings
    - Handbook on Fire Precautions in Buildings
    - FSSD Fire Safety Handbooks

- **LTA**
  - Guidelines & Publications on Rapid Transit Systems
  - Building Works & Restricted Activities in Railway Protection Zone
  - Street Proposals
  - Vehicle Parking
  - Other Guidelines and Standards
  
- **NEA**
  - Code of Practice on Environmental Health
  - Code of Practice on Pollution Control
  
- **PUB**
  - Code of Practice on Surface Water Drainage
  - Standard Specifications for Drainage Works
  - Code of Practice on Sewerage and Sanitary Works
  - Sewerage and Drainage Standard Drawings
  
- **NParks**
  - Procedures and Guidelines for Plan Submissions
  
- **MOM**
  - Workplace Safety & Health Act and Subsidiary Legislations
  
- **BCA**
  - National Productivity and Quality Specification (NPQS)
  - Guidelines and Handbooks on Civil Defence Shelters
  - Code of Practice on Buildable Design
  
- **Civil Engineering Codes/Standards**
  - Codes and Standards under Building Control Act and Regulations
  - Codes and Standards for Roads and Transit Systems to LTA's Requirements



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### **III Professional Practice Examination Part 2 (Electrical)**

The paper aims to examine the candidates on their proficiency in the practice of electrical engineering at a professional level. Candidates are expected to have a good working knowledge and experience of electrical engineering design and practices in Singapore. In particular, knowledge is required in the areas of regulatory framework, submission and approval procedures, statutory acts and regulations, practices guidelines and codes of practice.

The examination will place emphasis on the Professional Engineer's role in building projects in the local context in relation to electrical engineering works.

#### **Format**

This is a 4-hour paper that examines candidates on technical competency and understanding of standards and codes that are applicable in Singapore for the discipline of electrical engineering.

The paper consists of 2 Sections and 7 questions. Candidates must answer questions in both sections (Section 1 and Section 2). Section 1 consists of a compulsory question on CP5 and statutory acts and regulations. Candidate is required to answer this compulsory question. Section 2 consists of 6 questions. Candidates shall choose to answer 4 out of 6 questions.

#### **Syllabus**

- **Codes of Practice and Singapore Standards**
  - CP2: Installation, Operation and Maintenance of Electric Passengers and Goods Lifts
  - CP5: Code of Practice for Electrical Installations
  - CP10: Installation and Servicing of Electrical Fire Alarm System
  - CP15: Installation, Operation and Maintenance of Escalators
  - SS551 - Code of Practice for Earthing
  - CP17: Maintenance of Electrical Switchgear for Voltages up to and including 22kV
  - CP19: Installation and Maintenance of Emergency Lighting and Power Supply

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- SS530 – Code of Practice for Energy Efficiency Standard for Building Services and Equipment
  - CP25: Emergency voice communication system in building
  - CP31: Installation, Operation, Maintenance, Performance and Constructional Requirements of Mains Failure and Standby Generating System
  - CP33: Lightning Protection
  - CP38: Artificial Lighting in Buildings
  - CP39: Installation of MATV for the reception of VHF and UHF Sound and TV
  - SS532 – Code of Practice for the Storage of Flammable Liquids
  - CP59: Construction, installation, operation and maintenance of intruder alarm systems
  - CP88: Temporary Electrical installations for construction and building
  - Handbook on Application for Electricity
  - Fire Code 2007
  - CP on Environmental Health
  - CP58: Application, operation and maintenance of dry transformer
  - CP87: Illumination in industrial premises
  - **Electrical Power Supplies, Tariffs and Design**
    - Electricity market
    - Generation, transmission and distribution of electricity in Singapore
    - Handbook on Application for Electricity
    - Handbook on Solar Photovoltaic (PV) Systems
    - Electricity bill calculation for HT and LT consumers

- Design of electrical installations
  - Load estimation
  - Power factor correction
  - Power quality and power system harmonics
  - Consumer Substation, Switchboards and Switchgears
  - Maintenance of electrical equipment, switchgears and cables
  - Design for energy efficiency and sustainability
  - **Protection for Safety**
    - Measures in protection against electric shock (direct and indirect)
    - Principles of operation of protective devices
    - Maximum demand and diversity factors
    - Protection against over-currents and short circuits
    - Protective devices and circuit conductors
    - Discrimination in protection of electrical circuits
  - **Cables, Busways and Distribution Boards**
    - Types and characteristics of cables
    - Methods of installation
    - Sizing of conduits and trunkings
    - Factors affecting the current carrying capacities of cables
    - Sizing of cables and busways for use under different types of conditions
    - Connected load, maximum demand and circuit breaker ratings for a electrical distribution board
  - **Earthing**
    - Purpose of earthing
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- Methods of earthing
- Earth fault loop impedance and earth fault current
- Sizing of circuit protective conductor
- Testing of earthing system
- **Lightning Protection Systems**
  - Rolling sphere technique for determining zones of protection
  - Spacing of air terminations and types of air termination
  - Down conductors for buildings below 45 metres and those exceeding 45 metres
  - Earth electrodes, earth resistance values and hazards of a rise in ground potential caused by lightning strike
  - Selection of appropriate materials and installation methods
  - Prevention of side flashing
  - Design requirements of complete lightning protection system
  - Transient and surge suppressions
- **Emergency Lighting**
  - Exit and emergency lighting requirements for evacuation of occupants
  - Types of back-up power supplies
  - Exit and directional signs
- **Standby Power Generator System**
  - Types of essential and critical loads
  - Sizing of generator with considerations for maximum demand of essential load, transient or motor starting loads and voltage dip
  - Voltage regulation and its effects on generator sizing
  - Protection for alternator and prime mover

- Installation of standby generator system including day-tank, battery and charger, fuel supply, engine cooling system, plant room ventilation, exhaust and fresh air intake, control and instrumentation panel and automatic transfer switch.
- Underground fuel storage system
- Grounding/Earthing arrangement
- Maintenance
- **Automatic Fire Alarm System**
  - Requirement for automatic and manual fire detection system and purpose of compartmentation as required by the Fire Code
  - Interaction with other building services such as emergency voice communication system, lifts, AHUs, pressurization fans and auto-doors during alarm activation
- **Emergency Voice Communication System**
  - Requirements for public address system for building above 24 metres but less than 60 metres
  - Requirements for emergency voice communication for building above 60 metres
  - Requirements for fireman intercom
- **Inspection, Testing and Common Violation In Electrical Installation**
  - Mandatory requirements for inspection and testing of electrical installation prior to energisation of electrical supply
  - Types of test instruments and standard methods of testing

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## **IV Professional Practice Examination Part 2 (Mechanical)**

The paper aims to examine the candidates on their proficiency in the practice of mechanical engineering at a professional level. Candidates are expected to have a good working knowledge and experience of mechanical engineering design and practices in Singapore. In particular, knowledge is required in the areas of regulatory framework, submission and approval procedures, statutory acts and regulations, practices guidelines and codes of practice.

The examination will place emphasis on the Professional Engineer's role in building projects in the local context in relation to mechanical engineering works.

### **Format**

This is a 4-hour paper that examines candidates on technical competency and understanding of the use and application of standards and codes that are applicable to the practice of mechanical engineering at a professional level in Singapore.

The paper consists of 2 Sections comprising a total of 8 questions. Candidates are required to answer questions in both sections (Section 1 and Section 2). Section 1 will consist of a compulsory question on principles, codes, and legislation related to general mechanical engineering practice, safety and environmental protection. Section 2 will consist of a total of 7 optional questions. Candidates may choose to answer any 4 out of the 7 questions.

### **Syllabus**

The scope of professional engineering work covered by Professional Engineers (Mechanical) may include the following fields: -

- **Piped Services**

Cold and Hot Water Services; Sanitary Plumbing Systems within buildings; Town Gas Incoming Supply and Distribution; Liquefied Petroleum Gas (LPG) Multi-Cylinder Systems; Swimming Pool Filtration System

- **Air Conditioning & Mechanical Ventilation**

Indoor Air Quality Comfort / Environmental Control / Fire Safety Requirements

**Candidates shall note that CP13 is the operating CP for PPE 2010. Answer not based on CP13 will not be accepted.**

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- **Fire Safety in Buildings**

Wet and Dry Rising mains/Hydrant Systems; Fire Hose reel System; Automatic Fire Sprinkler System; Fire Detection and Alarm System; Gas Flooding System

- **Lift and Hoisting Systems**

Lifting / Hoisting Equipment

- **Other Major Mechanical Systems and Services**

Boiler Plants, Calorifiers, Pressure Vessels, Pressure Piping

- **Energy Conservation for Mechanical Building Services / Buildings**

- **Relevant Codes of Practices, Standards and Acts**

All relevant regulations, by-laws, Acts and accepted codes of practice of:-

- National Environment Agency
- Public Utilities Board
- PowerGas Ltd
- PowerGrid Ltd
- Singapore Civil Defence Force
- Ministry of Manpower
- Building and Construction Authority
- Energy Market Authority

- **Singapore Standards – Codes of Practice**

- CP 2 : Codes of Practice for Installation, Operation and Maintenance of Electric Passenger and Goods Lifts
- CP 10 : Code of Practice for The Installation and Servicing of Electrical Fire Alarm Systems
- CP 13: Code of Practice for Mechanical Ventilation and Air-Conditioning in Buildings (Operating CP for PPE 2010)

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- CP 15: Code of Practice for Installation, Operation and Maintenance of Escalators and Passenger Conveyors
  - SS530 – Code of Practice for Energy Efficiency Standard for Building Services and Equipment
  - CP27: Code of Practice for Factory Layout – Safety, Health and Welfare Considerations
  - CP29: Code of Practice for Fire Hydrant Systems and Hose Reels
  - CP34: Code of Practice for bulk liquid oxygen storage installation on user premises
  - CP35: Code of Practice for the selection, care and maintenance of steel wire ropes for hoisting
  - CP37: Code of Practice for safe use of mobile cranes
  - SS532 – Code of Practice for the Storage of Flammable Liquids
  - CP48: Code of Practice for Water Services
  - CP51: Code of Practice for Manufactured Gas Pipe Installation
  - CP52: Code of Practice for Automatic Fire Sprinkler System
  - CP55: Code of Practice for Use and Maintenance of Portable Fire Extinguishers
  - CP62: Code of Practice for safe use of tower cranes
  - CP63: Code of Practice for the lifting of persons in work platforms suspended from cranes
  - NFPA 2001: Standard for Clean Agent Fire Extinguishing systems (FM200)
  - American Society of Mechanical Engineers codes on pressure vessels and piping
  - American Petroleum Institute codes on pressure vessels and piping
  - British Standards on pressure vessels and piping