

PROFESSIONAL INTERVIEW GUIDELINES

I. THE PROFESSIONAL INTERVIEW

1. Definition

The Professional Interview is a peer review process comprising an examination on the professional competency of the candidate by Corporate Members of IEM with respect to:

- a) Grasp and application of engineering fundamentals
- b) Ability to communicate clearly both orally and in writing
- c) Demonstration of ethical judgement in the conduct of all works
- d) Ability to accept professional responsibility
- e) Awareness of engineering sustainability, health and safety issues

A successful candidate in the Professional Interview would have demonstrated his professional competence attained in all the following areas:

- Training and Experience Report;
- Technical Report;
- Oral Examination;
- Essay Writing - Section A, and
- Essay Writing - Section B

2. Glossary and Interpretation

Glossary

- **Applicant** means an engineer who has made an application to attend the Professional Interview set by IEM.
- **Bill of Quantities** means the list of work items, raw materials, etc. and their respective quantities required to complete an engineering work.

With regard to Chemical Engineering or related engineering discipline, the "*Material and Energy Balance*" in lieu could be considered as the Bill of Quantities.

- **Candidate** means an Applicant who has been approved by IEM to attend his Professional Interview.
- **Design/Office Experience** means the period, in man months, of training and experience of the candidate spent in an office environment to plan, manage and execute design work, feasibility study, research and development work, or operation and maintenance work under a Supervising Engineer.

With regard to Civil and Electrical Engineering disciplines, the Candidate has to spend a minimum aggregate of twelve (12) months in design/office, while for other disciplines he has to spend a minimum aggregate of six (6) months in design/office.

- **Design Work** means the detailed design calculations on an engineering assignment, together with at least two (2) working drawings, specifications and a set of Bill of Quantities. The Work must be submitted using the Professional Interview Certificate Form IEM/PI (2) duly certified by his Supervising Engineer or Mentor.
- **Essay Writing** means the second session of the Professional Interview, whereby the Candidate is required to write two essays.
- **Essay Writing – Section A** means the technical essay written by the Candidate during the second session of his Professional Interview, whereby he will write on one of the two alternative subjects selected by the Interviewers relating to his practical experience.
- **Essay Writing – Section B** means the second essay written by the Candidate during the second session of his Professional Interview on the Regulations of Professional Conduct. The Candidate will be asked to answer one question from two alternative questions selected by the Interviewers from a list of questions previously available to the Candidate.
- **Feasibility Report** means a document describing the feasibility study, evaluation or analysis of potential and impact of a proposed engineering project to determine its technical and financial viability, in addition to highlighting the difficulties in carrying out designated tasks related to the said project. The Report must be submitted using the Professional Interview Certificate Form IEM/PI (2) duly certified by his Supervising Engineer or Mentor.
- **IEM** is the abbreviation for “The Institution of Engineers, Malaysia”
- **IEM Corporate Member** means a member of IEM who has been admitted or transferred into the grade of Member (MIEM) or Fellow (FIEM) upon satisfying the IEM Council that he has attained such standard and criteria as set by the Council being evidence of his proficiency as a professional engineer.
- **IEM Council** means the elected governing body of IEM with the mandate to direct and manage all property and affairs of the Institution, including conducting the Professional Interview for the purpose of admission as Member of IEM (MIEM).
- **IEM Graduate Member** means a member of IEM who has been admitted or transferred into the grade of Graduate Member (Grad IEM).
- **IEM Log Book Training Scheme** means the training scheme organized by IEM to provide guidance to a proper practical training for IEM Graduate Member entering the profession of engineering and to ensure that such training fulfils the requirements for his transfer to be a Member of IEM.

Through the IEM Log Book Training Scheme, the IEM Graduate Member shall become a mentee who would obtain his practical experience under the supervision of a Mentor for a minimum period of three (3) years. The IEM Graduate Member shall maintain a log book of his

training, which shall be endorsed quarterly by his Mentor. Every year the log book has to be submitted to IEM for record and endorsement.

- **IEM Monthly Bulletin** means the monthly bulletin called 'The Ingenieur' published by IEM to communicate to its members information on matters affecting the Institution in particular and the engineering profession in general.

The names of all Applicants will be published in this Bulletin. If any IEM Corporate Member has any reason as to why any of the Applicants is not a fit and proper person for election or transfer as a Member of IEM (MIEM), he should communicate in writing to the Honorary Secretary. Such communication should be lodged within a month from the date of publication.

The names of successful Candidates will be published after the IEM Council has approved the election to Member of IEM (MIEM).

- **Lecturing Candidate** means the candidate who is engaged in lecturing an accredited engineering degree in an Institution of Higher Learning at the time of his application, and the final two years of the engineering course for a period not less than twelve (12) months. He has to have the equivalent of one year's practical engineering experience, which can be made up of separate parts. In addition to these prerequisites, he must have not less than three (3) years' experience, which may include a period on:
 - a) an approved course of full time post-graduate study, or
 - b) on research for the award of a higher degree, or
 - c) research done whilst holding the position of lecturer in an accredited degree course.
- **Member** means a Member of the Institution of Engineers, Malaysia (MIEM).
- **Mentor** means an IEM Corporate Member of the same discipline, who has been assigned to supervise the practical training of an IEM Graduate Member under the IEM Log Book Training Scheme.
- **Operation and Maintenance Candidate** means the candidate whose experience lies in the operation and maintenance of engineering plant or system, which forms the prerequisite for him to qualify to attend the Professional Interview.
- **Operation and Maintenance Work** means the Technical Report to be submitted by an Operation and Maintenance Candidate to the Principal Interviewer. The report must be submitted using the Professional Interview Certificate Form IEM/PI (1) duly certified by his Supervising Engineer or Mentor.
- **Oral Examination** is the first session of the Professional Interview, whereby the Candidate will be questioned by two Professional Interviewers on his training and experience with particular reference to its quality.
- **Peer Review** is a process used for checking the work performed by one's equal (peer) to ensure it meets a specific set of criteria.

- **Principal Interviewer** means an IEM Corporate Member assigned by the Professional Interview Board to conduct the Professional Interview.
- **Professional Interview Certificate** means Form IEM/PI (2) which either the Supervising Engineer or Mentor certifies for the Candidate that the Technical Report has been executed by the Candidate under his general supervision.
- **Professional Interview Board** means the unit within the Institution assigned by the IEM Council to organize the Professional Interview.
- **Professional Interview Document** means the Training and Experience Report and the Technical Report.
- **Professional Interview Regulations** means the regulations for the conduct of the Professional Interview.
- **Regulation on Professional Conduct** means a set of code intended to cover all eventualities on how an IEM Corporate Member or a professional engineer shall conduct himself, written in general terms based on broad ethical principles.
- **Research Candidate** means the candidate who has been engaged in engineering research work as a prerequisite for his practical experience in engineering to qualify him to attend the Professional Interview, and is doing research at the time of his application to sit for the Professional Interview. The candidate shall have at least five (5) years of experience made up of the following:
 - a) responsible position in engineering research; research for the award of a post graduate Master or Doctorate degree could be considered for an aggregation up to a maximum of one or two years respectively depending on the duration of the research; and
 - b) a minimum of two (2) years practical experience aggregated of one year on site and one year of approved relevant experience and under the supervision of a Corporate Member of the Institution of the same discipline.
- **Research and Development Work** means the Technical Report to be submitted by a Research Candidate to the Principal Interviewer. The Report must be submitted using the Professional Interview Certificate Form IEM/PI (2) duly certified by his Supervising Engineer or Mentor.
- **Second Interviewer** means an IEM Corporate Member appointed by the Principal Interviewer to assist him in the Professional Interview.
- **Site/Field Experience** means the period of training and experience of the Candidate during which he spends his time in the site/field either supervising an engineering work, conducting his research and development work, or being involved in operation and maintenance work.

Site/field experience shall not consist merely of periodical and routine site/field inspections, attending site meetings, but shall have to include activities which demonstrate engineering proficiency and competency like troubleshooting, site situational problem solving, clarifying of design uncertainties, proposing of better alternative designs, reviewing parameters and improving work procedures and standard practice, surveys, material testing and work sequencing.

With regard to the Civil Engineering discipline, the Candidate has to spend at least twelve (12) months in the site/field, while a Candidate from other disciplines has to spend a minimum of six (6) months at the site/field.

- **Supervising Engineer** means an IEM Corporate Member, or equivalent professional affiliation, of the same discipline who has personal knowledge of the Applicant/Candidate's roles and responsibility within the same organization or company.
- **Technical Report** means the second of two reports to be submitted by the Candidate to the Principal Interviewer presenting his Design Work, or Feasibility Study, or Research and Development Work (by Research Candidate), or Operation and Maintenance Work (by Operation and Maintenance Candidate).
- **Training and Experience Report** means the first of two reports to be submitted by the Candidate to the Principal Interviewer describing in details his engineering training and experience throughout his career in chronological order. The Candidate is expected to elaborate on any special problems he has encountered explaining how they were dealt with.
- **The Institution of Engineers, Malaysia** ("the Institution") is a society established to promote and advance the science and profession of engineering in any or all its disciplines and to facilitate the exchange of information and ideas related to engineering.
- **Unsuccessful Candidate** means the Candidate who has not satisfied the IEM Council that he has attained such standard and criteria as set by the Council being evidence of his proficiency as a professional engineer.

Interpretation

Unless the context requires otherwise:

- a) words in the singular include the plural and vice versa;
- b) words importing the masculine gender include the feminine gender;

II. PROFESSIONAL INTERVIEW REGULATIONS

1. General

- 1.1 The Professional Interview shall be held throughout the year in Malaysia.
- 1.2 An Applicant attending the Professional Interview shall:
 - a. be a Graduate Member of the Institution or in possession of qualifications recognized by the Institution; and
 - b. has at least three (3) years of approved experience (after graduation with an accredited engineering degree) in planning, design, execution and management of such works as are comprised within the profession of an engineer or relevant experience under the IEM Log Book Training Scheme.

- 1.3 An Applicant for the Professional Interview must submit one (1) copy of the completed Form IEM/PI (1) together with the appropriate fees to IEM.

In the course of narrating his experience, the Applicant should state concisely his role and responsibility and the tasks assigned to him.

- 1.4 The Applicant shall be informed in writing on his eligibility to attend the Professional Interview only after the relevant Committees have approved the application. The name of the Principal Interviewer shall then be communicated to the Candidate.

The Principal Interviewer shall notify the Candidate of the timeline by which the Documents (please see Section 2 below) are to be sent to him and the date, time and place of the Professional Interview.

- 1.5 The Documents shall be sent by the Candidate to the Principal Interviewer, properly packed and marked, at the top left hand corner, 'Professional Interview Documents'. Each sheet of drawing and every report must bear the Candidate's name and must be fully described in Form IEM/PI (2).

- 1.6 A Candidate will not be permitted to bring any book or any form of reference material, electronic devices such as mobile phones, PDA, laptops, notebooks, iPAD etc (except scientific calculators, *on condition that the calculators are non-programmable, silent and give no printout*), logbook etc during essay writing.

2. Documents to be submitted

- 2.1 The Candidate is required to submit:

(a) Training and Experience Report

- two (2) copies of the Report printed on A4 paper, giving an account of all his training and experience in chronological order, conforming to Section 3; and

(b) Technical Report

- one (1) copy of the Report printed on A4 paper with supporting sheets, calculations, tables, charts, diagrams and/or drawings duly certified and conforming to one of the alternatives in Section 4.
- the Report shall include one or more of the following categories; Design Work, Feasibility Study, Research and Development Work, and Operation and Maintenance Work

3. Training and Experience Report

- 3.1 The purpose of this Report is to provide a detailed description of the Candidate's engineering training and experience throughout his career. The Report should ideally be of 2,000 to 4,000 words and to be signed by the Candidate.
- 3.2 As an introduction, the Candidate should summarise in chronological order, his employment record inclusive of the dates of each position held.

Immediately below this summary, a Candidate, where relevant, must state the total time he has spent on design, field work, management and/or others (refer Glossary for details).

All time spent in any other capacity should be included to avoid any gaps in this summary.

- 3.3 In the Report, the candidate must deal fully with the tasks on which he has been employed, whether in design, construction, operations and maintenance, manufacturing, teaching or research. It should explain clearly the precise position that the Candidate has occupied in each case, and the role and responsibility assigned to him. He should elaborate on any special problems he has encountered explaining how they were dealt with.

The Report must not be a mere inventory of works prepared and executed.

He should also elaborate on any subject in which he has specialized or obtained exceptionally good experience. The size and cost of the works should be indicated.

- 3.4 Throughout the Report, reference should be made to the Candidate's employer or immediate superior under whom he has served, giving the name, designation, professional affiliation and stating their membership grade, if any.

4. Technical Report

This Report shall include one (1) or more of the following categories:

4.1 Design Work

Document shall include the following:

- a) At least two (2) working drawings;
- b) Detailed design calculations relating to one (1) or more of the Candidate's own submitted drawings;
- c) Specifications; and
- d) A set of Bill of Quantities (BQ), comprising abstract and take-off sheets relating either to one or more of the submitted drawings, whether or not prepared by the Candidate;

A Candidate may submit an additional drawing not necessarily prepared by him, to illustrate his experience in the engineering work.

4.2 Feasibility Study

A part of a feasibility study involving functional and economic comparison of preliminary designs of an engineering system, **OR** a comprehensive report of a major engineering project, **OR** a system design of a major engineering works. Document should include the following:

- a) at least one relevant drawing conveying essential features of and details of a structure or systems;
- b) at least three sketches containing sufficient details to enable a draughtsman to work them up into drawings without further guidance;

- c) Preliminary stress or systems analysis;
- d) Bill of Quantities, cost or economic analysis as appropriate; and
- e) Specifications

4.3 Research and Development Work

- a) Description of the research and development work detailing the planning, execution (methodology) and deliverables of the work that clearly demonstrate sound application of engineering principles.

Details of progressive pilot or prototyping work from computer and/or laboratory models shall also be submitted. The Report will need to include particularly the work actually carried out by the Candidate, appended with any engineering document including drawings produced by him.

- b) A critical appraisal of the design on any research experiments or systems which may not be the work of the Candidate may be included.

4.4 Operation and Maintenance Work

- a) A detailed description of the operations of the plant or system together with the maintenance schedule, which the Candidate has formulated or designed. In his submission, he should clearly indicate his contribution which would demonstrate a sound understanding of the engineering principles and their application.

- b) A critical appraisal of the design of the engineering system which may not be the work of the Candidate should be included. Details of modifications made to the existing system which are the work of the Candidate should also be submitted.

5. ***Certification of Documents***

- 5.1 Every drawing and document (supporting sheet, calculation, table, chart, and diagram) wherever relevant is to be signed by the Supervising Engineer or Mentor who must also certify on the prescribed Professional Interview Certificate Form IEM/PI (2) that these are the works of the Candidate. If only a portion of the Documents has been prepared by the Candidate, this must be clearly indicated by the Candidate and certified by Supervising Engineer.

It is essential that the drawings and document submitted shall be the work of the Candidate in the ordinary course of his employment. Drawings, design and document prepared as exercises for academic purposes or otherwise are not acceptable.

6. ***The Interview***

6.1 Oral Examination

- 6.1.1 The Candidate will be required to attend an Oral Examination, conducted by the Principal and Second Interviewers in which his training and experience, not only on time basis but also on merit and quality shall be assessed.

- 6.1.2 In general, the Oral Examination is intended to assess the Candidate's:

- a) Design Experience - Understanding with full participation
- b) Site/Field Experience - Degree of exposure and effective participation
- c) Management Experience - Capability to organise assignment and accept responsibility
- d) Engineering Application - Resourcefulness, ingenuity in giving solution with sound fundamentals
- e) Communication Skill - Ability to communicate verbally, clarity in speech
- f) Maturity of Thought - Development of professionalism, ability to focus on material issues rather than personal and petty matters
- g) Professional Responsibility - Capability to accept professional responsibility, have accountability, not passing the buck and blame others
- h) Ethical judgement in the conduct of works – Integrity and good governance
- i) Awareness of engineering sustainability, health and safety issues

6.1.3 At the Interview, a Candidate will be required to show that: he can apply in practice, the theory of at least one of the branches of engineering science, and has acquired an understanding of the fundamental processes of research, investigation, planning, analysis, design and construction wherever relevant by actually taking part in contributing to these processes in connection with an engineering research or project, whether or not it is brought to conclusion or fruition.

6.2 Written Examination

6.2.1 A Candidate shall, after the Oral Examination, be required to write a technical essay (Section A) and an essay on the Regulations of Professional Conduct (Section B).

6.2.2 The essays are intended primarily to test the Candidate's knowledge and ability to communicate in good English or Bahasa Malaysia, and to marshal his thoughts and then express them on paper in a clear, critical and concise manner. Time allocation for each essay is 1½ hours.

6.2.3 For Section A, the Candidate will be required to write an essay on one out of the two questions set by the Interviewers based on the Candidate's broad experience.

6.2.4 For Section B, the Candidate will be required to answer one question from two alternative questions selected by the Interviewers from a list of 13 questions previously made available to the Candidate.

These questions will be in relation to the Regulations of Professional Conduct.

III. REQUIREMENTS FOR SPECIFIC DISCIPLINES

(A) CHEMICAL

Training Requirements

- a) A potential candidate is expected to have knowledge/ experience in areas related to the Chemical Engineering.
- b) The candidate is expected to possess and apply Chemical Engineering knowledge including but not limited to Transfer Processes, Unit Operations, Reaction Engineering, Thermodynamics, Control and Instrumentation and Process economics and Costing.

Design Experience

The candidate is expected to have experience in the process and engineering design, fabrication requirements, material selection and erection requirements of process plant units which may include the preparation of process flow sheets showing heat and mass balances;

Field Experience

The candidate is expected to have some experience in the start-up and commissioning and operation and/or testing and evaluation studies, trouble-shooting, performance enhancement and maintenance and planning coordination of chemical plants and items of equipment.

Office/Management Experience

The candidate is expected to have experience in the office or management of projects. This may be in the form of general engineering management which may include Marketing of Engineering Products and Services; Projects; Contracts; R&D; Quality; Technical Services; and Health, Safety and the Environmental aspects of Chemical Engineering Operations including related regulations and legislation control.

Documentation Requirements

The candidate is expected, where appropriate, to submit drawings and calculations for the design and selection, in whole or in part, or an item of work relating to Chemical or Process Engineering e.g. heat exchangers; absorption towers; distillation plant; liquor filters; gas dedusting equipment; plant layouts. A candidate may also submit notes or reports on performance test and feasibility studies.

(B) CIVIL

Training Requirements

- a) The candidate should have sufficient site experience expected of an engineer, who has spent a ***minimum aggregate of twelve (12) months at site.***
- b) The candidate should have sufficient design office experience expected of an engineer, who has spent a ***minimum aggregate of twelve (12) months*** in the design office. The candidate should be able to demonstrate that he is thoroughly conversant with engineering design and he should have sufficient maturity to understand his own limitations. The candidate should also be able to indicate to the interviewers, his ability to develop himself further in his profession.
- c) A candidate should be able to demonstrate a high degree of proficiency in the analysis and detailing of structural elements. The candidate who is involved in civil engineering infrastructural works should have sufficient broad experience in earthworks, drainage, water reticulation, sewerage and road works. The candidate who has involved principally in large civil engineering works such as dam, water treatment must be able to demonstrate in depth knowledge in the particular field of works and at least understanding of the other areas. Design Coordination or Project Monitoring of the design or site works will not be considered.
- d) The candidate should show evidence of having adequate knowledge in the administration of construction contracts, tenders and legislation relevant to Civil Engineering profession in particular, and the construction industry in general such as Uniform Building Bylaws, Registration of Engineers Act, the Street Drainage and Building Act.

Documentation Requirements

On top of the above requirements, civil engineering candidates in specialized fields may submit their documents as follows:

(B1) Highway & Transportation:

- ◆ Drawings, calculations and quantities to show adequate knowledge of the practical of the theory of civil engineering design in relation to highway engineering, e.g. geometric design; interchange design; bridge design; retaining walls; earthworks; pavement; drainage; road furniture

and

- ◆ Notes or records on highway capacity standards in relation to estimated traffic volumes in particular reference to interchange/junction layout; highway material and pavement design; road location in urban or rural areas.

(B2) Tunnelling and Underground Space:

- ◆ Drawings and calculations for the detailed design tunnels involving soil and rock mechanics such as the stability and deformation of the tunnel and underground space structures, underground caverns, and cut & cover structures.

and

- ◆ Notes and records from site investigation; field and laboratory tests; trial sections, etc for the purpose of the foregoing

(B3) Water Resources:

- ◆ River basin study, prefeasibility or feasibility study of water resources development, computer modeling or water resources system, flood and drought forecasting, etc.
or
- ◆ Drawings and calculations and quantities for the design of an item of work related to hydrology.
or
- ◆ Record of fieldwork in hydrology, surface and groundwater hydrology, and water resources evaluation.

(C) Electrical, Electronics and Communication

(C1) Electrical

Training Requirements

a) General

A candidate is expected to have knowledge and experience in the design, installation, operation and/or maintenance of electrical installation or system with a voltage of at least 400V, three phase and operating current of at least 300A. He is expected to have sound electrical engineering knowledge and the ability to use such knowledge to solve electrical engineering problems that can arise in the course of his work. He is expected to be familiar with rules and regulations relating to the electricity industry, particularly those affecting his work. The candidate is expected to have sufficient exposure to medium voltage (1kV up to 33 kV).

b) Design Experience

The candidate is expected to have some experience in design of electrical system, installation, plant or equipment, which may include alteration or modification works. He shall be familiar with basic design principles and shall have a working knowledge of electrical distribution, protection, safety and the rules and regulations that govern them for *a minimum of one year* covering the following areas.

- (i) Acts and regulations
- (ii) Technical standards and their optimal applications and good engineering practices
- (iii) Assessment of load characteristics (demands, power quality, EMC, earthing, etc) of electrical systems.
- (iv) Safety and health against electrical hazards – direct and in – direct or secondary.
- (v) Characteristics and particulars of low voltage and high voltage system up to 11 kV
- (vi) Protection and fault discriminations – electric shock, over current, arc flash and Short circuit.
- (vii) Design and/or specifying and sizing electrical systems / components optimally – effective efficient, maintainable and cost optimized.
- (viii) Electrical installations of buildings to MS IEC 60364 or equivalent standards)

c) Field Experience

The candidate is expected to have some experience in the supervision, installation, operation or maintenance of an electrical system, installation, plant or equipment and is expected to have good working knowledge of such system, installation, plant or equipment and the rules and regulations governing their installation, operation or maintenance for a ***minimum of six months*** in the following areas.

- (i) Acts and regulations, technical standards
- (ii) Comply with safety and health practices
- (iii) Comply with electrical installations of buildings to MS IEC 60364 or equivalent standards, code of practices and good engineering practices
- (iv) Application of design experience to modification and upgrading works.)

d) Office/Management Experience

The candidate is expected to have some experience in the office or the management of projects/works. This may include feasibility studies, costing, budgeting, tendering, contract administration etc.

Documentation Requirement

- a) Drawings, charts, calculations, citations, compliance with Acts and regulations, and applications of standards and design rules for the design, installation, construction or operation in whole or part of a system or an item of work related to electrical engineering, and
- b) Notes or records on the installation, testing, commissioning, operation and maintenance of the system, plant or equipment, or other related document(s).

(C2) Electronic and Communication

Training Requirements

- a) A potential candidate is expected to have experience in the areas such as Telecommunication, Broadcasting, Multimedia Communication, IT, Information Communication Technology (ICT), Computers (Software & Hardware), Information Systems, Avionics & Aeronautics (Electronics related), Electronic Component Manufacture, Building Automation, Biomedical, Microelectronics, Mechatronics

Note: Software development, field, system, computational and parametric studies, system configuration development and planning, and control & instrumentation covering electronics would fall under this category.

- b) The candidate is expected to have basic knowledge of Electrical power 400V.

Design Experience

The candidate is expected to have experience in the design of electronic and communication system which may include alteration or modification works for a ***minimum of six months***.

Field Experience

The candidate is expected to have some experience in the supervision, installation, operation or maintenance of an electronic/communication system and is expected to have knowledge of the rules and regulations governing their installation, operation or maintenance for a ***minimum of twelve months***.

Office/Management Experience

The candidate is expected to have experience in the office or management of projects/works. This may include feasibility studies, costing, budgeting, tendering, contract administration etc.

Documentation Requirements

- a) The candidate is expected to submit drawings, charts, calculations for the design, analysis, installation, testing, commissioning of an item of work.
- b) The candidate should include evidence showing experience in management. This may include project work such as operation, maintenance, testing of equipment or system related to the relevant field of work.

(D) Mechanical

Training requirements

- a) A potential candidate is required to have experience in general mechanical engineering or relevant fields listed as **Appendix 1**.
- b) The candidate is expected to have sound knowledge of mechanical engineering practice. Evidence should be provided as in (a) and (b) below.

Design experience

The candidate is expected to have sufficient experience in the design of mechanical components, equipment or a system. The design may include alterations, addition or modifications to existing plant and equipment. The design experience shall be a **minimum of six months**.

Field Experience

The candidate is expected to have sufficient workshop/site experience in the supervision, fabrication, installation, commissioning, operation and maintenance of mechanical engineering works and/or other related works and familiar with all regulations and codes governing safe practice. The field experience shall be a **minimum of one year**.

Office/Management Experience

The candidate is expected to have some experience in the office or the management of projects/works. This may include feasibility studies, costing, budgeting, tendering, contract administration etc.

The candidate shall have not less than three years experience in the above areas.

Documentation requirements

- a) The candidate is expected to submit relevant drawings, calculations, charts, notes and records for the design, analysis, installation, testing and commissioning of an item of work in the relevant field of work for which the candidate was fully responsible.
- b) The candidate should include evidence showing experience in management. This may include project work such as operation, maintenance, testing of equipment or system related to the field of work.

(D1) Aeronautical

- a) Where appropriate, drawings and calculations for the design of part of an aircraft or guided missile, or the estimation of the performance of its engines or its structure, maintenance schedules for commercial airlines or the armed services;

and

- b) Notes or records, such as wind tunnel tests on models of aircraft or on parts thereof; flights trials; strength tests on wings or other components; vibration and stiffness tests; methods of construction and joining parts.

(D2) Industrial Engineering

- a) Drawings, models and calculations to show adequate practical application of Industrial Engineering in the design of systems for:- material handling, work methods organisation and Ergonomic, Information Resources Management, Manufacturing Planning, Inventory Control and Quality Systems Documentations.

and

- b) Notes or records on the performance of above systems to help achieve strategic operational objectives, operational flexibility, cost reduction, added value or quality improvement.

(D3) Marine

- a) Where appropriate, drawings and calculations for the design in whole or in part, of an item of work related to Marine engineering, such as: steam or internal combustion propulsion, or auxiliary machinery, such as electrical generating sets;

and

- b) Notes or records, such as operation or testing of one or more of the foregoing.

(D4) Naval Architecture and Shipbuilding

- a) Drawing and calculations for an item of work relating to: a design study of a modern ship; the launching of a large ship; a typical ship's system, eg. oil fuel, ballast, fresh and salt water, ventilation and airconditioning; cargo handling.

and

- b) Notes or records such as: estimate of ship performance including model tests and propeller design; trials at sea; eg propulsive performance; sea keeping; vibration; planning, production and quality control applied to ship building.

Appendix 1 - Mechanical

1. General mechanical engineering
2. Measuring and precision engineering

3. Agricultural machinery and equipment
4. Building services engineering
5. Material engineering
6. Facilities and plant engineering
7. Mechatronics and robotics
8. Automation and production
9. Industrial and manufacturing engineering
10. Aeronautical and aerospace
11. Marine and naval architecture
12. Mining and quarrying machinery and equipment
13. Welding and fabrication
14. Micro electromechanical systems
15. Acoustics and vibrations
16. Safety engineering
17. Energy engineering/management
18. Oil and gas engineering
19. Environmental engineering
 - thermal
 - sound
 - Internal air quality
20. Piping and pumping
21. Unfired and fired pressure vessels
22. Tribology and lubrication engineering
23. Fire engineering
24. Vertical/horizontal transport machinery
25. Air conditioning/ Heating and refrigeration
26. Biomedical engineering
27. Automotive engineering
28. Land Transportation