

# **THE PROFESSIONAL COMPETENCY EXAMINATIONS**

**The structure, the format, the syllabi ...**

**Board of Engineers Malaysia (BEM)**



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# BEM'S PROFESSIONAL COMPETENCY EXAMINATION COUNCIL

Their roles and functions ....

# What does the amended Engineers Act says

## (1) Amendment to Section 4 (Functions of the Board) of the Act;

**Section 4(1)**                      *The functions of the Board shall be –*

**(ee)(ed)(ii)**                      *to appoint a committee consisting of persons to be determined by the Board, to conduct the Professional Competency Examination for the purpose of issuing a Practising Certificate to Professional Engineers.*

### Explanation

Introduction of the 2nd. tier registration of Professional Engineers through the Professional Competency Examination (PCE). The examination to be conducted by the BEM who will then issue a “license” the Practising Certificate

**The function of the BEM has expanded to cover “licensing” .....**

# What does the amended Engineers Act says

## (2) Amendment to Section 10 (Qualifications for registration) of the Act;

*Section 10(D) (1) Subject to the provisions of this Act, any person who—  
is a registered Professional Engineer*

- (b) has passed a Professional Competency Examination  
conducted by the Board; and*
- (c) has complied with all the requirements of the Board;*

*shall be entitled on application to be registered as a  
Professional Engineer with a Practising Certificate*

### Explanation

Professional engineers who wish to set-up an Engineering Consultancy Practice (ECP) under Section 7A or 7B and supply professional engineering services must sit and passed the Professional Competency Examination (PCE) and registered with BEM as a Professional Engineer with a valid 'license' i.e. the "Practising Certificate".

**These fundamental amendments allow BEM to issue a "license" .....**

# BOARD OF ENGINEERS MALAYSIA

**BEM**

Amendment  
Professional Competency  
Examination (PCE) Council to  
be set-up

**President**

**Secretary &  
Registrar**

**14 members who shall be  
Professional Engineers**

**1 member from  
Board of Architect**

**1 member from Board  
of Quantity Surveyor**

Amendment to the  
composition of BEM

At least 50% of members of  
the Board shall be  
Professional Engineers with  
Practising Certificate

## Standing Committees of BEM

**Examination & Qualification**

**Quality**

**Application**

**Accredited Checkers**

**Management**

**Engineering Accreditation Council**

**Scale of Fees**

**Training & Education**

**Engineers Act**

**IT**

**National Monitoring**

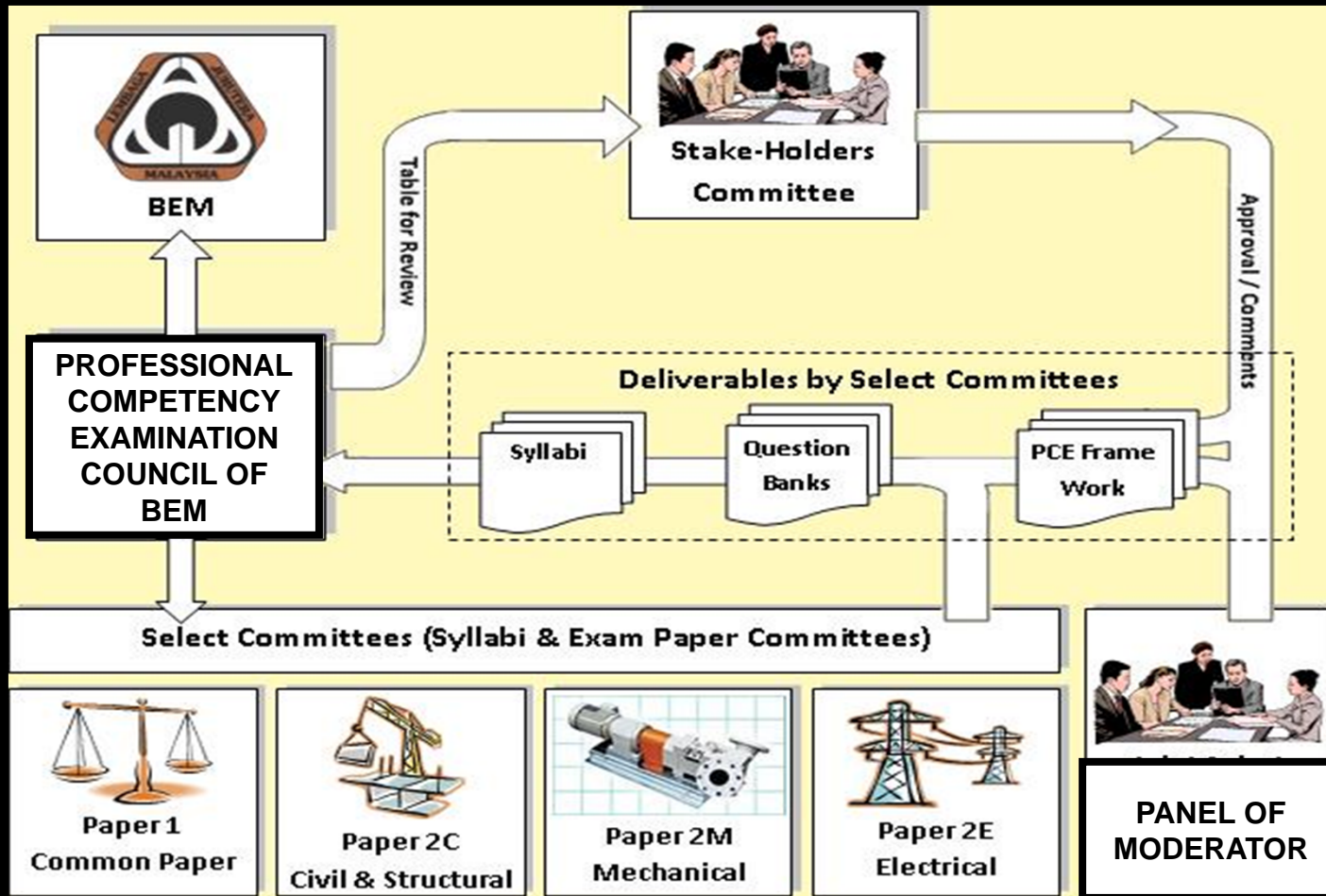
**Publications**

**Professional Practice**

The accreditation of the  
undergraduate engineering  
degree is under the purview of  
the BEM's Engineering  
Accreditation Council

The Professional Assessment  
Examination (PAE) is under the  
purview of BEM's Examination &  
Qualification Committee

# PROFESSIONAL COMPETENCY EXAMINATION COUNCIL



Integrity of the Competency Examination is important .....

# Professional Engineers' Licensing

What are the requirements of other countries .....



# P.E. LICENSING IN AUSTRALIA

**There is no Engineers Act, self-regulation is the norm.**

**The body that registers engineer is the National Professional Engineers Register Board (NPER). They have adopted the Australian Engineering Competency Standards as the basis for registering independent practitioners which consist of;**

**Stage 1** is the level of competency achieved on completion of an educational qualification accredited or recognized by Engineers Australia for entry to the profession.

**Stage 2** competencies relevant to a field of engineering and an occupational category. Consist of two parts;

**Part A – sets out the competencies required of an engineering practitioner**

**Part B – sets out the standards to which the competencies must be demonstrated**

**Use by the local authorities to recognize the “qualified person” .....**

# P.E. LICENSING IN CANADA

Engineering profession is regulated in accordance with the Engineers Act. However each territory or state (Ontario, Manitoba etc.) requires the practitioner to register separately.

In the state of Ontario the profession is regulated by Professional Engineers Ontario (PEO) requires the following before granting a license;

- \* satisfy the academic requirements set out by PEO
- \* satisfy the experience requirements set out by PEO
- \* pass the Professional Practice Examination (PPE) on engineering ethics and law

The designation of “consulting engineer” is also regulated by law which requires an applicant to have;

A minimum of five years of post-registration experience. This to ensure that in addition to technical experience, the applicant has acquired satisfactory exposure to the business aspects of consulting.

The word “consulting engineer” in Canada is regulated .....

# P.E. LICENSING IN SINGAPORE

The engineering profession is regulated by the Professional Engineers Board (PEB). They essentially register professional engineers in the building and construction industry.

The requirements to be registered as a professional engineer are;

- \* pass the Fundamentals of Engineering Examination (FEE) which can be undertaken upon graduation.
- \* pass the Practice of Professional Engineering Examination (PPE) and in addition attend and pass the Professional Interview.

The FEE tests the candidate on his technical capabilities whilst the PPE test him on the rules, regulations, practice and laws in Singapore. The PPE will focus on the Professional Engineers Act, Code of Conduct & Ethics, Engineers Rules and references to past disciplinary actions taken by the Board. PEB does not register Graduate Engineers.

**BEM has studied in detail this examination system .....**

# P.E. LICENSING IN TAIWAN

**Licensing is by the Ministry of Examination through the Senior Qualification Examination (SQE).**

**The requirements to be registered as a professional engineer are;**

- \* Recognized undergraduate degree**
- \* The SQE are mechanics of material, theory of structures, r.c. and precast concrete design, structural steel design, soil mechanics & foundation design, structural dynamics & earthquake design & Chinese language, charter and law.**

**Historically, passing rate for the SQE has been very low. 3% for 30 years ago. Today, it is between 15% to 20%.**

**On passing the SQE, the candidate has to submit an application to the Ministry of Economic Affairs for a license. With the license he has to join the Professional Structural Engineers Association in the region which he wishes to practice.**

**“..... and all documents and drawings related to work undertaken in Taiwan must use Chinese as the primary language.”**

# P.E. LICENSING IN UNITED KINGDOM

**There is no Engineers Act, self-regulation is the norm.**

**The body that registers professional engineer is Engineering Council (UK). A body such as the Institution of Civil Engineers or Mechanical Engineers provides the means by which a candidate can obtain a Chartered Engineers status i.e. a professional engineer.**

**Chartered Engineers are master's degree qualified and have gained professional competencies through training and experience. A typical qualification requirement is as follows;**

- \* Four years master course or three years with honours**
- \* Academic and internship/apprenticeship/graduate training**
- \* Peer reviewed professional practice**

**The process of becoming a Chartered Engineer takes 8-12 years. The title "Chartered Engineer" is protected by civil law but the practice of engineering has no legal restrictions in the UK.**

**The most recognizable professional engineer's qualification .....**

# P.E. LICENSING IN USA

**Engineers in practice are required by law to be licensed as a P.E. in the State which they wish to practice.**

**Licensed engineers carry the distinguished designation “professional engineer” or P.E. In general to obtain a license there is a four step process;**

- \* Undergraduate degree from ABET accredited engineering program.**
- \* Pass the first exam, the Fundamentals of Engineering which tests the applicant on the breath of understanding of basic engineering principles.**
- \* Gain engineering experience, under the supervision of a P.E. which takes about 4 years.**
- \* Pass the second exam, the Principles and Practice of Engineering which test the candidate’s knowledge & skills as well as engineering ethics.**

**The process is all by examination there is no interview.**

**However in the USA there are 50 states requiring 50 licenses .....**

# SUMMARY OF FINDINGS OF LICENSING FOR ENGINEERS

Country	By Interview	By Examination
Australia	X	
Canada		X
Malaysia	X	X
Singapore	X	X
Taiwan		X
United Kingdom	X	X
United States of America		X
New Zealand		X

Diversity of registration of professional engineers depending on the needs of each country .....

# What is the purpose of the PCE ?

To ensure competency .....



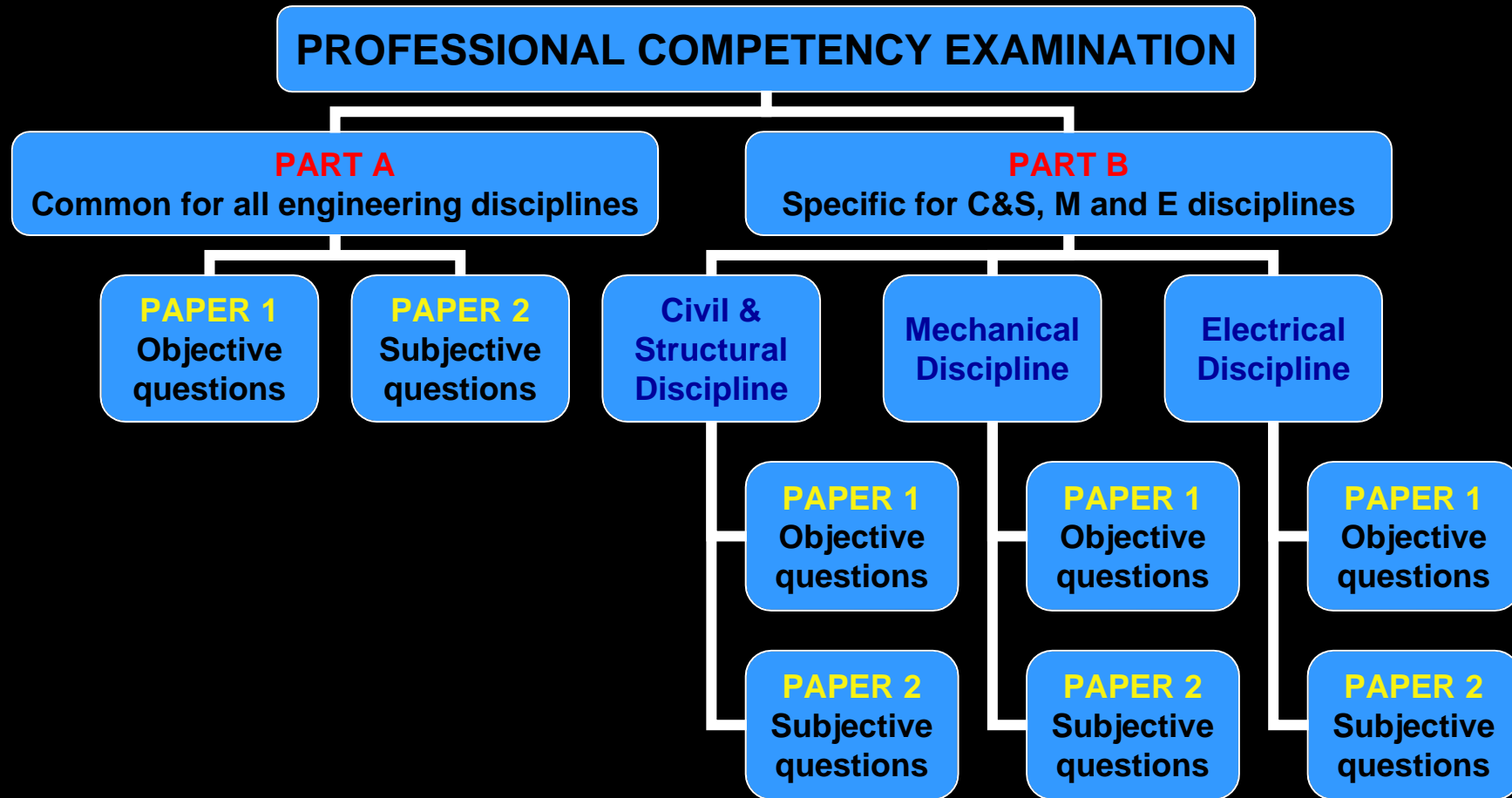
# AIMS OF THE PROFESSIONAL COMPETENCY EXAMINATION

The Professional Competency Examination will test the candidates within the limits of “**professional engineering services**” as defined by the Engineers Act in the engineering disciplines of civil & structural, mechanical and electrical engineering.

The examination will test the candidate's knowledge, experience and application of:

- Regulations and rules of engineering practice by BEM
- Statutory laws, design codes, regulations and
- Standards of professionalism and ethical behaviour imposed by BEM

# SUMMARY OF THE EXAMINATION SYSTEM



Currently has been developed for the Building/Construction Industry .....

# THE PROFESSIONAL COMPETENCY EXAMINATION (P.C.E.)

- The Examination is conducted by the Board of Engineers Malaysia pursuant to Section 4 of the amended Registration of Engineers Act 1967.
- The Board appoints an Examination Panel, consisting of such members from amongst the registered Professional Engineers to assist in conducting the Examination.
- The PCE comprises :
  - Part A – Common Part – Paper 1(Objective) and Paper 2(Subjective)
  - Part B – Each discipline – Paper 1(Objective) and Paper 2(Subjective)
  - Candidates can sit for Part A and B together or separately
  - Must pass both papers for both Parts at one sitting
  - The exam is an open book exam

# ELIGIBILITY TO SIT FOR THE EXAMINATION

- Professional engineers wishing to sit for the Professional Competency Examination (PCE) shall apply to the Board of Engineers Malaysia by completion of a prescribed form and pay the prescribed fees.
- Eligible candidates for the examination must be a Professional Engineer registered with the Board in the appropriate discipline.
- Candidates seeking registration as a licensing submitting engineer in the construction industry must have the relevant working experience to the field of engineering which he wishes to practice.
- On approval of the candidate's application by the Board, the candidate is allowed to sit for the examination.

# EXAMINATION REGULATIONS FOR THE PCE

## PCE COMPRISES OF 2 PARTS; PART A & PART B

Regulations for the examination:

- Compulsory to pass both papers in Part A and B
- Candidates must pass both papers for Part A and B at one sitting
- If the candidate passes Part A but fails Part B, he is allowed to sit the latter. This condition will also apply if he passes Part B but fail Part A.
- The pass result for Part A or B is valid for 3 years and there is no limit of attempts to re-sit the other Part as long as it is within the 3 years period.
- After the 3 years period, the candidate has to re-sit both Parts again.

# PCE: PART A

## PART A – COMMON PAPER

- \* To be taken by all candidates
- \* Non-technical in nature
- \* Test candidates' knowledge of laws governing the profession, the responsibility of the professional towards the general public and standards of professionalism and ethical behaviour

There are two papers for this Part – Paper 1 and 2

# **PCE: PART B**

## **PART B – PAPER ON EACH DISCIPLINE**

- \* To be taken by candidates in the relevant discipline which they wish to practice
- \* Technical in nature
- \* Test candidate's competency within his respective field of practice on :  
Regulations and rules of practice by BEM  
Statutory laws, codes, regulations etc.

There are two papers for this Part – Paper 1 and 2

# Format of the Professional Competency Examination (P.C.E.)

The structure & format .....



# GENERAL DESCRIPTION OF THE P.C.E.

**COMPRISES OF 2 PARTS; PART A & PART B**

Subjects	Time Allocated	Description
<b><u>PART A</u></b> Common Paper	<b><u>Consists of 2 papers</u></b>  Paper 1(Objective) & Paper 2(Subjuctive)  1.5+1.5 hours	<p>Common paper is to be taken by all candidates, which will be non-technical in nature but will test on the candidates' knowledge of laws governing the profession, the responsibility of a professional Towards the general public and standards of professionalism and ethical behavior. There are two papers for this Part i.e. Paper 1 and Paper 2.</p> <p>Candidates must pass both papers at one sitting.</p>
<b><u>PART B</u></b> Paper specific for each discipline	<b><u>Consists of 2 papers</u></b>  Paper 1(Objective) & Paper 2(Subjuctive)  2.0+1.5 hours for C&S 1.5+1.5 hours for M&E	<p>A technical paper which will be on civil &amp; structural, mechanical and electrical engineering. Candidates will sit for the paper in the relevant subject which they wish to practice. The examination will test the candidates' competency within his respective field of practice. There are two papers for this Part i.e. Paper 1 and Paper 2.</p> <p>Candidates must pass both papers at one sitting.</p>

# SUMMARY OF SYLLABI FOR PART A & B

<b>PART A</b> Common for all disciplines	<b>PART B</b> Specific for each discipline		
<b>Common Paper</b> (Paper 1 & 2)	<b>Civil &amp; Structural Paper</b> (Paper 1 & 2)	<b>Mechanical Paper</b> (Paper 1 & 2)	<b>Electrical Paper</b> (Paper 1 & 2)
Laws and regulations governing the engineering profession in Malaysia	Survey & Site Investigation Works	Air Conditioning and Ventilation System	Regulatory Practice
Engineer's responsibility to society and to the public	Earthworks	Fire Protection	Electricity Distribution System
Professionalism on a conceptual basis, ethical conduct and professional practice	Structural Analysis & Design	Hydraulics	System Protection & Discrimination
Overview of laws having relevance	External Water Supply & Sewerage for Building Development	Other mechanical systems	Building Systems
Basic knowledge of Contract Laws being practiced locally with respect to the Construction Industry	Road & Highway designs		
An in-depth knowledge of the functions of the consulting engineer during the various stage of project implementation in accordance with BEM Model Form of Agreement.	Drainage Design for Building development		
Management of Engineering Consultancy Practice	Regulatory practice & Submission Procedure for Civil Engineers		

For each major topic above there will be sub-topics .....

# FORMAT & STRUCTURE OF THE P.C.E.

PART A		TIME ALLOCATED	FORMAT
Common Paper (For all disciplines)	Paper 1	1.5 hours	40 objective questions Passing mark 50%
	Paper 2	1.5 hours	5 long/essay questions of which 3 to be answered. Passing mark 50%
PART B		TIME ALLOCATED	FORMAT
Civil & Structural Paper	Paper 1	1.5 hours	40 objective questions Passing mark 50%
	Paper 2	2.0 hours	5 long/essay questions of which 3 to be answered. Passing mark 50%
Mechanical Paper	Paper 1	1.5 hours	40 objective questions Passing mark 50%
	Paper 2	1.5 hours	5 long/essay questions of which 3 to be answered. Passing mark 50%
Electrical Paper	Paper 1	1.5 hours	40 objective questions Passing mark 50%
	Paper 2	1.5 hours	5 long/essay questions of which 3 to be answered. Passing mark 50%

## **PART A – Weightage for Common Paper 1 & 2**

**No. of multiple choice questions = 40**

**No. of subjective questions = 5**

<b>Category</b>	<b>Weightage in %</b>
<b>Construction Law</b>	<b>25%</b>
<b>Engineers Act</b>	<b>35%</b>
<b>Local Laws relevant to the practice</b>	<b>30%</b>
<b>Management of Engineering Consultancy Practice</b>	<b>10%</b>

**Note: Subjective questions may comprise combination of some or all of the above categories.**

## PART B – Weightage for Discipline Paper 1 & 2

No. of multiple choice questions = 40

No. of subjective questions = 5 (may be a combination of categories)

Civil & Structural Paper		Mechanical Paper		Electrical Paper	
Category	Weightage (%)	Category	Weightage (%)	Category	Weightage (%)
Geotechnical	20%	Air-Conditioning and Ventilation	40%	Regulatory Practice	20%
Civil infra	30%	Fire Protection	30%	The Electricity Distribution System	30%
Structure	40%	Hydraulics	20%	System Protection	25%
UBBL	10%	Other Mechanical Systems	10%	Building Systems	25%

# The Common Paper

For all engineers in the building/construction industry .....

## TYPICAL QUESTION PART A - Common Paper 1

Q1. A local Consultant (A) enters into an agreement with a foreign Contractor (B) to carry out engineering consultancy services for a Turnkey Contract in that country. Mid-way through the project, war breaks out in that country. What is the effect?

- A. The Contract is valid and enforceable
- B. The Contract is frustrated
- C. The Contract is suspended
- D. The Contract is discharges
- E. The Contract is void

[Test on Contract law]

## TYPICAL QUESTION PART A - Common Paper 1

Q5. Which of the following statement is/are true?

- a) Only Mechanical Professional Engineers can submit active fire protection plans.
- b) Only Civil or Mechanical Professional Engineers can submit passive fire protection plans for industrial buildings.
- c) Professional Engineers of any discipline can submit active fire protection plans.
- d) Only Electrical Professional Engineers can submit electrical plans.

- A. a) only
- B. a) and b) only
- C. a), b) and d) only
- D. c) only
- E. b), c) and d) only

[Test on UBBL and Regulations]



## TYPICAL QUESTION PART A - Common Paper 1

Q10. Which of the following statement is false?

- A) The BEM Scale of Fees is mandatory.
- B) A Sole Proprietorship practising as an ECP must be registered with BEM.
- C) All ECPs must be registered with BEM.
- D) Professional Fees based on man months do not contravene the BEM Scale of Fees.
- E) For a private project, a consultant may exclude provision of supervision and hence need not charge the corresponding professional fees.

[Test on Engineers Act]

## TYPICAL QUESTION PART A - Common Paper 2

Q1. The contractor applies for Extension of Time (EOT) before his contract completion period expires. The Contract Administrator does not respond and the original contract completion date is passed. One month later, the Contract Administrator issues a V.O. for additional works to the Contractor. The Contractor refuses to carry out the V.O. works. What can the Contract Administrator do in this situation?

[Test on Contract law and the Engineers Act]

## TYPICAL QUESTION PART A - Common Paper 2

Q3. A Consultant has carried out substantial works on a project and the Employer encounters financial difficulties. He suspends the project. On resumption, he terminates the Consultant's employment citing use of in-house consultants to complete the works due to financial constraints. What is the legal effect of the termination and what financial compensation can the consultant seek?

[Test on Contract law and the Engineers Act]

# The Civil & Structural Paper

For civil engineers .....

## TYPICAL QUESTION PART B – C&S Paper 1

Q5. Which of the following statements are true for circular column?

- A. Minimum no. of bars is 8, size of bar is not less than 10 mm
- B. Minimum no. of bars is 8, size of bar is not less than 12 mm
- C. Minimum no. of bars is 6, size of bar is not less than 10 mm
- D. Minimum no. of bars is 6, size of bar is not less than 12 mm
- E. None of the above

[Where understanding of the Code of Practice is required]

## TYPICAL QUESTION PART B – C&S Paper 1

Q8. What is the minimum residual pressure head for an external hydrant system required by Bomba.

- A. 3.0m
- B. 7.5m
- C. 12.5m
- D. 10.0m
- E. 9.0m

[Understanding of Bomba requirements]

## TYPICAL QUESTION PART B – C&S Paper 1

Q9. What is the fire resistance requirement for a concrete structure of underground basement car-park?

- A. One hour
- B. Half an hour
- C. Two hours
- D. Four hours
- E. One & half hours

[Understanding of UBBL requirements]

## TYPICAL QUESTION PART B – C&S Paper 2

Q1. A 3-storey basement car park is to be built with an excavation of approximately 15.0m from the existing ground level. The water table is 1.0m below the existing ground level. You are required to provide a solution on the structural system for the retaining walls of the basement.

Note:

This question can be answered in ½ hr. if it is expected that the answer is only descriptive in nature. However if a plan of basement & sections are provided with the soil properties then this question will take at least 1 hr where it is expected that sketches and typical details are provided with supporting calculations.

[Understanding of retaining structures & safeguarding public interest]



## TYPICAL QUESTION PART B – C&S Paper 2

Q3. You are the infrastructure engineer for a housing developing scheme for a 500 acres project. What is your advice to the Developer, Planners and Architects in terms of requirements for drainage for the whole development?

Note:

Question can be answered in ½ hr provided that the answer is descriptive in nature. However if a layout plan of the housing scheme with contours are provided and it is expected that the drainage reserve be sized-up this question will take 1 hr. to answer.

[Understanding of MASMA]

# The Mechanical Paper

For mechanical engineers .....

## **TYPICAL QUESTION PART B – Mechanical Paper 1**

Q5. Which of the following is not applicable for active fire designs?

- A. MS 1472
- B. MS 1780
- C. MS 1910
- D. MS 1525
- E. Guide to Fire Protection in Malaysia

**[Understanding of design codes for fire protection]**

## TYPICAL QUESTION PART B – Mechanical Paper 1

Q7. Which of the following requirement not stipulated in the UBBL or SBO is not true?

- A. Smoke spill system must be provided for any fire compartmented area exceeding 10,000 sq.ft.
- B. The first stage wet riser tank cannot be installed above the ground floor
- C. Sprinkler tank may be installed at roof level
- D. A wet riser system cannot contain more than 4 riser stacks
- E. A hose reel system cannot contain more than 8 riser stacks

[Understanding of UBBL requirements]

## TYPICAL QUESTION PART B – Mechanical Paper 1

Q10. Fire lifts are required for buildings where the topmost occupied floor is

- A. Over 30.5m
- B. Over 18.5m
- C. Over 1,000m<sup>2</sup>
- D. Over 18.5m and 1,000m<sup>2</sup>
- E. Over 30.5m and 1,000m<sup>2</sup>

[Understanding of Bomba requirements]

## TYPICAL QUESTION PART B – Mechanical Paper 2

Q1. You are appointed to design the air conditioning and mechanical ventilation system for the retrofit of a 20 year old, 25 storey Office Building with a nett rentable area of 1500m<sup>2</sup> per floor. Your client requires for the new air conditioning system to have minimum running costs and with flexibility to cater for after normal office hour occupation by some of the tenants.

List the types of air conditioning systems you would consider and recommend. Elaborate the reasons for your recommendation and how you would ensure compliance to current local authorities requirements. Also list down specific areas not within your responsibilities and capabilities where you need your client to seek expert advice.

[Understanding of HVAC requirements]

## TYPICAL QUESTION PART B – Mechanical Paper 2

Q4. The following complaints have been received from building occupants. Briefly describe what you think are the likely causes of these problems and the solutions you would propose.

- a) Office occupants seating next to window complain of unsatisfactory air conditioning. Your on -site measurement shows the design temperature of 24degC DB and 55% RH is achieved.
- b) Hotel guests complain it takes a long time to get hot water from their toilet showers and the water temperature fluctuates during their showers.
- c) The contractor was unable to achieve specified background noise level of NC 25 for the auditorium even though he has followed manufacturer's recommendation of internal duct lining as well as installed silencers.

**[Understanding of building services requirements]**

# The Electrical Paper

For electrical engineers .....



## TYPICAL QUESTION PART B – Electrical Paper 1

Q1. Select the statement which do not describe the function of the Minister under “The Electricity Supply Act”

- A. Efficient use of energy
- B. Power to fix tariff for electricity
- C. Competency of persons in charge
- D. Licensing of electrical installation
- E. Control of electrical equipment and plant for safety

[Understanding of Regulatory Practice]

## TYPICAL QUESTION PART B – Electrical Paper 1

Q3. Which is the best installation method to minimize eddy current losses in single core cable sheaths

- A. Flat formation
- B. Trefoil formation
- C. Alternate formation
- D. Cross bonding of sheaths
- E. Bundle in air

[Understanding of Electrical Distribution Network]

## TYPICAL QUESTION PART B – Electrical Paper 1

Q8. What is expected short circuit current at 400V if a 1000kVA transformer of 11/0.4kV with an impedance of 5% is connected to a 11kV infinite bus ?

- A. 8,000 Amps
- B. 1,250 Amps
- C. 50,000 Amps
- D. 2,886 Amps
- E. 28,868 Amps

[Understanding of System Protection]

## **TYPICAL QUESTION PART B – Electrical Paper 2**

**Q1. You are requested to plan the electrical installation for a modern 8 storey commercial building given the following information:**

**(a) Building aircond with 1x35HP ACPU service basement and ground floor, 7 sets 17HP APU for each floors, 1x7HP and 1x25HP ACPU on the 8<sup>th</sup> Floor,**

**(b) 1x15HP lift motor at motor room at roof**

**(c) 1x5HP water pump at basement floor**

**(d) Lighting and other power loads per floor (including basement and ground) at estimated 5kW and 4kW respectively.**

**(e) The landlord will be responsible for the consumption with respect to air cond on all floors, lift, water pumps, lighting in staircase and lighting and power in basement.**

**(f) The basement floor will house TNB substation and consumer main switch board whilst the rest of the floors will be sublet for offices.**

**Draw a single line diagram of the installation showing the sizes of main conductors, method of running, rating of switches and metering arrangement on the main intake board and individual metering by the TNB for each floor.**

**[Understanding of System Design]**

## **TYPICAL QUESTION PART B – Electrical Paper 2**

**Answer completely the following two questions:**

- (a) As a electrical consulting engineer, described clearly the general procedures which would be established for acceptance of works under your supervision.**
- (b) Describe the role of SIRIM certification in the work acceptance procedure.**

**[Understanding of Building Systems]**

# Trial examination

To test the examination .....

## Format of Trial Examination

The examination was organized for the following branches of engineering in the building/construction industry:

- Civil & structural engineering
- Mechanical engineering
- Electrical engineering

The Examination was conducted in two parts:

- **Part A** – The Common paper was to be taken by all candidates. This paper was non-technical in nature but would test on the candidates' knowledge of laws governing the profession, the responsibility of a professional towards the general public and standards of professionalism and ethical behavior. There were two papers for this Part i.e. Paper 1 and Paper 2. Candidates must pass both papers at one sitting.
- **Part B** – This was the technical paper which was on civil & structural, mechanical and electrical engineering. Candidates will sit for the paper in the relevant subject which they wish to practice. The Examination will test the candidates' competency within his respective field of practice. There were two papers for this Part i.e. Paper 1 and Paper 2. Candidates must pass both papers at one sitting.

## **Breakdown of candidates in various disciplines**

**All candidates are Professional Engineers (P.E.)**

A total of 47 candidates sat for the trial PCE on 24 April 2010 at The Women's Institute of Management, Kuala Lumpur

Breakdown of disciplines:

Civil and Structural	=	25 candidates
Mechanical	=	12 candidates
Electrical	=	10 candidates

Candidates from consultant firms:	40 pax
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Candidates from govt. bodies/organization:	7 pax
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# **Professional Competency Examination Schedule**

## **Schedule for Part A: Common Paper**

<b>8.00am</b>	<b>Registration</b>
<b>*8.45am-10.30am</b>	<b>Part A: Common Paper 1 (1½ hours)</b>
<b>10.30am-11.00am</b>	<b>Breaktime</b>
<b>*11.00am-12.45pm</b>	<b>Part A: Common Paper 2 (1½ hours)</b>
<b>12.45pm-1.30pm</b>	<b>Lunch</b>

**\* Inclusive of 15 minutes to read the question paper**

# **Professional Competency Examination Schedule**

## **Schedule for Part B: Discipline Paper**

<b>*1.30pm-3.15pm</b>	<b>Part B: C&amp;S / Mechanical / Electrical Paper 1 (1½ hours)</b>
3.15pm-3.45pm	Breaktime
<b>*3.45pm-5.30pm</b>	<b>Part B: Mechanical / Electrical Paper 2 (1½ hours)</b>
<b>*3.45pm-6.00pm</b>	<b>Part B: Civil &amp; Structural Paper 2 (2 hours)</b>

**\* Inclusive of 15 minutes to read the question paper**

## Photos of Candidates



No hand phones

No computers

Open book examination

Provide 2 tables



# Candidates' feedback on examination

To gauge the level of difficulty .....

# 1. The environment of the examination venue

(a) Was the location difficult to find?

	<u>Yes</u>	<u>No</u>
C&S	5	18
Mechanical	1	10
Electrical	1	8
<b>Total (43)</b>	<b>7</b>	<b>36</b>

For those from outstation it can pose problems .....

# 1. The environment of the examination venue

(b) Was there a problem getting to the place with traffic congestion?

	<u>Yes</u>	<u>No</u>	<u>N/A</u>
C&S	2	21	0
Mechanical	0	10	1
Electrical	0	9	0
<b>Total (43)</b>	<b>2</b>	<b>40</b>	<b>1</b>

Even location of the venue may pose problems .....

# 1. The environment of the examination venue

(c) Was the space allotted for you at the exam hall comfortable?

	<u>Yes</u>	<u>No</u>
C&S	19	4
Mechanical	10	1
Electrical	8	1
<b>Total (43)</b>	<b>37</b>	<b>6</b>

As this is an open book examination space is important .....

# 1. The environment of the examination venue

(d) Were there any factors that have affected your performance?

	<u>Yes</u>	<u>No</u>
C&S	3	20
Mechanical	1	10
Electrical	1	8
<b>Total (43)</b>	<b>5</b>	<b>38</b>

Reason if yes:

- Air-condition not working in the afternoon for a couple of hours.
- Whole exam takes too long in 1 day. Should conduct over 2 days.
- Hall is very warm.
- Mentally tiring to sit for 4 exam papers in 1 day.



## 2. The Standard of the Examination

(a) Was the standard of the examination questions in accordance with the given syllabus?

	<u>Yes</u>	<u>No</u>	<u>No comments</u>
C&S	18	2	3
Mechanical	9	1	1
Electrical	9	0	0
<b>Total (43)</b>	<b>36</b>	<b>3</b>	<b>4</b>

A syllabus is important so that candidates should not be misled .....

## 2. The Standard of the Examination

(b) Please rate the standard on the questions.

### Part A Common Paper 1 (Objective questions)

	<u>Difficult</u>	<u>Reasonable</u>
C&S	7	16
Mechanical	4	7
Electrical	3	6
<b>Total (43)</b>	<b>14</b>	<b>29</b>

Majority of candidates find it reasonable .....

## 2. The Standard of the Examination

(b) Please rate the standard on the questions.

### Part A Common Paper 2 (Subjective questions)

	<u>Difficult</u>	<u>Reasonable</u>
C&S	8	15
Mechanical	3	8
Electrical	2	7
<b>Total (43)</b>	<b>13</b>	<b>30</b>

Majority of candidates find it reasonable .....

## 2. The Standard of the Examination

i.	Part A Common Paper 1	Difficult: 14	Reasonable: 29
ii.	Part A Common Paper 2	Difficult: 13	Reasonable: 30
iii.	Part B C&S Paper 1	Difficult: 8	Reasonable: 15
iv.	Part B C&S Paper 2	Difficult: 8	Reasonable: 15
v.	Part B Mech. Paper 1	Difficult: 1	Reasonable: 10
vi.	Part B Mech. Paper 2	Difficult: 1	Reasonable: 10
vii.	Part B Elect. Paper 1	Difficult: 2	Reasonable: 7
viii.	Part B Elect. Paper 2	Difficult: 1	Reasonable: 8

Majority of candidates find it reasonable .....

## 2. The Standard of the Examination

- (c) Comment on the time of 15 minutes given for reading of the questions before commencement of each of the exam paper.

	<u>C&amp;S</u>	<u>Mech.</u>	<u>Elect.</u>
Too long	3	1	0
Reasonable	20	9	7
Too short	0	0	1
Not necessary	0	1	1
<b>Total (43)</b>	<b>23</b>	<b>11</b>	<b>9</b>

### Comments:

- 5-10 minutes is reasonable, 5 minutes is sufficient.
- Difficult for implementation-some candidates have started answering the questions.
- The 15 minutes should be granted to the candidates to answer the questions.
- Too short especially Part B, Paper 2.

## 2. The Standard of the Examination

- (d) Comment on the time period given for Paper 1 and 2 of both Part A & B.

Paper 1 of 1½ hours:

	<u>Too long</u>	<u>Reasonable</u>	<u>Too short</u>
C&S	0	21	2
Mechanical	1	9	1
Electrical	1	7	1
<b>Total (43)</b>	<b>2</b>	<b>37</b>	<b>4</b>

### Comments:

- C&S - Part B requires some calculations which takes quite some time, too many calculations for structural portions.
- Mech - Just nice if minus the “reading time”.
- Elect - Not enough time to complete, many questions requiring reference to some books (i.e. laws & regulations, standards, codes, etc) may take longer time to answer, should be reduced to 1 hour + reading time.

## 2. The Standard of the Examination

(d) Paper 2 of 1½ - 2 hours:

	<u>Too long</u>	<u>Reasonable</u>	<u>Too short</u>	<u>No Comment</u>
C&S	1	18	4	0
Mech.	0	6	4	1
Elect.	0	2	7	0
<b>Total (43)</b>	<b>1</b>	<b>26</b>	<b>15</b>	<b>1</b>

### Comments:

- C&S - Too many calculations required for structural questions, Paper 2 requires more time for calculations, Don't know how detailed we should write.
- Mech - Paper 2 of 1½ is too short considering essay answers for 3 questions in point form doesn't reflect the whole thought process and may affect the mark to be awarded. There is a level of uncertainty to what details one should answer.
- Elect - Paper 2, time is slightly short since it involves calculation and sketches; Part B, paper 2 needs longer time; Should be increased to 2 hours + reading time.

## 2. The Standard of the Examination

(e) Was the whole examination too hectic to be taken in one day?

	<u>Yes</u>	<u>No</u>
C&S	18	5
Mechanical	5	6
Electrical	3	6
<b>Total (43)</b>	<b>26</b>	<b>17</b>

(f) Would you like the examination to be conducted over two days period?

	<u>Yes</u>	<u>No</u>
C&S	17	6
Mechanical	5	6
Electrical	4	5
<b>Total (43)</b>	<b>26</b>	<b>17</b>



## 2. The Standard of the Examination

- (h) Any further comments on the exam which you like to make and which are not covered in this questionnaire?

### **Civil & Structural Candidates**

- More space to place books.
- A lot of references are not in electronic form or accessible from the net, while books are too bulky to bring along. Please consider allowing electronic form of reference and/or internet access without possible communication with another individual.
- To arrange a whiteboard to display.
- Start and end time of paper under way – clock available but candidate has to work out the end time of each paper.
- Display any errata/typo corrections, if required.
- Time/duration of exam for each paper should write on the whiteboard at the stage together with the clock.
- Will be nice to provide a bottle of mineral water.
- All candidates shall have equal reference (books, journal, code of practice, etc.)
- Those who already passed MIEM/P.Eng professional interview will find it reasonable as the exam format quite in-line although not similar.

## 2. The Standard of the Examination

- (h) Any further comments on the exam which you like to make and which are not covered in this questionnaire?

### **Mechanical Candidates**

- There should be questions on submission process/procedure (i.e. DO to BP to CCC) to ensure that the submitting engineer is aware of the local requirements for paper 1.
- Mechanical paper 2 part B appears to have more questions on HVAC and doesn't covers much on other services (gas & lift).
- There is not much questions involving calculations, should this be reviewed?
- Proposed C&S to be separated for the 2<sup>nd</sup> paper so that concluding announcements for M&E will not disturb them.
- Give more on the management area rather than too technical aspect.
- Design engineers are not involved in contract administration except for contract pertaining to M&E tender.
- Most of the questions are related to fire and very few related to HVAC and zero on BMS.
- Part A & B to divide into two days.

## 2. The Standard of the Examination

- (h) Any further comments on the exam which you like to make and which are not covered in this questionnaire?

### Electrical Candidates

- Difficult for outstation candidates to bring books. I had to select only more relevant books to bring because of airline luggage allowance.
- Need to choose a venue which is convenient/close to hotel, restaurant and ease of transport from/to airport.

# Results of the trial examination

& the level of understanding .....

# Passing Marks for the Examination

- a) Candidates must satisfy the examiners in all the papers in Part A and Part B of the examination.
- a) No marks will be revealed to the candidates. The result will be notified to the candidates as either a “pass” or “fail”.
- c) The marks are to be used as an internal tool to gauge the “difficulty” level of the exam for the examination committee. They are being kept as “confidential”.
- c) To obtain an overall pass in the exam, candidates must pass Part A and Part B.

# Examiner Markers for the Examination

- \* Each paper in the exam is being marked by two examiners except for the geotechnical questions in C & S Part B – paper 2 which is marked by only one examiner.
- \* Each paper has been marked by two examiners independently.
- \* In the event of a dispute in the overall marks for the paper given by each examiner, a third examiner will be appointed to mark the paper to resolve the results.
- \* The dispute in the marks for each paper will not be revealed to the examiners.

## Results of Part A – Common Paper

Total no. of candidates: 47 of which 25 C&S, 12 Mech & 10 Elect

### Part A – Common Paper 1 (Objective)

No. of candidates who passed:

<u>C&amp;S</u>	<u>Mechanical</u>	<u>Electrical</u>	<u>Total</u>
14	5	3	22

Percentage passing: 46.81%

### Part A – Common Paper 2 (Subjective)

No. of candidates who passed:

<u>C&amp;S</u>	<u>Mechanical</u>	<u>Electrical</u>	<u>Total</u>
6	3	3	12

Percentage passing: 25.53%

**No. of candidates who passed**

**Part A Common Paper 1 & 2: 7 out 47 which is 14.98%**

## Results of Part B – C&S Paper

### Part B – Civil & Structural Paper 1(Objective)

No. of candidates:	25	
No. of candidates who passed:	7	28.00%

### Part B – Civil & Structural Paper 2(Subjctive)

No. of candidates:	25	
No. of candidates who passed:	5	20.00%

**No. of candidates who passed**

**Part B C&S Paper 1 & 2: 2 out 25 which is 8.00%**



## Results of Part B – Mechanical Paper

### Part B – Mechanical Paper 1(Objective)

No. of candidates:	12	
No. of candidates who passed:	11	91.67%

### Part B – Mechanical Paper 2(Subjective)

No. of candidates:	12	
No. of candidates who passed:	7	58.33%

**No. of candidates who passed**

**Part B Mechanical Paper 1 & 2: 7 out 12 which is 58.33%**

## Results of Part B – Electrical Paper

### Part B – Electrical Paper 1(Objective)

No. of candidates:	10	
No. of candidates who passed:	7	70.00%

### Part B – Electrical Paper 2(Subjective)

No. of candidates:	10	
No. of candidates who passed:	4	40.00%

**No. of candidates who passed**

**Part B Electrical Paper 1 & 2: 3 out 10 which is 30.00%**

# Summary of Results

	<u>C&amp;S</u>	<u>Mech.</u>	<u>Elect.</u>
Common Paper 1(Objective)	14	5	3
Common Paper 2 (Subjective)	6	3	3
C&S Paper 1(Objective)	7		
C&S Paper 2(Subjective)	5		
Mechanical Paper 1(Objective)		11	
Mechanical Paper 2(Subjective)		7	
Electrical Paper 1 (Objective)			7
Electrical Paper 2 (Subjective)			4

## No. of candidates who passed the overall examination

Civil & structural discipline:	0
Mechanical discipline:	2
Electrical discipline:	0

Total no. of candidates who passed:      2 (or 4.26%)

## **Circumstances under which the candidates were sitting for the exam and these factors were:**

1. There was no recognition for the results of the exam by ACEM or BEM. It was a trial run of the PCE programme.
2. Candidates were given a limited time frame to prepare for the exam i.e. less than two months.
3. No course was being organized to prepare the candidates for the exam except for an evening presentation talk organized by ACEM.
4. Time was rather limited for any course in the PCE programme to be organized.
5. Honorarium was given not for success in the exam but rather to attract them to sit for the exam voluntarily.

# BEM's Operations for the P.C.E.

Information for the Candidates .....

# APPLICATION TO SIT FOR THE P.C.E.

The following documents will be made available to candidates.

1. Application form for the P.C.E. which amongst others will include the time, date and venue. The form will also be available on BEM's website.
2. P.C.E. – Volume 1 (General information and examination syllabus) will be available for candidates.
3. P.C.E. – Volume 2 (Sample questions for PCE) will be available for candidates.

# DRAFT APPLICATION FORM

## Application to Sit for Professional Competency Examination

To: Registrar,  
The Board of Engineers Malaysia,  
Tingkat 17, Ibu Pejabat JKR,  
Jalan Sultan Salahuddin,  
50580 Kuala Lumpur.

I hereby apply to sit for the following papers in the Professional Competency Examination:

- Part A – Common Paper 1 and 2 (Compulsory for all candidates) ☐
- Part B – Civil & Structural Paper 1 and 2 ☐
- Part B – Mechanical Paper 1 and 2 ☐
- Part B – Electrical Paper 1 and 2 ☐

*Please tick ( ✓ ) in the appropriate box for the papers which the applicant wishes to sit*

I attach herewith my \*cheque/bank draft for RM \_\_\_\_\_ being payment of my application to sit for the above examination.

*\*Payment by cheque is to be made payable to: 'The Board of Engineers Malaysia'*

I hereby authorize the Board of Engineers Malaysia to seek verification on the information submitted by me in any manner and by any means as it deems fit and proper.

### Personal Particulars

(To be completed by the applicant)

Full Name: \_\_\_\_\_

(Use block letters and underline surname)

Permanent Address: \_\_\_\_\_

\_\_\_\_\_

Postal Address: \_\_\_\_\_

\_\_\_\_\_

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THANK YOU