Asian Epilepsy Academy *(ASEPA)*

EEG Certification Examination

EEG Certification Examination

- **Aims**

  – To set and improve the standard of practice of Electroencephalography (EEG) in the Asian Oceanian region

ASEPA EEG Certification Examination Board

(January 2010 to December 2013)

ILAE Chapter Representatives

Chairman: Shih-Hui **LIM** (Singapore Epilepsy Society)

Members: Andrew **BLEASEL** (Epilepsy Society of Australia)

Weiping **LIAO** (China Association Against Epilepsy)

Akio **IKEDA** (Japan Epilepsy Society)

Byung-In **LEE** (Korean Epilepsy Society)

Chong-Tin **TAN** (Malaysian Society of Neurosciences)

Shang-Yeong **KWAN** (Taiwan Epilepsy Society)

Asian Epilepsy Academy (ASEPA)
## EEG Certification Examination

- **ASEPA-ASNA EEG Certification Examination**

  – In collaboration with the ASEAN Neurological Association (ASNA) since 2005; for candidates from Asian Oceanian region except China

- **ASEPA-ASNA-CAAE EEG Certification Examination**

  – In collaboration with China Association Against Epilepsy (CAAE) since 2009; for candidates in China

Conduct of EEG Examination

- **Part 1 or Part 2**

  - 1 to 4 times a year

  - During regional neurological or epilepsy conference, e.g.

    - Biennial Convention of ASEAN Neurological Association (ASNA)

    - Biennial Asian Oceanian Epilepsy Congress (AOEC)

  - During ASEPA Teaching Courses / Workshops

  - During annual conference of ILAE Chapter, e.g.

    - CCAE's annual epilepsy conferences

  - Any time of the year in any city or country when there are enough numbers of candidates

Certification Examination
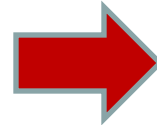
Part 1: Written ➡ Part 2: Oral

Who Can Apply For Part 1 Exam?

- Practicing Neurologists or Psychiatrists in their own countries / regions

- Neurology, Epilepsy or EEG Trainees

  – Need to show proof that they have had adequate training and experience in EEG interpretation and reporting

- Experienced EEG technologists, especially those involved in EEG reporting and/or interpretation in their own EEG laboratories

Before Applying For Part 1 Exam

- The Board expects that training in EEG will include broad exposure to the scientific basis of clinical neurophysiology as well as relevant aspects of technique and instrumentation

- All candidates are expected to have extensive experience interpreting EEGs, in various age groups and in a wide range of clinical disorders

Part 1 Examination

- Written

- Answer **150 Multiple Choice Questions** in **3** hours

- 3 Sections (50 questions each)

  1. EEG recording techniques and instrumentation

  2. Normal EEGs

  3. Abnormal EEGs

- **Each question will have 5 choices of which only one is correct**

- No minus mark for wrong answer

Topics Asked In Written Examination

- **Neuroanatomy and Neurophysiology**

    – Anatomy of neural generation

    – Mechanisms of EEG generation

    – Pathophysiology of abnormal waveforms

    – Basic mechanisms of epileptogenesis

- **EEG Recording Techniques**

    – Head measurement and marking

    – Electrode position nomenclature (International 10-20 & 10-10 System)

    – Electrodes: properties and application techniques

    – Impedance measurements)

    – Activation procedures such as hyperventilation, sleep deprivation, photic stimulation

- **Instrumentation, Polarity and Localization**

    – Basic electricity and electronics

    – Amplifiers and their characteristics

    – Calibration

    – Waveform measurements (voltage, frequency, and duration)

    – Filters, sensitivity and frequency response curves

    – Localization and polarity

    – Electrical safety

    – Principles of EEG digitalization including analog-to-digital conversion (vertical and horizontal resolution), sampling rate (aliasing and Nyquist frequency), screen or monitor display (sensitivity scale and pixel resolution), etc

    – Recording reference (electrode site, average reference and Laplacian reference)

    – Montages and reformatting

- **Artefacts**

    – All physiological and non-physiological artefacts including artefacts caused by chewing, sweating, eye movements, ECG, pulse motion, movement of head/body, electrode pops or movements, electrical fields from electrical devices (TV, telephones), respirator-induced movements, intravenous drips/drip pumps, etc

Topics Asked In Written Examination

- **EEG Interpretation and Reporting**

  – Principles of interpretation

  – General classification of abnormal EEGs

  – Elements of EEG reports

  – How to make good reports

- **Normal EEG in Adult & Elderly**

  – Normal awake and normal sleep patterns including alpha, beta, theta, delta waves, mu, lumbda waves, POST, Vertex sharp transients, spindles, K-complex

  – Normal responses to hyperventilation and photic stimulation

  – Changes in EEG in the elderly

- **Normal EEG in Infants and Children**

  – Normal patterns of various ages from neonates up to adolescents

- **Normal Variants & Uncommon Patterns of Doubtful Significance**

  – Small sharp spike / benign epileptiform transients of sleep

  – Wicket spikes

  – Psychomotor variants

  – 14&6 positive spike

  – Breech rhythm

  – Sub-clinical rhythmic EEG discharges in adults (SREDA)

  – Alpha variants,

  – Phantom spike-waves patterns

Topics Asked In Written Examination

- **Non-Epileptiform Patterns**

  - Slow waves

  - Triphasic waves

  - Generalized periodic complexes/patterns

  - Periodic lateralized epileptiform discharges (PLEDs)

  - Coma and stupor

- **Epileptiform Patterns**

  - Definition of epileptiform patterns

  - Types & recognition of various inter-ictal epileptiform patterns such as sharp waves, spikes, polyspikes, 3Hz spike & wave complexes, 4-6Hz spike & wave complexes, slow spike & wave complexes, photo-paroxysmal responses, hypsarrhythmia

  - Ictal patterns

  - How to differentiate interictal from ictal patterns

  - EEG patterns in specific epilepsy syndrome such as focal (e.g. Benign Rolandic Epilepsy, Benign Epilepsy of Childhood with Occipital Paroxysms) and generalized (West Syndrome, Lennox-Gastaut Syndrome, Absence Epilepsy, Juvenile Myoclonic Epilepsy, etc) epilepsy syndromes

  - EEG in status epilepticus

- **Long-term EEG Monitoring**

  - Types of long-term EEG recording

  - Indications and limitation of ambulatory and video-EEG monitoring

  - Various semiology and their localizing & lateralizing values

- **Use of EEG in the Management of Seizure and Non-Seizure Disorders**

  - Strength and limitations of EEG

  - Indications for ordering EEG

  - Yields of finding abnormality (e.g. epileptiform patterns) in patient with & without seizure disorders

  - Use of long-term EEG monitoring in patients with refractory epilepsy

  - Use of EEG in treatment & prognosis of epilepsy

  - Use of EEG in non-seizure disorders (e.g. CVA; metabolic & toxic encephalopathies; dementia; brain tumors; head trauma; headaches, etc)

Eligibility for Part 2

- **Must Pass Part 1**

  – Pass at least 2 of the 3 sections

    • Passing marks for each section is **50%**

  – Average mark for 3 Sections must be **≥ 50%**

Part 2 Examination

- **Oral Examination**

  – 2 stations, 30 minutes each

  – 2 examiners in each station

- **Station 1**

  – Test 2 EEGs brought by each candidate

- **Station 2**

  – Test 20 EEG samples provided by the Examination Board

Station 1

- Review and discuss 2 complete EEG records brought by each candidate from his/her <u>routine</u> EEG laboratory

- Both EEGs could be recorded by technologist under the candidate's direct supervision and should be representative of the candidate's opinion of good technical quality

- Recordings of normal EEGs or demonstrating electrocerebral silence are not acceptable and will result in failure of this Station

EEG Records

- EEGs need to be recorded on digital media and be reviewed on a computer monitor

- Candidates are required to demonstrate the ability to change sensitivity & filter settings as well as montages

- Candidates have to take responsibility should they not able to open the EEG files during the examination

- Advisable for candidates to prepare hardcopy of their EEG tracings in case their notebook computer does not function normally during the examination

EEG Reports

- Each record should include a report dictated by the candidate

- To prepare for a good report, please refer to the American Clinical Neurophysiology Society's Guideline 7 on "Guidelines for Writing EEG Reports".

    https://www.acns.org
    http://www.acns.org/pdfs/ACFDD50.pdf

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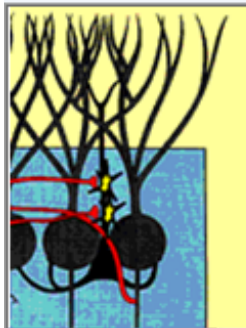
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· Feb 10, 2006   00 - Introduction

· Feb 10, 2006   01 - Guideline 1: Minimum Technical Requirements for Performing Clinical Electroencephalography

· Feb 20, 2006   02 - Guideline 2: Minimum Technical Standards for Pediatric Electroencephalography

· Feb 10, 2006   03 - Guideline 3: Minimum Technical Standards for EEG Recording in Suspected Cerebral Death

· Feb 10, 2006   04 - Guideline 4: Standards of Practice in Clinical Electroencephalography

· Feb 10, 2006   05 - Guideline 5: Guidelines for Standard Electrode Position Nomenclature

· Feb 10, 2006   06 - Guideline 6: A Proposal for Standard Montages to Be Used in Clinical EEG

· Feb 10, 2006   07 - Guideline 7: Guidelines for Writing EEG Reports   ⟵

· Feb 10, 2006   08 - Guideline 8: Guidelines for Recording Clinical EEG on Digital Media

American Clinical Neurophysiology Society

Guideline 7: Guidelines for Writing EEG Reports[1]

These guidelines are not meant to represent rigid rules but only a general guide for reporting EEGs. They are intended to apply to standard EEG recordings rather than to special procedures. When reporting on more specialized types of records (e.g., neonatal records, records for suspected electrocerebral silence), description of technical details should be more complete than in the case of standard recordings. However, if the technique used is the one recommended for those special procedures in the "Guidelines in EEG," (ACNS, 2006), a sentence to that effect should be sufficient (Guidelines 1, "Minimum Technical Requirements (MTR) for Performing Clinical EEG"; 2, "Minimal Technical Standards for Pediatric Electroencephalography"; and 3, "Minimum Technical Standards for EEG Recording in Suspected Cerebral Death" .

Assessment at Station 1

- **Examiner 1**

  - Review the EEG records/tracings with candidate and

    » Assesses the technical quality of EEG record

    » Asks candidate to demonstrate main EEG abnormality(ies)

    » Assesses candidate's competency in using sensitivity, filters, montages to localize / lateralize EEG abnormality(ies)

- **Examiner 2**

  - Marks the EEG report prepared by the candidate

    » Assesses the quality of EEG reporting

- **Both Examiners**

  - Counter check whether the reported abnormalities in the EEG Report correspond to the actual EEG tracings

Station 2

- Candidate will be given short segments (10 or more seconds) of 20 EEG samples supplied by the Board

- Candidate will be required to identify various patterns

  – Normal patterns of various ages

  – Normal patterns of the awake and sleep states

  – Patterns obtained with various activating procedures (hyperventilation, photic stimulation, etc)

  – Various types of artefacts

  – Benign EEG variants and patterns of unknown significance

  – Abnormal patterns including:

    - Various types of interictal epileptiform abnormalities, ictal patterns, specific patterns (e.g. triphasic waves, PLEDs, coma patterns, etc), slow wave patterns

Assessment at Station 2

- **Examiners**

  - **Examiner 1**: lead the assessment for the first 10 EEGs; ~15 min

  - **Examiner 2**: lead the assessment for the other 10 EEGs; ~15 min

  - **Both Examiners independently score all 20 EEGs**

- **Scoring**

  1. Correct recognition of the pattern

  2. Correct localization / lateralization

  3. Ability to describe the clinical significance

Passing Part 2

- Each candidate <u>must pass **BOTH** Station 1 & 2</u>

  – Passing marks for each station: **≥ 60%**

  – Average mark for both stations: **≥ 65%**

Examiners For Part 2

- **Epilepsy Society of Australia**
  - Andrew BLESEAL
  - John DUNNE
  - Simon HARVEY
  - Terrence O'BRIEN
  - Mark COOK
- **China Association Against Epilepsy**
  - Weiping Liao
  - Yun WU
  - Liwen WU
  - Xiaoyan LIU
  - Yuangui HUANG
  - Jinghua ZHOU

- **Japan Epilepsy Society**
  - Akio IKEDA
  - Yushi INOUE
- **Malaysian Society of Neurosciences**
  - Chong-Tin TAN
  - Raymond ALI
- **Singapore Epilepsy Society**
  - Shih-Hui LIM
  - Andrew PAN
  - Einar WILDER-SMITH
  - Nigel TAN
  - Derrick CHAN

- **Taiwan Epilepsy Society**
  - Shang-Yeong KWAN
  - Jing-Jane TSAI
  - Chun-Hing YIU
- **Epilepsy Society of Thailand**
  - Yotin CHINVARAN
- **Guest Examiners**
  - Alois EBNER (Germany)
  - Prakash KOTAGAL (USA)

ASEPA EEG Certification Examination

✓Part 1: Written

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✓Part 2: Oral

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✓Electroencephalographer

Asian Epilepsy Academy (ASEPA)
and
ASEAN Neurological Association (ASNA)

EEG Certification Examination

This is to certify that

Dr Kurnia Kusumastuti

has satisfied the requirement of the ASEPA-ASNA EEG Certification Examination Board and
is hereby certified as a qualified

Electroencephalographer

2006

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Dr Shih-Hui LIM
ASEAN Neurological Association

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Dr Chong-Tin TAN
Asian Epilepsy Academy

Asian Epilepsy Academy (ASEPA) – ASEAN Neurological Association (ASNA)
China Association Against Epilepsy (CAAE)

EEG Certification Examination

This is to certify that

Dr Weiping Liao

has satisfied the requirement of the ASEPA-CAAE EEG Certification Examination Board and

is hereby certified as a qualified

Electroencephalographer

2010

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Dr Chong-Tin TAN
Asian Epilepsy Academy

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Dr Shichuo Li
China Association Against Epilepsy

_____
Dr Shih-Hui LIM
ASEAN Neurological Association

Direct your queries to:

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Chairman, ASEPA EEG Examination Board

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