American Board of Psychiatry and Neurology, Inc.

A Member Board of the American Board of Medical Specialties (ABMS)

CERTIFICATION EXAMINATION IN CLINICAL NEUROPHYSIOLOGY

2021 Content Blueprint

(January 3, 2019)

Number of questions: 220		**Percent**
01.	EEG	32-38%
02.	NCS/EMG	32-38%
03.	Other CNP	14-18%
04.	Basic Science	12-16%
TOTAL		100%

CERTIFICATION EXAMINATION IN CLINICAL NEUROPHYSIOLOGY
2021 Content Outline

01.	**EEG**			
	A.	Methods		
		1.	Techniques—activation	
			a.	Hyperventilation
			b.	Photic stimulation
			c.	Sleep deprivation
			d.	Sedation
			e.	Supplementary electrodes
			f.	Video use
			g.	Response testing/interviewing
			h.	Reactivity
			i.	Cerebral death criteria
			j.	Electrode placement
			k.	Trendline/quantification
			l.	Montage selection
			m.	MEGs
			n.	Electrocorticography/cortico-mapping
			o.	Other (applications/indications and limitations of ambulatory EEG, scalp video EEG, and intracranial EEG monitoring)
		2.	Artifacts	
			a.	Electrode pop
			b.	Photoelectric
			c.	Salt bridge
			d.	Movement
			e.	Muscle
			f.	Eye movements/eye flutter
			g.	Rectus muscle spicules
			h.	Interelectrode distance errors
			i.	Glossopharyngeal
			j.	Machine/ventilator
			k.	60 Hz
			l.	Dissimilar metals
			m.	Bruxism
			n.	Fluid collection
			o.	Breach rhythm/skull defect
			p.	Sweat artifact

		q.	Suck artifact	
		r.	Pulse artifact	
		s.	ECG	
		t.	Other artifacts (e.g., bed motion, patting, IV drip, ICU artifacts)	
B.	Basic patterns			
	1.	Maturational, state, and age-related changes		
		a.	Premature neonate	
			i.	Trace discontinue
			ii.	Positive temporal theta bursts
			iii.	Delta brush
			iv.	Synchrony
			v.	Inter burst interval duration
		b.	Term neonate	
			i.	Trace alternant/quiet sleep
			ii.	Activitè moyenne/wakefulness
			iii.	Multifocal sharps/quiet sleep
			iv.	High voltage slow/quiet sleep
			v.	Central apnea
			vi.	Active sleep
			vii.	Wakefulness
			viii.	Encoches frontales
		c.	Infant patterns	
			i.	Sleep spindles
			ii.	NREM sleep: other
			iii.	REM sleep
			iv.	Waking posterior rhythm
		d.	Childhood	
			i.	Waking posterior rhythm
			ii.	Central theta
			iii.	NREM sleep: hypnogogic
			iv.	NREM sleep: arousals
			v.	Posterior slow waves of youth
		e.	Adult	
			i.	Posterior waking rhythm
			ii.	Mu
			iii.	Beta
			iv.	NREM
			v.	REM

				vi.	Lambda		
				vii.	POSTs		
			f.	Elderly			
				i.	Temporal theta		
				ii.	Slowing of alpha rhythm		
				iii.	Diminished amplitude		
		2.	Variants—normal and uncommon				
			a.	Benign epileptiform sharp transients			
				i.	RMTD/psychomotor variant		
				ii.	SSS/BETS		
				iii.	Wicket spikes		
				iv.	6-14		
				v.	SREDA		
				vi.	Midline theta rhythm		
			b.	Alpha rhythm variants			
				i.	Slow and fast		
				ii.	Squeak		
				iii.	Asymmetry		
	C.	Clinical correlations					
		1.	Seizures and other paroxysmal events				
			a.	Focal			
				i.	By EEG findings		
					aa.	Ictal discharges	
					bb.	Interictal discharges	
						xa.	Focal spikes
						xb.	TIRDA
						xc.	OIRDA
					cc.	Neonatal seizures	
				ii.	By specific epilepsy syndrome		
					aa.	Rolandic/BECTS	
					bb.	Panayiotopoulos/BOEC	
					cc.	Other benign	
					dd.	MTLE	
					ee.	Rasmussen	
					ff.	Other focal	
					gg.	Focal NCSE/EPC	
					hh.	Landau-Kleffner syndrome/electrical status epilepticus in sleep	

		b.	Generalized			
			i.	By EEG findings		
				aa.	Photoparoxysmal responses	
				bb.	Polyspike and wave	
				cc.	Generalized fast activities/tonic seizures	
				dd.	Electrodecremental seizures	
				ee.	3-cps spike-wave	
			ii.	By specific epilepsy syndrome		
				aa.	Epileptic encephalopathies	
					xa.	Ohtahara/burst suppression
					xb.	West/hypsarrhythmia
					xc.	LGS/slow spike-wave
					xd.	Doose syndrome
					xe.	Angelman syndrome
					xf.	Dravet syndrome
				bb.	Idiopathic generalized	
					xa.	Childhood absence
					xb.	JME
					xc.	Other idiopathic
				cc.	Other generalized/multifocal	
				dd.	NCSE/ictal stupor/spike wave stupor	
		c.	Nonepileptic events			
			i.	Syncope/cardiac		
			ii.	Psychogenic nonepileptic		
			iii.	Other		
	2.	Focal lesions				
		a.	IRDA			
		b.	ADA			
		c.	Sporadic theta/delta			
		d.	Focal suppression			
	3.	Diffuse encephalopathies: coma, death				
		a.	Alpha rhythm slowing			
		b.	Reactive theta/delta			
		c.	Triphasic waves			
		d.	IRDA			
		e.	ADA			
		f.	Alpha/theta coma			
		g.	Spindle coma			

		h.	Burst-suppression	
		i.	Cerebral death	
		j.	FIRDA	
		k.	Extreme delta brushes	
		l.	Neonatal encephalopathies (incl. periventricular hemorrhage)	
	4.	Drugs and treatment effects		
		a.	Enhanced beta	
		b.	Slowing	
		c.	Epileptiform/seizure activation	
		d.	Hypothermic therapy effects	
	5.	Periodic and uncertain patterns		
		a.	Focal or lateralized periodic	
			i. HSV	
			ii. Stroke	
			iii. GBM	
			iv. other focal	
		b.	Generalized or bilateral periodic	
			i. Hypoxia/anoxia (adult/neonate)	
			ii. Prion	
			iii. Neonatal BERDs	
			iv. Other generalized periodic (e.g., SSPE)	
		c.	Status epilepticus	
		d.	ICU-EEG terminology/ictal-interictal continuum	

02.	**NCS/EMG**			
	A.	Methods		
		1.	Anatomy	
		2.	Techniques	
			a. NCS	
			b. EMG	
			c. Repetitive stimulation	
			d. SFEMG	
	B.	Basic patterns		
		1.	NCS	
			a. Normal	
				i. Pediatric normal patterns
			b. Abnormal	

			i.	Neuropathic
			ii.	Myopathic
			iii.	Other
	2.	EMG		
		a.	Normal	
			i.	Pediatric normal patterns
		b.	Abnormal	
			i.	Neuropathic
			ii.	Myopathic
			iii.	Other
	3.	Repetitive stimulation		
	4.	Artifacts/Technical problems		
		a.	NCS (stimulation/recording)	
		b.	Physiologic (e.g., temperature)	
		c.	Needle examination technique	
		d.	EMG waveform artifacts (e.g., pacemaker)	
		e.	Artifacts in the ICU	
C.	Clinical correlations			
	1.	Peripheral nerve disease		
		a.	Diffuse axon loss	
			i.	Sensorimotor
			ii.	Motor neuropathy
			iii.	Sensory neuropathy/ganglionopathy
			iv.	Pediatric axonal (e.g., Friedreich ataxia)
		b.	Diffuse demyelinating	
			i.	Inherited (e.g., CMT, HNPP), adult
			ii.	Acquired (e.g., AIDP, CIDP, MAG, multifocal motor neuropathy with conduction block)
			iii.	Pediatric (e.g., CMT1A, CMT3, metachromatic leukodystrophy, adrenoleukodystrophy)
		c.	Focal	
			i.	Mononeuropathy
				aa. Median neuropathy at wrist (CTS)
				bb. Ulnar neuropathy at elbow
				cc. Ulnar neuropathy at wrist
				dd. Radial neuropathy
				ee. Other upper limb mononeuropathy (e.g., musculocutaneous, suprascapular, axillary, proximal median)

			ff.	Fibular/peroneal
			gg.	Tibial
			hh.	Femoral
			ii.	Sciatic
		ii.	Plexopathy	
			aa.	Brachial
			bb.	Lumbosacral
			cc.	Pediatric plexopathy (e.g., obstetric)
		iii.	Root/radiculopathy	
			aa.	Lumbosacral
			bb.	Cervical
			cc.	Thoracic
	d.	Multifocal		
		i.	Mononeuropathy multiplex	
		ii.	Polyradiculopathy (cauda equina, infectious, inflammatory, infiltrative)	
		iii.	Polyradiculoneuropathy (amyloid, diabetes, etc.)	
	e.	Cranial		
		i.	Trigeminal	
		ii.	Facial	
		iii.	Spinal accessory	
		iv.	Other cranial neuropathy	
	f.	Hyperexcitability states (Isaacs, other myokymias, fasciculation/cramp, etc.)		
2.	Central disease—motor neuron, cord, stem			
	a.	ALS/PLS		
	b.	Inherited motor neuron diseases, adult (e.g., SMA, Kennedy)		
	c.	Inherited motor neuron disease, pediatric (e.g., SMA, Hirayama, hexosaminidase deficiency)		
	d.	Polio, West Nile virus, other infectious etiologies		
	e.	Post-polio syndrome		
	f.	Other (e.g., syrinx, AV fistula)		
3.	Neuromuscular junction disease			
	a.	Myasthenia gravis		
	b.	LEMS		
	c.	Botulism		
	d.	Other (congenital myasthenic syndromes; repetitive CMAPs with single stimuli, etc.)		
4.	Muscle disease			

			a.	Inflammatory
			b.	Dystrophy (pediatric) (e.g., Duchenne, Becker, congenital myotonic)
			c.	Dystrophy (adult) (e.g., myotonic, FSH, OPMD)
			d.	Metabolic/toxic (storage diseases, endocrine, mitochondrial, critical illness, steroid, etc.)
			e.	Channelopathies (periodic paralyses, myotonia/paramyotonia congenita, etc.)
			f.	Medications/toxin (e.g., steroid, chloroquine, statin)
		5.	Prognosis, evolution of disease	
			a.	NCS features
			b.	Needle EMG features
03.	**Other CNP**			
	A.	Sleep		
		1.	Normal (stages and morphology of sleep)	
		2.	Apnea	
			a.	Obstructive
			b.	Central
			c.	Mixed
		3.	Narcolepsy	
		4.	Polysomnography	
		5.	Multiple sleep latency test	
		6.	Periodic limb movements	
		7.	Parasomnias	
	B.	Evoked potentials		
		1.	Technical	
			a.	Signal averaging
			b.	Stimuli parameters
			c.	Other
		2.	SSEP lower	
			a.	Normal pattern (e.g., poor cervical response)
			b.	Peripheral neuropathy pattern
			c.	Myelopathy pattern
		3.	SSEP upper	
			a.	Brain death/coma prognosis
			b.	Focal lesion
		4.	BAEP	
		5.	VEP	
		6.	Other	

	C.	Autonomic	
		1.	Tilt table testing
		2.	Valsalva testing
		3.	Heart rate variability
		4.	QSART/TST
		5.	Sympathetic pathways
		6.	Parasympathetic pathways
		7.	Cardiovagal
		8.	Other
	D.	Ethics	
	E.	Safety	
		1.	General electrical
		2.	EMG morbidity/complications
		3.	EEG/monitoring morbidity and complications
		4.	Electrode/neuroimaging safety
	F.	Central EMG, movement disorders	
	G.	Intraoperative monitoring and ICU	
		1.	NCS
		2.	EMG
		3.	EEG (CEA, TAA, other carotid endarterectomy)
		4.	EP (SSEP, PAEP, MEP)
		5.	Mapping
		6.	Anesthetic events
04.	**Basic Science**		
	A.	Physiology	
		1.	Potentials—resting, action, conduction
		2.	Synaptic transmission—NMJ, central
		3.	Generators—anatomy, mechanisms
		4.	Temperature effects
		5.	Volume conduction—polarity, far-/near-field
	B.	Instrumentation	