1. Regarding the pathophysiology of myasthenia gravis, what is/are the possible mechanisms by which acetylcholine receptor antibodies interfere with neuromuscular transmission?
   A. binding to the acetylcholine receptor and blocking the binding of acetylcholine
   B. cross-linking acetylcholine receptors, thereby increasing their rate of internalization
   C. binding of complement resulting in destruction of the muscle end plate
   D. all of the above
   E. none of the above

2. All of the following statements are correct regarding the medial lemniscus EXCEPT:
   A. Near the sensory decussation, its blood supply comes from the anterior spinal artery.
   B. The medial lemniscus can be found in close proximity to the anterolateral tract in the medulla.
   C. Its somatotopy in the pons is such that leg fibers are lateral to arm fibers.
   D. The fibers of the medial lemniscus arise from the cuneate and gracile nuclei.
   E. Brainstem lesions involving medial lemniscus fibers usually include adjacent structures, resulting in motor and sensory losses.
2 Neurosurgery Practice Questions and Answers

3. The current accepted method for decontamination of surgical instruments that have been used in a confirmed case of Creutzfeldt-Jakob disease (CJD) is
   A. 10% formalin
   B. 12% glutaraldehyde
   C. UV irradiation
   D. autoclaving at 121°C
   E. sodium hydroxide (2N)

4. Which of the following lines at the craniocervical junction extends from the basion to the opisthion?
   A. McRae’s line
   B. McGregor’s line
   C. Chamberlain’s line
   D. Wackenheim’s line
   E. Anterior marginal line

5. The somatotopic arrangement in the ventral horn is such that
   A. the flexors are dorsal to extensors and limbs are medial to trunk.
   B. the extensors are dorsal to flexors and limbs are medial to trunk.
   C. the flexors are dorsal to extensors and limbs are lateral to trunk.
   D. the extensors are dorsal to flexors and limbs are lateral to trunk.
   E. none of the above

6. The oxygen extraction ratio is increased when blood flow decreases in all of the following organs EXCEPT:
   A. brain
   B. kidney
   C. liver
   D. heart
   E. lungs
Questions 3

7. The following MRI image represents an opportunistic infection in a 25-year-old man with acute myelogenous leukemia. All the following statements are true EXCEPT:

![MRI Image]

A. pathology reveals pleomorphic short and wide septate hyphae
B. treated with Cancidas, Voriconazole, and Ambisome
C. causes hemorrhagic necrosis and ischemic strokes
D. organism originates in the soil
E. may be seen in an immunocompromised patient

8. Somatic motor efferents to the urethral sphencter are located
   A. in intermediolateral cell columns of the sacral cord.
   B. in Onuf’s nucleus.
   C. in Barrington’s nucleus.
   D. all of the above
   E. none of the above

9. Cerebral ischemia begins when cerebral perfusion pressure (CPP) falls below
   A. 100 mm Hg.
   B. 75 mm Hg.
   C. 50 mm Hg.
   D. 23 mm Hg.
   E. 8 mm Hg.

10. Regarding the anatomy near the cavernous sinus, the borders of the clinoidal triangle are cranial nerves
   A. I and II.
   B. II and III.
   C. III and IV.
   D. IV and V.
   E. none of the above
4 Neurosurgery Practice Questions and Answers

11. Which of the following is FALSE regarding myasthenia gravis?
   A. The first presentation is usually weakness of the extraocular muscles.
   B. Weakness that fluctuates and fatigues over the course of the day.
   C. Speech may be hypernasal or hoarse in some patients.
   D. It may present with a head drop.
   E. Dysphagia is worst at breakfast and improves during the course of the day.

12. All of the following are true of polymyositis EXCEPT:
   A. It involves a symmetric weakness of proximal limb and trunk muscles.
   B. Its onset is insidious.
   C. Ocular muscles are usually spared.
   D. Muscles are not tender to palpation.
   E. Skin changes typically occur before muscle abnormalities.

13. Protein 14–3–3 is elevated in the CSF in which of the following conditions?
   A. Creutzfeldt-Jakob disease
   B. Demyelinating disease
   C. Head trauma
   D. Meningoencephalitis
   E. All of the above

14. Which of the following statements is most accurate regarding the nerve supplying the teres minor muscle?
   A. It has a contribution from the lateral cord.
   B. It is an extension of the posterior cord.
   C. Ventral rami C8 and T1 are major contributors to this nerve.
   D. It is derived from the same cord as the musculocutaneous nerve.
   E. None of the above

15. The pterion is formed by the junction of the all of the following EXCEPT:
   A. Frontal bone
   B. Sphenoid bone
   C. Zygomatic bone
   D. Temporal bone
   E. Parietal bone

16. Which of the following increase dead space?
   A. PE (pulmonary embolus)
   B. PEEP (positive end expiratory pressure)
   C. Emphysema
   D. All of the above
   E. None of the above
Questions 5

17. Regarding infection in a trauma patient with the following x-ray, the most common pathogen is

A. *S. aureus.*
B. *Pseudomonas.*
C. *Proteus.*
D. *S. pneumoniae.*
E. *E. coli.*

18. Patients with interstitial cystitis
A. are rarely incontinent.
B. have an overwhelming desire to urinate.
C. have activation of a sensory pathway subserving cortical sensation of the bladder without activation of the afferent reflex pathway.
D. all of the above
E. none of the above

19. Which of the following factors increase ICP?
A. movement
B. pain
C. fever
D. Valsalva
E. all of the above

20. The posterior loop of the internal carotid artery and the origin of the meningo-hypophyseal trunk are exposed in the floor of which triangle?
A. lateral triangle
B. anterior lateral triangle
C. Parkinson’s triangle
D. anterior medial triangle
E. none of the above
6 Neurosurgery Practice Questions and Answers

21. Jitter is best described
   A. as synchronous muscle fiber activation between fibers of different motor units.
   B. as the difference in timing of muscle fiber activation between two fibers in a single motor unit.
   C. as the difference in timing of muscle fiber activation between two fibers of different motor units.
   D. as the complete failure of neuromuscular transmission at one muscle fiber in a pair.
   E. none of the above

22. Ataxia may be seen in all of the following syndromes EXCEPT:
   A. Claude's syndrome
   B. Benedikt's syndrome
   C. Nothnagel's syndrome
   D. Basilar artery syndrome
   E. Weber's syndrome

23. Which one of the following findings is seen with subacute combined degeneration?
   A. ataxic gait
   B. antalgic gait
   C. myopathic gait
   D. apraxia gait
   E. calcaneus gait

24. A lesion of which of the following structures would MOST significantly impair memory?
   A. amygdala
   B. fornix
   C. dorsomedial nucleus of the thalamus
   D. mamillary body
   E. area 44
25. Which of the following is NOT associated with the findings on this x-ray?

A. weakness of hand
B. Horner's syndrome
C. Raynaud's syndrome
D. traction meningocele
E. ulnar paresthesias

26. Which of the following are true of PEEP (positive end expiratory pressure)?
A. it decreases work of breathing
B. it increases cerebral perfusion pressure
C. it decreases physiologic dead space
D. all of the above
E. none of the above

27. Which of the following can decrease the infection rate of venous catheters?
A. changing the line periodically over a guide-wire
B. occlusive dressings
C. masks and gowns
D. all of the above
E. none of the above

28. Which of the following neurotransmitters promotes penile erection?
A. serotonin
B. dopamine
C. noradrenaline
D. all of the above
E. none of the above
8 Neurosurgery Practice Questions and Answers

29. The peak reduction in ICP after administration of mannitol occurs
   A. in about 4 hours.
   B. in about 2 hours.
   C. in about 1 hour.
   D. in about 30 minutes.
   E. in about 15 minutes.

30. The borders of Parkinson’s triangle are cranial nerves
   A. I and II.
   B. II and III.
   C. III and IV.
   D. IV and V₁
   E. none of the above
1. D. All three are mechanisms of antiacetylcholine receptor antibodies.

2. B. The medial lemniscus (ML) is widely separated from the anterolateral system (ALS) in the medulla. In fact, ML and ALS fibers receive different blood supplies in the medulla. In the midbrain and pons, the ML and ALS are in close proximity and receive similar blood supplies.

3. E. Sodium hydroxide (2N) for 1 hour is the current standard for decontamination after CJD cases. Characteristic features of CJD include ataxia, myoclonus, and dementia. Death usually occurs within 1 year after onset of symptoms.

4. A. McRae's line is from the basion to the opisthion.

5. C. It is helpful to remember that this pattern of somatotopy can be appreciated in the descending motor pathways: those tracts that are concerned with flexor musculature (corticospinal tract and rubrospinal tract) lie dorsal to those tracts concerned with extensor musculature.

6. D. All tissues increase oxygen extraction in the face of decreased blood flow except the coronary circulation, which is flow dependent.

7. A. Rhinocerebral mucormycosis on pathology reveals pleomorphic short and wide nonseptate hyphae. It can be treated with Cancidas, Voriconazole, and AmBisome. It may cause hemorrhagic necrosis and ischemic strokes. The organism originates in the soil.
8.B. Somatic motor efferents to the sphincter are located in the ventral lateral area of Onuf's nucleus. Sacral parasympathetics to the bladder are located in intermediolateral cell columns of the sacral cord. Barrington's nucleus is also known as the pontine micturition center and is responsible for initiating the process of micturition.

9.C. Cerebral ischemia begins when CPP falls below 50 mm Hg.

10.B. The clinoidal triangle is defined by the medial border of the optic nerve and the oculomotor nerve laterally.

11.E. Dysphagia in myasthenia gravis is fatigable, and the patient often relates a history of little difficulty with breakfast, moderate difficulty with lunch, and inability to eat in the evening.

12.E. Skin changes precede muscle abnormalities in dermatomyositis (DM). Polymyositis (PM) is diagnosed by fibrillation potentials on EMG and elevated CPK (creatine phosphokinase) levels (higher than DM). In polymyositis, there is widespread single-fiber necrosis and T cells with macrophages may be found in the muscle fibers. PM is the most frequent inflammatory myopathy.

13.E. Protein 14–3-3 is elevated in the CSF with destructive diseases of the CNS. This protein is sensitive for Creutzfeldt-Jakob disease, but not specific.

14.B. The posterior cord gives rise to the axillary nerve and the radial nerve as its terminal branches.
15. C. The pterion is located about two fingerbreadths above the zygomatic arch, and a thumb's breadth behind the frontal process of the zygomatic bone; however, the zygomatic bone does not form the pterion.

16. D. Increased dead space is caused by overdistended alveoli (COPD and PEEP), or by decreased blood flow (CHF, pulmonary embolus, emphysema).

17. D. After basilar skull fractures, the most common pathogen is *S. pneumoniae*, and the infection usually occurs within the first few days.

18. D.

19. E. General treatment of ICP is aimed at minimizing these factors.

20. C.

21. B.

22. E. Weber's syndrome involves the base of the midbrain. It is characterized by CN III palsy with crossed hemiplegia. All other syndromes mentioned may have ataxia as part of the clinical findings.

23. A.

24. C. Lesions of the DM thalamus, hippocampus, or temporal cortex cause memory impairment.

25. B. The x-ray shows a cervical rib, usually associated with ulnar nerve weakness and paresthesia, Raynaud's syndrome, and traction meningocele.

26. A. Positive end-expiratory pressure (PEEP) decreases the work of breathing and the FIO₂ requirement, but it may decrease cerebral perfusion pressure. PEEP increases the physiologic dead space, lung compliance (therefore, decreasing plateau pressure), and risk of barotrauma.

27. E. None of these maneuvers actually reduces infection rate.

28. B. Serotonin pathways inhibit copulation, explaining the side effect of decreased libido with selective serotonin reuptake inhibitors (SSRIs) used to treat depression. Administration of L-dopa increases libido. Noradrenergic receptors in the brain exert an inhibitory effect on penile erection.
29.E. The peak reduction in ICP occurs in ~15 minutes after administration of mannitol. The duration of action of mannitol is ~4 hours due to the rapid renal elimination of the drug. When mannitol is used with furosemide, the combined effect on ICP reduction is greater than if either were used alone.

30.D. Parkinson’s (infratrochlear) triangle is located between the lower margin of the trochlear nerve and the upper margin of the ophthalmic nerve.