

BASIC SCIENCES

Anatomy

1. Topographical Anatomy as Landmarks
2. General radiographic anatomy
3. Neck anatomy
4. Chest
5. Back and Pelvis
6. Extremities
7. Dermatome anatomy
8. Brain and Skull
9. Spine anatomy
10. Abdominal Wall
11. Upper Extremity
12. Lower Extremity

Mechanics

13. Pressure Measurement of Gases, Liquids
14. Transducers, Regulators, Medical Gas Cylinders
15. Principles of Ultrasound
16. Flow Velocity
17. Flowmeters
18. Principles of Doppler Ultrasound
19. Properties of Liquids, Gases, and Vapors
20. Vapor Pressure and Calculation of Anesthetic Concentrations
21. Vaporizer Types and Safety Features
22. Uptake and Distribution of Inhalation Agents
23. Uptake and Elimination Curves
24. Concentration Effect
25. Second Gas Effect
26. Nitrous Oxide and Closed Spaces
27. Principles
28. Components
29. Circle Systems
30. Non-Circle Systems
31. Portable Ventilation Devices
32. Carbon Dioxide Absorption
33. Toxicity of Inhaled Anesthetics
34. Oxygen Supply Systems
35. Waste Gas Evacuation Systems
36. Safety Features (include disconnect monitors, line isolation monitors, and current leakage)
37. Monitoring Methods
38. Neuromuscular Function
39. Mechanism of Pulmonary Ventilation
40. Methods of Monitoring Oxygen
41. Blood Pressure Monitoring Methods

42. Heart Function: Heart tones, EKG, and Echo

43. Echocardiography

Instrumentation

44. Gas Concentrations

45. Pressure Transducers

46. Neurologic Function Monitors.

47. Fluid Warmers and Autotransfusion Devices

48. Body Warming Devices

49. Mechanical Ventilators

50. Defibrillators: Basic Physics and Anesthetic Implications

51. Electrical; Fire and Explosion Hazards; Basic Electronics

52. Intravascular Pumps

Mathematics

53. Statistics and Simple Math in Anesthesia Practice

Pharmacology

54. Pharmacokinetics and PHarmacodynamics

55. Drug Absorption and Distribution

56. Pharmacokinetics of Neuraxial Anesthesia

57. Tolerance and Tachyphylaxis

58. Termination of Action

59. Impact of Renal Disease

60. Impact of Hepatic Disease

61. Drug Interactions

62. Hepatic Blood Flow

63. Drug-Drug Binding

64. Alternative and Herbal Medicines: Perioperative Implications

65. Drug Reactions

66. Anesthetics: Gases and Vapors

67. Minimum Alveolar Concentration (MAC)

68. Trace Concentrations, OR Pollution, Personnel Hazards

69. Comparative Pharmacodynamics of Inhaled Anesthetics

70. Intravenous Opioid Anesthetics

71. Substance Use Disorder

72. Epidural and Intrathecal Anesthesia

73. Barbiturates

74. Propofol

75. Etomidate

76. Benzodiazepines

77. Ketamine

78. Dexmedetomidine

79. Thiopental

80. Sodium Bicarbonate

81. Nitroglycerin and Sodium Nitroprusside

82. Nicardipine and Other Antihypertensive Medications

83. Calcium Channel Blockers
84. Monoamine Oxidase Inhibitors
85. Anticonvulsants
86. Local Anesthetics
87. Muscle Relaxants
88. Medication Assisted Opioid Withdrawal
89. Agents and Techniques in Pediatric Anesthesiology

CLINICAL SCIENCES

Anesthesia Procedures, Methods, and Techniques

90. American Society of Anesthesiologists (ASA) Preoperative Testing Guidelines
 91. American College of Cardiology/American Heart Association Guidelines for Perioperative Cardiovascular Evaluation
 92. ASA Classification
 93. Preparation for Anesthesia/Premedication
 94. Interaction with Chronic Drug Therapy
 95. Adverse Reactions to Premedications
 96. Drug Abuse
 97. Intraocular Pressure
 98. Uremia
 99. Increased Cerebro Spinal Fluid Pressure
 100. Chronic Steroid Ingestion
 101. Obstructive Sleep Apnea
 102. Depression
 103. Chronic Obstructive Pulmonary Disease
 104. Hypertension
 105. Malignancy
 106. Pediatric and Geriatric Doses, Routes of Administration
 107. Anesthetic Management of Patients with Allergies
 108. NPO and Full Stomach Status
 109. Alteration of Gastric Fluid Volume and pH, Sphincter Tone
 110. Continuation versus Discontinuation of Chronic Medications
 111. Prophylactic Cardiac Risk Reduction
 112. Prophylactic Antibiotics
 113. COMA
 114. Minimal Invasive Cardiac Surgery
 115. Abdominal Aortic Aneurysm
 116. Anesthetic Choice in Reduced Renal Function
 117. Fluid Replacement Strategies and Controversies
 118. Problems of Term and Delivery
 119. Nonobstetric Surgery During Pregnancy
- ### **Regional Anesthesia**
120. Spinal, Epidural, Caudal, Combined Spinal/Epidural
 121. Intravenous Regional Anesthesia
 122. Neuroaxial Anesthesia in Obstetrics

General Anesthesia

- 123. Stages and Signs of Anesthesia
- 124. Techniques of General Anesthesia
- 125. Assessment/Identification of Difficult Airway
- 126. Techniques for Managing Airway
- 127. Airway Devices
- 128. Surgical Airway
- 129. Endobronchial Intubation
- 130. Types of Endotracheal Tubes
- 131. Supraglottic Secretion Suctioning and LASER Safety Protocols
- 132. Intravenous Fluid Therapy During Anesthesia
- 133. Colloids, Albumin, Hetastarch, and Pentastarch
- 134. Enhanced Recovery After Surgery Protocol for Fluid Therapy
- 135. Acute Postoperative and Posttraumatic Pain
- 136. Indications and Contraindications: Outpatient Pediatric Anesthesia in an Ambulatory Surgical Center

Common Complications

- 137. Trauma
- 138. Vascular Injuries
- 139. Neurological Complications
- 140. Burns
- 141. Chronic Environmental Exposure
- 142. Hypothermia
- 143. Nonmalignant Hyperthermia
- 144. Acetylcholinesterase-inhibitor Toxicity
- 145. Bronchospasm
- 146. Latex Allergy
- 147. Laryngospasm
- 148. Postobstructive Pulmonary Edema
- 149. Aspiration of Gastric Contents
- 150. Malignant Hyperthermia
- 151. Pain Relief
- 152. Opioids
- 153. Agonist-Antagonists
- 154. Alpha-2 Agonists
- 155. NSAIDS
- 156. N-Methyl-D-Aspartate (NMDA) Receptor Antagonists
- 157. Tricyclic Antidepressants
- 158. Selective Serotonin Reuptake Inhibitor (SSRIs)
- 159. Other Modalities
- 160. Acupuncture and Hypnosis
- 161. Respiratory Consequences of General and Regional Anesthesia
- 162. Cardiovascular Consequences of General and Regional Anesthesia
- 163. Nausea and Vomiting

164. Neuromuscular Complications of Anesthesia

165. Neurologic Consequences of Anesthesia

Central Nervous System

Physiology

166. Cerebral Cortex: Functional Organization

167. Subcortical Areas

168. Cerebral Blood Flow

169. Pathophysiology of Ischemia/Hypoxia: Global vs. Focal, Glucose Effects

170. Effects of Brain Trauma or Tumors

171. Cerebrospinal Fluid

172. Blood-Brain Barrier

173. Relation to Blood Chemistry and Acid-Base Balance

174. Increased Intracranial Pressure

175. General Organization

176. Spinal Cord Reflexes

177. Spinal Cord Tracts

178. Spinal Cord Morphology

179. Neuromuscular Transmission

180. Social, Vocational, and Psychological Influences on Pain Perception

181. Sex, Gender, and Age Differences in Pain and Pain Perception

Automatic Nervous System

182. The Sympathetic Nervous System

183. The Parasympathetic Nervous System

184. Termination of Action

185. Ganglionic Transmission

186. Autonomic Reflexes

187. Afferent and Efferent Limbs

Temperature Regulation

188. Temperature Sensing, Heat Production, and Conservation

189. Temperature Regulating Centers

190. Heat Loss Mechanisms

191. Body Temperature Measurement

192. Effect of Drugs/Anesthetic Technique on Temperature Regulation

Brain Anatomy

193. Cerebral Cortex

194. Cerebellum

195. Brain Stem: Anatomy and Critical Role in Nausea and Vomiting

196. Respiratory Centers

197. Reticular Activating System

198. Cerebral Circulation; Circle of Willis, Venous Sinuses and Drainage

Spinal Cord and Spine

199. Variations in Vertebral Configuration

200. Spinal Nerves

201. Blood Supply

- 202. Sacral Nerves
- 203. Meninges
- 204. Cranial Nerves
- 205. Carotid and Aortic Bodies, Carotid Sinus
- 206. Ganglia, Rami Communicantes, Sympathetic Chain
- 207. Nociception
- 208. Periphera Nociceptors
- 209. Ascending Pathways and Descending inhibition

Respiratory System

Physiology

- 210. Lung Functions, Cellular Processes, and Surfactants
- 211. Lung Volumes and Capacities
- 212. Pulmonary Function Tests and Spirometry
- 213. Static, Dynamic Compliance and Airway Resistance
- 214. Pleural Pressure Gradient, Flow-Volume Loops and Hysteresis, Surfactant, Laplace Law
- 215. Work of Breathing
- 216. Regulation of Airway Caliber
- 217. Ventilation: Perfusion
- 218. Distribution of Ventilation
- 219. Distribution of Perfusion
- 220. Alveolar Gas Equation
- 221. Diffusion and Pulmonary Diffusion Capacity
- 222. Apneic Oxygenation and Diffusion Hypoxia
- 223. Blood Gas
- 224. Oxygen Transport
- 225. Carbon Dioxide Transport
- 226. Systemic Effects of Hypercarbia and Hypocarbia
- 227. Systemic Effects of Hyperoxia and Hypoexemia
- 228. Basic Interpretation of Arterial Blood Gas and Temperature Correction
- 229. Respiratory Centers
- 230. Central and Peripheral Chemoreceptors
- 231. CO₂ Response Curves
- 232. Non-Respiratory Functions of Lungs: Metabolic, Immune
- 233. Perioperative Smoking and Caffeine Use
- 234. Special Considerations in Pediatric Otolaryngology Surgery
- 235. Respiratory and Congenital Pediatric Airway Problems

Anatomy

- 236. Nasal Anatomy and Pathology
- 237. Pharynx
- 238. Larynx
- 239. Innervation
- 240. Vocal Cords
- 241. Differences Between Infant and Adult Airway
- 242. Structure and Relationships in Neck and Chest

243. Muscles of Respiration

Pharmacology

244. The Tracheobronchial Tree

245. Beta-Agonists

246. Anticholinergics

247. Steroids

248. Leukotriene Modifier Drugs

249. Mast Cell Stabilizers

250. Immunoglobulin E Blockers

251. Cocaine Pharmacology

Cardiovascular System

Physiology

252. Cardiac Cycle

253. Control of Heart Rate

254. Perioperative Use of Alcohol

255. Synchronicity of Pressure

256. Impulse Propagation

257. Normal ECG and Electrophysiology

258. Ventricular Function

259. The Frank-Starling Law

260. Force, Velocity, Length, Rate of Shortening

261. Myocardial Contractility

262. Myocardial Oxygen Utilization/Consumption

263. Systolic and Diastolic function

264. Cardiac Output: Fick Principle

265. Venous Return

266. Vessel Function

267. Blood Volume and Distribution

268. Blood Pressure

269. Systolic, Diastolic, Mean, and Perfusion Pressures

270. Intracardiac, Pulmonary and Venous Pressures

271. Baroreceptor Function

272. Systemic, Pulmonary Vascular Resistance and Viscosity

273. Capillary Diffusion, Osmotic Pressure, Starling's Law

274. Pre- and Post- Capillary Sphincter Control in Shock

275. Viscosity

276. Regional Blood Flow and Its Regulation

277. Regulation of Circulation and Blood Volume

278. Basics of Cardiopulmonary Resuscitation

Anatomy

279. Coronary Circulation

280. Cardiac Glycosides

281. Heart Conduction System

Pharmacology

- 282. Phosphodiesterase III Inhibitors (Inotropic Dilators)
- 283. Antiarrhythmics
- 284. Vasopressors and Inotropes
- 285. Antianginal Drugs
- 286. Angiotensin Converting Enzyme Inhibitors and Angiotensin Receptor Blockers
- 287. Vasodilators
- 288. Electrolytes
- 289. Non-Adrenergic Vasoconstrictors

Gastrointestinal/Hepatic Systems

- 290. Hepatic Function and Metabolism
- 291. Enhanced Recovery After Colorectal Surgery
- 292. Anatomy of the Gastrointestinal and Hepatic System

Renal System

- 293. Renal and Urinary Systems/Electrolyte Balance
- 294. Renin-Angiotensin-Aldosterone System
- 295. Anatomy of the Kidney
- 296. Diuretics
- 297. Dopaminergic Drugs

Hematologic System

- 298. Alternatives to Blood Transfusion
- 299. Blood Transfusions
- 300. Immunosuppressive and Anti-Rejection Drugs
- 301. Transfusion Indications
- 302. Complications of Transfusions
- 303. Blood Preservation, Storage
- 304. Blood Filters and Pumps
- 305. Effects of Cooling and Heating
- 306. Preparation for Transfusion
- 307. Anesthetic Considerations for Reactions to Transfusions
- 308. Synthetic and Recombinant Hemoglobins
- 309. Massive Transfusion Protocol
- 310. Anticoagulants, Antithrombotics, and Anti-Platelet Drugs

Endocrine and Metabolic Systems

- 311. Hypothalamus
- 312. Pituitary Gland
- 313. Thyroid
- 314. Parathyroid Gland
- 315. Adrenal Gland and Pancreas
- 316. Adrenal Disease
- 317. Biochemistry of Normal Body Metabolism
- 318. Carbohydrates, Aerobic and Anaerobic Utilization, Chemical Processes and Enzymes
- 319. Relationship to Hormones
- 320. Glucagon and Catecholamines
- 321. Effects of Stress

- 322. Perioperative Management of Insulin
- 323. Protein Function as Immunoglobulins and Hormones
- 324. Protein Synthesis Structure, and Function
- 325. Cyclic Adenosine Monophosphate (cAMP), Cyclic Guanosine Monophosphate (cGMP)
- 326. Lipids: Triglycerides, Lipoproteins, Cholesterol
- 327. Specific Organ Metabolism

Neuromuscular Diseases and Disorders

- 328. Prejunctional Components and Events
- 329. Postjunctional Components and Events
- 330. Perijunctional Channels

Special Problems in Anesthesiology

- 331. Physician Impairment and Disability: Substance Abuse, Fatigue, Aging, Visual and Auditory Impairment, American Disabilities Act
- 332. Physician Wellness
- 333. Professionalism and Licensure
- 334. Ethics: Advance Directive, DNR/Suspend Orders, HIPAA
- 335. Informed Consent
- 336. Medical Errors
- 337. Shared Decision-Making
- 338. Disclosure of Errors to Patients
- 339. Core Competencies
- 340. Approach to Anesthesiology Exams: BASIC and ADVANCED