

ASSOCIATION OF SURGICAL TECHNOLOGISTS

SURGICAL TECHNOLOGIST CERTIFYING EXAM STUDY GUIDE, 3RD Ed.

BONUS SCIENCE REVIEW QUESTIONS #2: EXPLANATIONS WITH REFERENCES

Reference Key

Alex

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Anatomy

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B&K

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Med Term

Gyls BA, Wedding ME. *Medical Terminology Systems: A Body Systems Approach*. 6th ed. Philadelphia, PA: FA Davis; 2009.

Memmler's

Cohen BJ, Taylor JJ. *Memmler's The Human Body in Health and Disease*. 11th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.

Micro

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OR Instr

Tighe SM. *Instrumentation for the operating room*. 7th ed. St Louis, MO: Mosby; 2007.

Pharm

Snyder KC, Keegan C. *Pharmacology for the Surgical Technologist*. 2nd ed. St Louis: Saunders; 2006.

Physiology

Rhoades R, Pflanzner R. *Human Physiology*. 4th ed. Pacific Grove, CA: Brooks/Cole; 2003.

ST for ST

Frey KB, Ross T. Eds. *Surgical Technology for the Surgical Technologist: A Positive Care Approach*. 4th ed. Clifton Park, NY: Delmar Cengage Learning; 2014 .

- 1) C - Bronchioles end in the clusters of grape-like structures called the alveoli where the exchange of oxygen and carbon dioxide takes place. (ST for ST 1004, 1006, 1007)
- 2) B - Viruses are obligate intracellular parasites, meaning they rely completely on the host cells for survival. (ST for ST 133)
- 3) D - Early ambulation is one of the most important factors in the recovery of the surgical patient therefore, it would not interfere with the healing process for a patient. (ST for ST 293)
- 4) B - Excessive granulation tissue, referred to as "proud flesh", protrudes above the edges of the wound. (ST for ST 293)
- 5) D - Cerebrospinal fluid (CFS) is formed in the choroid plexuses of the brain. (Memmler's 215)
- 6) A - The internal carotid and vertebral arteries supply blood to the brain. (ST for ST 1095)
- 7) D - Sodium citrate is an H₂ blocker that neutralizes stomach acid and is give preoperatively. (ST for ST 219)
- 8) C - All bacteria are procaryotes (also spelled prokaryotes). (ST for ST 129-130)
- 9) B - The Penrose drain is a type of passive drain; one end is inserted into the wound and the other is outside the wound to allow the fluid to move out of the wound to be absorbed by the dressing. (ST for ST 287)
- 10) A - The last section of the colon is the anal canal ending in the anal orifice called the anus. (ST for ST 462)
- 11) B - Naloxone hydrochloride is a narcotic antagonist used to reverse narcotic analgesics. (ST for ST 220)
- 12) B - The combining form aden/o means gland such as adenoma. (Med Term 540)
- 13) D - The broad ligament is one of four ligaments that extend from the pelvic walls and suspend the uterus. (ST for ST 523)
- 14) A - Hypertrophic occurs when the body over-produces collagen: therefore, the scar formation would be a keloid. (ST for ST 295)
- 15) C - Diuretics such as mannitol are used to decrease ICP, IOP or edema. (ST for ST 218)
- 16) A - Lasers are named according to the active medium that is used such as gas, solid, liquid or semiconductor crystals. (ST for ST 115)
- 17) A - The prefix contra means against or opposite such as contralateral. (Med Term 541)

- 18) D - The lateral ventricles are located in each cerebral hemisphere; third ventricle is located between the halves of the thalamus; fourth ventricle is located in the brain stem. (ST for ST 1163-1164)
- 19) C - The choroid plexuses are networks of capillaries located in the walls of the ventricles and are responsible for producing CSF. (Anatomy 1164)
- 20) C - The excretory duct of the parotid salivary gland is Stensen's duct. (ST for ST 649)
- 21) D - An impacted fracture is when the broken ends of bones are forced into each other creating bone fragments. (ST for ST 902, 903)
- 22) B - Small, irregular shaped bones located within the sutures of cranial bones are called sutural or Wormian bones; the number of bones varies with each person. (Anatomy 142)
- 23) A - The epiphyses (plural; epiphysis, sing.) are the proximal and distal ends of the bone. (Anatomy 142)
- 24) A - Polypropylene is one of the most inert suture materials. (ST for ST 301)
- 25) A - Immediately after a medication is transferred to the sterile field the CST must label it. (ST for ST 211)
- 26) B - The Bakes common duct dilator comes in a set of sequentially sized dilators #3-#10. (ST for ST 414, 416)
- 27) B - The wavelength of laser light energy extends from near-ultraviolet to far-infrared. (ST for ST 114)
- 28) D - The carbon dioxide laser beam is absorbed by water, therefore it is not effective for transmitting through clear liquids. (ST for ST 115-116)
- 29) A - Gynecomastia refers to the excess development of the male breast due to pathological or physiological reasons. (ST for ST 492)
- 30) B - Surgilon is an example of a nylon suture. It is braided nylon with minimal tissue reaction and is coated to reduce tissue drag. (ST for ST 300)
- 31) B - The medulla portion of the brain is a continuation of the spinal cord and forms the inferior portion of the brain stem. (Anatomy 620)
- 32) D - A blunt needle would be used for a liver resection due to the tissue being so friable. (ST for ST 308)
- 33) C - Seven bones are located in the cervical region; the second cervical vertebra (C2) is the axis which is fused with the body of the atlas (C1). (ST for ST 1171)

- 34) A - The hip joint is a ball-and-socket joint formed by the head of the femur that fits into the acetabulum of the pelvis. (ST for ST 939)
- 35) C - Otomy means incision. (Med Term 552)
- 36) B - The third innermost layer of the eye is the retina that lines the posterior 3/4 of the eyeball. (Anatomy 705)
- 37) A - The large intestine begins at the cecum; cecum begins inferior to the ileocecal valve. (ST for ST 451)
- 38) A - The retina is the inner tunic that contains the photoreceptors; it receives images. (ST for ST 610-611)
- 39) B - The cranial bones are examples of flat bones. (Anatomy 142)
- 40) B - Laser light travels in a straight line called collimated. (ST for ST 114)
- 41) B - The islets of Langerhans are endocrine glands that consist of alpha cells and beta cells; the main function is to maintain normal blood sugar level. (ST for ST 482)
- 42) B - 1 cubic centimeter is equal to 1 milliliter. (ST for ST 209)
- 43) D - NPO (nil per os) stands for nothing by mouth. (Med Term 533)
- 44) D - Hemi- means half such as in hemicolectomy. (ST for ST 454)
- 45) C - The corpus luteum is a granular yellow body that develops in the ovary after the extrusion of an ovum. (Memmler's 493)
- 46) B - Tendons are tough connective tissue that attach the muscle to bones. (Anatomy 290)
- 47) C - Polypropylene suture includes Prolene and Surgilene; it is a synthetic available as a monofilament nonabsorbable. (ST for ST 301)
- 48) A - Hypospadias is the abnormal urethral opening on the underside of the penis, perineum of the male or vagina of the female. (ST for ST 881)
- 49) B - Calcium is used as a blood coagulating agent to promote clot formation. (Pharm 198-199)
- 50) A - A pantaloon hernia is the presence of a direct and indirect hernia. (ST for ST 422)
- 51) C - $98.6 - 32 = 66.6$; $66.6 \div 1.8 = 37$ degrees C. (ST for ST 207)
- 52) B - The jugular vein is a large vein that drains blood from the head. (Anatomy 544)

- 53) C - Viruses are the smallest microbe ranging from 300 nm to 30 nm. (ST for ST 133)
- 54) A - The layers of the colon from outside to inside are serosa, muscularis, submucosa, and mucosa. (ST for ST 452)
- 55) A - The papillary muscles are found in the ventricles of the heart. (Anatomy 462)
- 56) C - Collagen is available in various forms one of which is Avitene®; it is available in powder form, sheets and dispenser. (ST for ST 228)
- 57) A - A curved, tapered needle is used most often in soft tissue such as bowel or intestine or subcutaneous tissue. (ST for ST 308)
- 58) D - Hydrocortisone sodium succinate decreases inflammation by suppressing the immune response. (ST for ST 221)
- 59) D - Osmosis is a type of diffusion where fluid and dissolved solvents move from an area of lower concentration to area of higher concentration. (Memmler's 48)
- 60) C - The suffix rrhaphy means to suture such as herniorrhaphy. (Med Term 546)
- 61) C - Blephar/o refers to the eyelid such as blepharoplasty. (ST for ST 739)
- 62) B - Endocarditis can involve the lining of the chambers of the heart, but it usually refers to inflammation of the endocardium that covers the valves. (Memmler's 311)
- 63) C - Sterile drapes once positioned should not be moved, since the portion that falls below the table edge is considered contaminated. Only the top of the back table is considered sterile. (ST for ST 173)
- 64) C - The argon laser beam can travel through clear fluids and tissues making it the laser of choice for treating diabetic retinopathy. (ST for ST 117)
- 65) C - The right and left lateral lobes of the thyroid gland are joined by tissue that lies between the lobes and anterior to the trachea called the isthmus. (Anatomy 736)
- 66) D - The use of silk suture in urinary or biliary tract may result in calculi. (B&K 556)
- 67) B - Carpal tunnel syndrome is caused by pressure of the median nerve by the transverse carpal ligament. (ST for ST 1186)
- 68) D - The autonomic nervous system (ANS) controls contractions of involuntary muscles. (Anatomy 570)
- 69) D - Body temperature is regulated by the hypothalamus by monitoring the processes of heat production and loss. (ST for ST 249)

- 70) A - Neuroleptanalgesia is achieved with a balanced combination of a tranquilizer (neuroleptic) and narcotic analgesic agent. (ST for ST 241)
- 71) A - Contaminated wounds that contain infected and/or necrosed tissue may require excision of the tissue called debridement. (ST for ST 291)
- 72) A - A primary sign and symptom of arterial disease is claudication, a cramping ache due to muscle ischemia. (ST for ST 1100, 1211)
- 73) C - The Gram stain is used to differentiate between Gram-positive and Gram-negative bacteria. (ST for ST 130)
- 74) B - The first flap is opened away from self, side flaps laterally and last flap towards self. (ST for ST 332)
- 75) C - The frontal sinus is drained through an external incision made along the inferior edge of the eyebrow. (ST for ST 661-663)
- 76) A - Craniosynostosis is the abnormal premature closure of the cranial sutures of an infant; it is treated by craniotomy. (ST for ST 1158)
- 77) C - The hinge joint allows movement in only one plane such as the elbow joint. (ST for ST 895)
- 78) A - Hepat/o is the combining form that means liver; megaly is a suffix meaning enlarged. Therefore, hepatomegaly is the abnormal enlargement of the liver. (Med Term 114)
- 79) C - Certain areas of the body are considered contaminated; the surrounding area is prepped first and the contaminated area last using a separate sponge for both areas. (ST for ST 371)
- 80) A - The kneecap is a small triangular-shaped sesamoid bone that rests on the anterior surface of the knee joint. (Anatomy 238)
- 81) D - Topical administration includes buccal, sublingual, instillation and inhalation. (ST for ST 202)
- 82) C - The appendix is located in the right lower quadrant of the abdomen. (Anatomy 19)
- 83) C - Albumin, globulin, and fibrinogen are all plasma proteins. (Physiology 526)
- 84) D - An epicondyle is a projection on the surface of the bone that is located proximal to the condyle. (Anatomy 221)
- 85) B - The peripheral nervous system (PNS) consists of cranial and spinal nerves. (Anatomy568)

- 86) A - The olecranon is part of the ulna. (Anatomy 222)
- 87) B - Irregular bones are of a complicated shape and include such bones as the vertebrae and certain facial bones. (Anatomy 142)
- 88) C - The integumentary system consists of two layers: epidermis and dermis. (ST for ST 730)
- 89) B - A tear in the retina allows the liquid from the vitreous cavity to leak through the tear and collect under the retina separating it from the choroid. (ST for ST 611)
- 90) A - Osteomalacia is a disease condition that causes softening of the bones caused by abnormal calcium deposits. (ST for ST 898)
- 91) B - The daily actions and reactions of the body, such as maintaining the normal blood sugar level in the body, to maintain a normal physiological balance is called homeostasis. (ST for ST 230, 1214)
- 92) A - Schiller's test involves applying Lugol's solution to the cervical os with a sponge stick; the tissue that remains brown colored is normal tissue and tissue that does not stain brown demonstrates dysplasia. (ST for ST 561)
- 93) B - The roof of the mouth is the palate that is divided into the hard and soft palates. (ST for ST 709)
- 94) C - Thrombin is used as a topical hemostatic and should never be injected. (ST for ST 229)
- 95) C - Achalasia is a type of motility disorder characterized by weight loss and aspiration pneumonia. (ST for ST 434)
- 96) B - The suffix stasis means standing, stopping or still such as hemostasis. (Med Term 546)
- 97) D - Surgical conscience is the basis for the practice of strict adherence to aseptic technique and the ability to recognize and correct breaks in technique whether committed in the presence of others or alone. (ST for ST 18; 170-171)
- 98) D - The conjunctiva is the mucous membrane that lines the inner surface of the eyelid and over the sclera and cornea. (ST for ST 416, 702)
- 99) C - The small intestine begins at the pyloric sphincter located at the junction of the stomach with the duodenum. (ST for ST 438)
- 100) B - Prothrombin reacts with thromboplastin to form thrombin that reacts with fibrinogen to form fibrin. (ST for ST 178)
- 101) D - Streptokinase activates plasminogen to cause fibrinolysis of thrombi in treatment of MI. (ST for ST 218)

102) A - Eucaryotes include protozoa; fungi; green, brown and red algae; and all plant and animal cells. (ST for ST 129)

103) A - Hypovolemia refers to a low blood volume that can be the result of hemorrhage or dehydration. (ST for ST 57, 234)

104) B - Supination refer to pointing or turning a body part upward. (ST for ST 896)

105) A - The foramen magnum is found in the occipital bone. (Anatomy 172)

106) D - There are twelve pairs of cranial nerves that originate in the brain stem. (ST for ST 1148-1149)

107) A - Peristalsis is the rhythmic contractions of the smooth muscle layer to move food forward in the intestine, urine through the ureters and bile through the CBD. (Anatomy 794, 812)

108) C – HAIs (formerly called nosocomial) are infections acquired in the healthcare facility as a result of healthcare intervention. (ST for ST 128-129)

109) C - Marcaine is four times more potent than lidocaine that takes longer to take effect, but has a longer duration. (ST for ST 242)

110) D - A chain of bacteria is called streptococci. (ST for ST 130)

111) A - Cephalosporins such as Ancef, Kefzol, and Keflex are antibiotics. (ST for ST 218)

112) C - *Streptococcus pneumoniae* is the primary cause of bacterial pneumonia. (ST for ST 131)

113) C - Arteriosclerosis obliterans affects the arterial system and is characterized by the formation of atheroma in the lumen of an artery. (ST for ST 1103)

114) C - Polyethylene is a nonabsorbable, braided suture and has a high tensile strength making it ideal for tendon repair. (ST for ST 302-303)

115) B - Crohn's is an autoimmune disease that causes inflammation of the distal section of the small intestine. (ST for ST 444, 451)

116) D - The number 4 represents thousandths since it is three spaces after the decimal point. (ST for ST 208)

117) D - Stat means immediately such as a stat cesarean section. (Med Term 535)

118) C - The integumentary system consists of the outer epidermis and inner dermis layers. (ST for ST 730)

119) D - Luer-Lok syringes have a secure connection that locks the needle onto the syringe by twisting it on. (ST for ST 288)

120) A - The talus is one of the seven tarsal bones that articulate with the fibula and tibia. (Anatomy 243)

121) B - Medial means towards the middle or midline of the body; opposite is lateral. (Med Term 47)

122) A - The layers in order from outside to inside are dura, arachnoid and pia maters. (ST for ST 1143-1144)

123) D - The brain stem is located between the spinal cord and diencephalon. (Anatomy 620)

124) B - The invasion and multiplication of microbes within a host is called an infection. (ST for ST 57-58; 128-129)

125) C - Ischemia is the reduction of blood flow to an area. (ST for ST 1110, 1215)

126) A - $1 \div 4 = 0.25$ (ST for ST 207)

127) A - Polypropylene, besides steel, is one of the most inert suture materials that can be used in the presence of infection. (ST for ST 301)

128) D - Sepsis refers to the presence of pathogens and/or their toxins in tissue or blood resulting in an infection. (ST for ST 141)

129) D - Neurotransmitters are chemicals released by neurons to increase or inhibit impulses. (Physiology 216, 239-240)

130) D - Lysosomes surround food molecules that enter the cell; the enzymes in the lysosomes breakdown the molecules to be used by mitochondria for producing ATP, the energy source for the cell. (Physiology 69-70)

131) B - Microaerophiles need oxygen, but at a lower level than what is found in room air. (ST for ST 130)

132) D - The six extrinsic muscles of the eye originate from the bones of the orbit to move the eye in all directions. (ST for ST 606-607)

133) D - The hypoglossal nerve must be identified and preserved during a carotid endarterectomy; the hypoglossal canal course through the neck to supply the muscles of the tongue. (Anatomy 648)

134) D – Staphylococcus refers to a cluster of bacteria. (ST for ST 130)

- 135) B - Viral replication is dependent on the viral nucleic acid within the host cell. (ST for ST 133)
- 136) D - In the adult the clinical symptoms of shock are tachycardia, hypovolemia and hypotension. (ST for ST 57, 234)
- 137) B - The pouches of the large intestine are called haustra. (Anatomy 812)
- 138) B - Aerobic bacteria require oxygen to survive; there are two types: obligate aerobes and microaerophiles. (ST for ST 130)
- 139) B - Bartholin's glands are located in the vestibule; they are a pair of glands that secrete a thick lubricating mucoid fluid. (ST for ST 551)
- 140) B - Polydioxanone (PDS®) is an absorbable suture that offers extended wound support. (ST for ST 298)
- 141) C - Regional anesthesia is the administration of an anesthetic drug along a major nerve tract; types include Bier, spinal and epidural blocks. (ST for ST 243)
- 142) A - Intact skin is the primary barrier against the invasion of pathogens. (Memmler's 112)
- 143) C - Anticoagulants prevent blood clot formation and are used during vascular procedures. (ST for ST 216)
- 144) B - Spinal anesthesia involves injection of an anesthetic agent into the CSF in the subarachnoid space between meningeal layers. (ST for ST 243)
- 145) C - Facultative microbes can survive in an environment that contains oxygen or no oxygen. (ST for ST 130)
- 146) C - The iliac crest is the best source for obtaining autogenous cancellous and cortical bone for grafting purposes. (ST for ST 708)
- 147) A - The trigeminal is also called the fifth cranial nerve. (Anatomy 642)
- 148) C - The pericardium protects the heart and prevents friction against the thoracic cavity. (ST for ST 1039)
- 149) D - The two primary sources of SSI risk to the patient are endogenous flora and resident flora of the skin. (ST for ST 138)
- 150) B - Gram-negative bacteria do not retain the crystal violet and stain red from the safranin stain. (ST for ST 143)
- 151) A - The thalamus and the hypothalamus comprise the diencephalon. (Anatomy 627)

- 152) C - Analgesics combine with the opiate receptors in the CNS to decrease pain perception. (ST for ST 213)
- 153) B - Anaphylaxis is an allergic reaction to a substance including drugs and latex. (ST for ST 201, 234)
- 154) B - Prior to donning sterile gown and gloves the surgical technologist must perform a surgical hand and arm scrub. (ST for ST 332)
- 155) A - Coagulation uses electric current to close severed vessels. (ST for ST 111)
- 156) C - On a routine basis antibiotics are often administered preoperatively and postoperatively to prevent an SSI referred to as surgical prophylaxis. (ST for ST 199, 214-215)
- 157) C - The cerebrum is the largest portion of the brain. (Anatomy 613)
- 158) A - The femur is the longest, heaviest and strongest bone in the body. (Anatomy 236)
- 159) C - Hept/o refers to liver. (Med Term 542)
- 160) D - The large folds of the stomach are called rugae. (Anatomy 796)
- 161) C - The sphincter of Oddi is located where the CBD and pancreatic duct join forming the ampulla of Vater; it controls the flow of bile into the duodenum. (Anatomy 798, 804)
- 162) A - Heparin sodium is measured in units; the intraoperative normal dosage is 150-300 units/kg IV. (ST for ST 216)
- 163) D - In gynecology, methylene blue solution is used during a chromotubation procedure (tubal dye study) to determine the patency of the fallopian tubes. (Pharm 157)
- 164) A - The two primary purposes of the Foley catheter is measuring the urinary output and provide bladder decompression to protect the organ from injury. (ST for ST 285)
- 165) D - The hyoid bone does not articulate with any other bone; it is suspended from the styloid processes of the temporal bones by ligaments and muscles. (Anatomy 192)
- 166) A - Millimeter is a metric unit of length. (ST for ST 208)
- 167) B - The prefix inter-means between (Med Term 543)
- 168) D - A suture's tensile strength is the amount of weight required to break it. (ST for ST 296)
- 169) C - The first cervical vertebra is called the atlas (C1) and it supports the skull. (ST for ST 1171)
- 170) A - The suffix that refers to a blood condition is emia such as anemia. (Med Term 542)

171) B - Cardiac muscle tissue is striated, but involuntary. (Anatomy 288)