

***SURGICAL TECHNOLOGIST CERTIFYING EXAM STUDY GUIDE, 3<sup>RD</sup> Ed.***

**BONUS SCIENCE REVIEW #1: EXPLANATIONS WITH REFERENCES**

**Reference Key**

**Alex**

Rothrock JC. *Alexander's Care of the Patient in Surgery*. 14<sup>th</sup> ed. St Louis, MO: Elsevier; 2011.

**Anatomy**

Tortora G, Nielsen MT. *Principles of Human Anatomy*. 11<sup>th</sup> ed. Hoboken, NJ: John Wiley & Sons; 2009.

**B&K**

Phillips N. *Berry & Kohn's Operating Room Technique*. 12<sup>th</sup> ed. St Louis, MO: Elsevier; 2013.

**Med Term**

Gylys BA, Wedding ME. *Medical Terminology Systems: A Body Systems Approach*. 6<sup>th</sup> ed. Philadelphia, PA: FA Davis; 2009.

**Memmler's**

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

**Micro**

Price P, Frey KB. *Microbiology for Surgical Technologists*. Clifton Park, NY: Delmar Learning; 2003.

**OR Instr**

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

**Pharm**

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

**Physiology**

Rhoades R, Pflanzner R. *Human Physiology*. 4<sup>th</sup> 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*. 4<sup>th</sup> ed. Clifton Park, NY: Delmar Cengage Learning; 2014 .

- 1) D - Phimosis is a pathology in which the prepuce cannot be retracted over the glans penis. (ST for ST 879 )
- 2) A - Bacilli are recognized by their rod-shape. (ST for ST 130 )
- 3) A - EEA is a stapling device used to perform lower anterior anastomosis. (ST for ST 319 )
- 4) B - The sympathetic nervous system is a division of the ANS that causes a physiological response to danger or emergencies. (Physiology 341 )
- 5) D - Arthrocentesis involves placing a needle into the joint to withdraw synovial fluid for diagnostic purposes or remove excess fluid. (ST for ST 907 )
- 6) D - Overactive GH-producing cells cause acromegaly characterized by widening of the bones of the face, hands and feet. (Memmler's 265)
- 7) D - Oophorectomy is the removal of one or both ovaries. (ST for ST 562 )
- 8) A - Skeletal muscle tissue is striated; skeletal muscle is voluntary. (Anatomy 288)
- 9) B - The suffix pexy means to fixate such as orchiopexy. (Med Term 545)
- 10) A - An axon is the cytoplasmic process of a neuron that conducts impulses away from the cell body. (Anatomy 571)
- 11) A - Pseudo- means false, such as pseudoaneurysm. (ST for ST 1065-1066; 1067 )
- 12) A - Dehiscence is the partial or total separation of layers of tissue. (ST for ST 293-294 )
- 13) B - Fomites are inanimate objects, such as the back table and Mayo stand, that harbor microbes. (ST for ST 141 )
- 14) D - Estrogen is responsible for the development and maintenance of the female secondary sex characteristics. (Physiology 944-945)
- 15) C - Surrounding the shoulder joint is the rotator cuff that consists of four muscles: infraspinatus, teres minor, subscapularis and supraspinatus. (ST for ST 915-916 )
- 16) A - An antigen is a foreign substance in the body that initiates the immune response with the production of antibodies. (Anatomy 548)
- 17) C – Lysis means separation, destruction or loosening; it can be used as a suffix or stand alone word. (Med Term 543)
- 18) D - Hypaque, Renografin and Conray are types of contrast media used for the visualization of vessels and organs during X-ray examinations. (ST for ST 217, 400 )

- 19) B - The small intestine is divided into the duodenum, jejunum (middle section), and ileum (distal section). (Anatomy 805-806 )
- 20) C - Epidural anesthesia involves administering an anesthetic agent into the tissues located right above the dura mater. (ST for ST 246 )
- 21) B - The electrical impulses from the bundle of His enter the Purkinje fibers and the fibers focus the impulses to the apex of the left ventricle resulting in contraction. (ST for ST 1040 )
- 22) B - The action of the majority of antibiotics is inhibiting cell wall synthesis during multiplication. (ST for ST 214-215 )
- 23) D - The greater trochanter is located on the upper, lateral part of the upper shaft of the femur; it serves as the insertion for the gluteus medius and minimus. (Anatomy 236-237 )
- 24) C - The ACL is attached to the posterior lateral condyle of the femur and midline notch (intercondylar) are of the tibia. (ST for ST 957-958 )
- 25) A - Carpal bones are a type of short bone that aid in the movement of the wrist. (ST for ST 893 )
- 26) A - Para- means surrounding such as in paranasal sinuses, the air cavities that surround the nasal cavity. (Med Term 33 )
- 27) A - The transversalis fascia is the primary focus of inguinal hernias; a hernia occurs when the fascia ruptures or tears and is repaired during surgery. (ST for ST 421, 425 )
- 28) B - Plantar flexion is bending the foot downward at the ankle joint. (ST for ST 896 )
- 29) D - There are 12 thoracic vertebra and the 12 ribs that form the thoracic cage articulate with each thoracic vertebrae. (ST for ST 1004 )
- 30) C - The liver is a complex organ that carries out multiple physiological activities including producing bile. (Physiology 711 )
- 31) B - Coccus (sing.form; cocci, pl.) refers to round-shaped bacteria. (ST for ST 130 )
- 32) C - Incontinence is the involuntary lack of control of urination; one type is stress incontinence. (ST for ST 853 )
- 33) A - Hypaque is a type of contrast agent used to outline biliary structures during surgery. (ST for ST 217, 400 )
- 34) B - The thymus gland functions in immunity by producing T-cells. (Physiology 861)

- 35) B - The vagus (X) is the cranial nerve that emerges from the medulla, passes through the skull, and descends through the neck region into the thorax and abdominal region. (Anatomy 646)
- 36) B - During early development the number of vertebrae is 33; when the sacral and coccygeal regions fuse the adult vertebrae numbers 26. (Anatomy 193)
- 37) C - The thorax refers to the chest or thoracic cavity. (ST for ST 1004 )
- 38) C - Cholecystectomy is removal of the gallbladder primarily as a laparoscopic procedure. (ST for ST 467 )
- 39) A - Bone cells are called osteocytes. (ST for ST 892 )
- 40) B - The gastrocnemius is the superficial muscle of the calf. (Anatomy 398)
- 41) D - The suffix -malacia means softening such as osteomalacia. (ST for ST 898 )
- 42) A - A cutting needle would not be used on friable intestinal tissue. (ST for ST 307-308 )
- 43) A - Chronic or acute diseases, such as PVD, negatively effect the ability of a wound to heal. (ST for ST 293 )
- 44) C - The bacterial cell contains a single strand of DNA that is unique to each bacterial species. (ST for ST 130 )
- 45) C - E. coli colonizes within the colon and obtains nutrients from the food humans eat, and produce vitamin K. (ST for ST 129 )
- 46) D - The nerves of the breast are cutaneous nerves from the anterior thorax. (Anatomy 132; B&K 660 )
- 47) C - The cerebellum is positioned in the inferior and posterior area of the cranial cavity. (Anatomy 625)
- 48) B - Omnipaque is a contrast dye that is injected into the artery or vein during an angiography. (Pharm 152)
- 49) C - Tetanus and botulism are caused by Gram-positive anaerobic bacteria. (ST for ST 132 )
- 50) C - Three phases of first intention wound healing are: lag (inflammatory response), proliferation and maturation (differentiation phase). (ST for ST 292-293 )
- 51) D - Ethibond Excel® is an example of a polyester fiber suture. (ST for ST 303 )
- 52) A - The epiphyseal plate is the area of a bone where growth occurs until early adulthood. (Anatomy 152)

- 53) A - Pneumothorax is the entry of air into the pleural cavity due to blunt or penetrating trauma; it displaces the lung which can collapse due to inability to expand. (ST for ST 58 )
- 54) B - The result of fertilization of gametes is a zygote. (Memmler's 511)
- 55) D - The twelve pair of ribs articulate posteriorly with twelve thoracic vertebrae. (Anatomy 208)
- 56) B - The seventh cranial nerve is the facial nerve that transmits impulses to the pons. (Anatomy 623)
- 57) D - Cephalalgia is another term for headache. (Taber's 407)
- 58) B - Brady- means slow such as bradycardia. (Med Term 540)
- 59) D - Parenteral means by injection; it includes intradermal, subcutaneous, intramuscular and intravenous. (ST for ST 202 )
- 60) A - Strabismus is the misalignment or deviation of the eye(s) that includes crossed eyes and wall eyes. (ST for ST 607-608 )
- 61) C - Biotransformation of drugs usually occurs in the liver, breaking down products of metabolism into metabolites. (ST for ST 202 )
- 62) A - The bleeding from an epidural hematoma rips the dura away from the skull resulting in more hemorrhaging. (ST for ST 1145-1146 )
- 63) C - Any item that extends or falls below the table edge is considered non-sterile. (ST for ST 173 )
- 64) B - Pharmacodynamics is the study of the interaction of drugs with the target cells of living organisms. (ST for ST 200 )
- 65) D - Mutualism is when both microbes benefit from one another. (ST for ST 129 )
- 66) A - Hemostasis is stopping hemorrhage by pressure, ligation, or with hemostatic agents. (ST for ST 178 )
- 67) B - Connective tissue is the most abundant tissue in the body; examples include cartilage, bone, ligaments and blood. (Physiology 14)
- 68) B - Heparin sodium prevents clot formation; it is used during vascular procedures. (ST for ST 216 )
- 69) D - Varicocele is due to varicosities of the veins that drain the testes and the scrotum is swelled. (Anatomy 856)

- 70) B - The medical term for RBCs is erythrocytes that contain hemoglobin. (Anatomy 443)
- 71) B - The Asepto syringe is the most frequently used irrigator that holds about 120cc. (ST for ST 288 )
- 72) A - Sterilization is the destruction of spores and microorganisms on inanimate objects. (ST for ST 140 )
- 73) C - Diabetes mellitus places an individual at a higher risk for developing retinopathy that results in blindness. (ST for ST 61 )
- 74) D - The two pectoral girdles, also called shoulder girdles, consist of the clavicle and scapula. (Anatomy 214)
- 75) C - Tuberculosis is caused by *Mycobacterium tuberculosis* and usually infects the lungs. (ST for ST 132 )
- 76) A - The hyoid bone is a part of the axial skeleton and is the only bone in the body that does not articulate with another bone; it supports the tongue and aids in keeping the larynx continuously open. (Anatomy 192)
- 77) D - The adrenal cortex secretes steroid type of hormones that are important in the control of fluid and electrolyte balance. (ST for ST 819 )
- 78) D - Rickettsia are gram-negative, pleomorphic coccobacilli transmitted to humans by bites of infected ticks or mites, or feces of infected lice or fleas. (Micro 29; 240)
- 79) C - Antibiotics are often administered intravenously by the anesthesia provider. (ST for ST 202, 214-215 )
- 80) C - The two chambers of the nasal cavity has a series of bony projections called the nasal conchae or turbinates. (ST for ST 658 )
- 81) A - Epinephrine is a vasoconstrictor that is often mixed with local anesthetics to provide hemostasis and to keep the local from being rapidly absorbed. (ST for ST 213, 229 )
- 82) D - Hemophilia is a congenital bleeding disorder that will affect the patient during surgery; hemophilia is a clotting deficiency. (ST for ST 178 )
- 83) A - To avoid complications including cardiovascular and respiratory complications, the OR table is slowly leveled. (ST for ST 362, 364 )
- 84) C - The vagus (X) is the cranial nerve that innervates the pharynx, larynx, external auditory meatus and thoracic and abdominal muscles. (ST for ST 1148, 1149 )
- 85) D - Cefazolin sodium is in the class of cephalosporin antibiotics. (ST for ST 214 )

- 86) D - Atropine sulfate is a common mydriatic drug. (ST for ST 223 )
- 87) D - Bolsters are used with retention sutures to prevent the suture from cutting into the skin surface. (ST for ST 315-316 )
- 88) B - Pulse oximetry is a noninvasive method of measuring the blood oxygenation. (ST for ST 249, 408 )
- 89) C - The parietal bones form the greater portion of the sides and roof of the cranial cavity. (Anatomy 168)
- 90) B - Ketamine is a dissociative agent that produces amnesia and profound analgesia; it is administered IM or IV and due to its disadvantages is limited to use on children 2-10 years old. (ST for ST 238 )
- 91) A - Epidural anesthesia is often used in obstetrics to produce painless child birth; it is replacing caudal anesthesia. (ST for ST 246 )
- 92) C - The meter is the basic unit of length in the metric system. (ST for ST 207-208 )
- 93) D - Phagocytosis is a cells ability to engulf a solid particle and digest it; it is an important defense in helping the body fight disease. (Anatomy 31)
- 94) A - The hypoglossal (XII) cranial nerve carries motor fibers to the tongue and sensory impulses from the tongue to the brain. (Anatomy 649)
- 95) A - Osteoarthritis is a degenerative joint disease that occurs with age; the articular cartilage is worn and the two bones move against each other causing pain due to the friction. (ST for ST 897 )
- 96) D - There are three types of hydrocephalus: noncommunicating, communicating, and improper absorption of CSF by the arachnoid villi. (ST for ST 1164 )
- 97) D - Some bacterial species are capable of spore formation in order to survive harsh environmental conditions; spores are difficult to destroy. (ST for ST 131 )
- 98) C - The anterior and lateral walls of the trachea are supported by 15-20 C-shaped hyaline cartilage to keep the trachea from collapsing. (ST for ST 683 )
- 99) D - The thrombin used in the OR is of bovine origin; thrombin is a part of the blood-clotting mechanism. (ST for ST 229 )
- 100) B - The appendicular skeleton consists of the shoulders, arms, pelvis and legs. (Anatomy 163-164 )

- 101) C - The rate of absorption depends on many factors including type of drug preparation, dosage, route of administration and patient's health condition. (ST for ST 201 )
- 102) C - A Colles fracture is an angulated fracture of the distal radius located at the epiphysis about 1 in. from the wrist joint. (ST for ST 933 )
- 103) B - The olfactory (I) cranial nerve carries impulses for the sense of smell. (Anatomy 639)
- 104) C - The purpose of the surgical hand scrub is to reduce the microbial count and render them surgically clean. (ST for ST 333 )
- 105) C - The extremity or end of a bone is the epiphysis. (Anatomy 142)
- 106) D - The combining form that means kidney is ren/o such as renal. (Med Term 545)
- 107) A - The wisp-like nerve roots at the end of the spinal cord are called cauda equina. (Anatomy 589)
- 108) A - Pneumatic tourniquet is an external mechanical method of hemostasis. (ST for ST 278-279 )
- 109) B - An aneurysm is a weak sac formed by the dilatation of the arterial walls. (ST for ST 1065-1066; 1067 )
- 110) B - Some bacterial species are capable of spore formation in order to survive harsh environmental conditions; spores are difficult to destroy. (ST for ST 131 )
- 111) C - The suffix rhea means discharge or flow such as menorrhea. (Med Term 546)
- 112) D - The tympanic cavity located in the middle ear contains the malleus, incus and stapes. (ST for ST 637 )
- 113) A - Miotics constrict the pupil by acting on the sphincter of the iris; one miotic drug is pilocarpine hydrochloride. (ST for ST 223 )
- 114) C - Afferent neurons, also called sensory neurons, carry nerve impulses to the CNS. (Physiology 216)
- 115) C - A differential count determines the distribution of the different kinds of WBCs through counting and providing a percentage of the total examined in the stained blood smear. (Med Term 247)
- 116) C - Chromic suture is treated with a salt solution to decrease its absorbability. (ST for ST 298 )



117) B - Scoliosis is recognized by a lateral curvature of the spinal column, deformity of the rib cage and vertebrae. (Memmler's 147 )

118) D - Sterile bottles of fluid should never be recapped; replacing the cap contaminates the inner fluid. (ST for ST 174 )

119) A - Binary fission is the simple division that results in two cells; most bacteria divide by binary fission. (ST for ST 130 )

120) A - The dome-shaped portion of the uterus located above the uterine tubes is the fundus. (Anatomy 869)

121) B - Warfarin is an anticoagulant that prohibits the action of vitamin K. (Pharm 210, 212-213 )

122) D - Neostigmine bromide (Prostigmin) is a neuromuscular blocker. (ST for ST 217 )

123) B - Eucaryotes cellular structure is complex and procaryotes is simple with no membrane to contain the organelles. (ST for ST 129 )

124) B - The innermost thin layer of endothelium is the endocardium. (Anatomy 458)

125) C - The normal WBC is 5,000-10,000; above that means an infection could be present. (ST for ST 405 )

126) D - The function of hemoglobin is to carry oxygen. (Physiology 830)

127) A - The ECG is a noninvasive method used to monitor the rate, rhythm and contractions of the heart; used to detect dysrhythmias. (ST for ST 248, 407-408 )

128) A - The primary source of airborne bacteria in the O.R. is the surgical team that shed microbes from their skin. (ST for ST 137-138 )

129) C - The parotid is one of three pairs of salivary glands; it is located anterior and inferior to the ears. (Anatomy 788)

130) B - Human Immunodeficiency Virus (HIV) is the cause of Acquired Immunodeficiency Syndrome (AIDS). (ST for ST 64, 134 )

131) D - Stapling devices do not retract. (ST for ST 317-319 )

132) B - The acromion is part of the scapula or shoulder blade. (Anatomy 218-219)

133) B - Evisceration is the rupture of a wound with the spilling of contents. (ST for ST 294 )

134) C - The knee joint is cushioned by the lateral and medial menisci that are situated on the upper articular surface of the tibia. (ST for ST 958 )

- 135) C - The axillary region should be considered non-sterile once the gown has been donned. (ST for ST 173, 336-338 )
- 136) D - One meter equals 1,000 millimeters. (ST for ST 208 )
- 137) C - The calcaneus is one of seven tarsal bones; it is the largest of the tarsal bones located inferiorly to the talus and forms the heel. (ST for ST 987-988 )
- 138) C - The diaphysis is the shaft, or long, main part of the bone. (Anatomy 142)
- 139) C - Viruses that invade bacteria are called bacteriophages. (Micro 32)
- 140) B - Another name for spongy bone is cancellous. (ST for ST 893 )
- 141) A - 8-0 suture size are used for microvascular and eye procedures. (ST for ST 296 )
- 142) D - There are 12 pairs of ribs; the first 7 pairs are called the true ribs that join anteriorly with the sternum by costal cartilages. (ST for ST 1004 )
- 143) C - The suffix trophy means development or nourishment such as hypertrophy. (Med Term 547)
- 144) A - Second intention (granulation) healing occurs in large wounds that cannot be approximated due to loss of tissue or an infection has caused tissue necrosis. (ST for ST 293 )
- 145) D - Class IV Dirty/Infected has the highest rate of wound infection since it is an open traumatic wound, preoperative microbial contamination or perforated viscus. (ST for ST 290-291 )
- 146) D - Atrophy refers to wasting or decrease in size of a body part due to disease or other reasons such as muscle atrophy due to lack of exercise. (Memmler's 73)
- 147) B - C. perfringens is the microbe that is responsible for causing gas gangrene, a serious type of deep wound infection. (ST for ST 132 )
- 148) A - Furosemide is a diuretic used to maintain intraoperative urinary output. (ST for ST 218 )
- 149) D - Stainless steel suture has high tensile strength and can support a wound indefinitely. (ST for ST 301 )
- 150) D - Furosemide is a diuretic that prevents reabsorption of sodium and water in the kidney; it is given intraoperatively to maintain urinary output. (ST for ST 218 )
- 151) A - Cilia and flagella are two methods by which bacteria can achieve motility. (ST for ST 130 )

- 152) B - Drugs can cause undesirable effects such as diarrhea, dizziness, drowsiness and constipation, but do not cause hemorrhage. (ST for ST 201 )
- 153) C - Emergence occurs at the end of the surgical procedure with the goal of having the patient as awake as possible by the end of the procedure. (ST for ST 232 )
- 154) C - Suture ligature is another name for stick tie. (ST for ST 304-305 )
- 155) D - Oxytocin is an oxytocic drug that is used to induce or continue labor and contract the uterus following delivery to control hemorrhage. (ST for ST 212 )
- 156) D – The fimbriae are finger-like projections located around the funnel-shaped end of the fallopian tube called the infundibulum. (Anatomy 866)
- 157) A - The six rights are right patient, right drug, right dose, right route of administration, right time and frequency, right documentation and labeling. (ST for ST 209 )
- 158) C - The prostate is a gland that is conical shaped that lies under the bladder and the urethra travels through it. (ST for ST 856 )
- 159) D - Agar is an agent added to a growth medium to solidify the medium. (Micro 18)
- 160) B - Vicryl® is another name for polyglactin 910, which is the synthetic chemical used to make the suture material. (ST for ST 299-300 )
- 161) C - The prefix epi means above and upon such as epicondyle. (Med Term 542)
- 162) C - Tendons are located at the end of muscles and attaches the muscle to bone; ligaments attach bone to bone. (Anatomy 143)
- 163) D - The sections of the stomach are the upper fundus, cardia, corpus, antrum and pylorus. (ST for ST 438, 440 )
- 164) C - A needle with a cutting point is used on tendon. (ST for ST 307-308 )
- 165) C - The left coronary artery divides into the anterior interventricular and circumflex. (Anatomy 469)