

9. Goodpasture syndrome and myasthenia gravis are examples of which type of hypersensitivity reactions?

- a. Type 1
- b. Type 2
- c. Type 3
- d. Type 4
- e. Type 5



10. A 20-year-old boy had typhoid fever one year ago. This year he again presented with complaints of anorexia, nausea, vomiting and intermittent fever for the last one week. He is suspected to have recurrent typhoid fever. Which immunoglobulin is predominantly seen in the secondary immune response to this infection?

- a. IgG
- b. IgA
- c. IgE
- d. IgD
- e. IgM



11. A burn victim's face was reconstructed by taking a flap of skin from his back and thigh; this represents what type of a graft?

- a. Allograft
- b. Autograft
- c. Xenograft
- d. Isograft
- e. Homograft



12. A 45-year-old patient with end-stage renal disease (ESRD) receives a kidney transplant from his brother. However, after 60 days the patient suffers from graft rejection and his renal function deteriorates, this is an example of:

- a. Chronic rejection
- b. Acute rejection
- c. Accelerated rejection
- d. Hyperacute rejection
- e. Graft versus host disease



13. A 28-year-old woman is found to have pulmonary sarcoidosis. Flow cytometric analysis of T cells isolated from the alveoli and lung interstitium reveals the presence of large number of T helper (Th1) cells. These cells are known to secrete which of the following substances?

- a. Complement component C5a
- b. IL-2 and IFN gamma
- c. IL-8 and TGF beta
- d. Leukotrienes
- e. Elastase



4. A 26-year-old African American woman presents with nonspecific symptoms including fever, malaise, and increasing respiratory problems. A chest x-ray reveals enlarged hilar lymph nodes, while laboratory tests find her serum calcium level to be elevated. A trans-bronchial biopsy reveals scattered chronic inflammatory cells, reactive epithelial changes, and several caseation granulomas. The pathological mechanism involved in the formation of these non-caseating granulomas involves the activation of macrophages to form epithelial cells by the action of which substance?

- a. Gamma-interferon
- b. Leukotriene C₄
- c. Interleukin-2
- d. Interleukin-5
- e. Interleukin-17

5. Which of the following is the definition of an allograft?

- a. A graft between a human and an animal
- b. A graft between two individuals of different species
- c. A graft between two individuals of the same species
- d. A graft between two individuals of the same in dead strain
- e. A graft between identical twins

6. A 28-year-old woman presents with increasing shortness of breath, fatigue, arthritis and a bilateral photosensitive, erythematous rash. Biopsies from this rash reveal liquefactive degeneration of the basal layer of the epidermis with a perivascular lymphoid infiltrate. Immunofluorescence examination reveals linear deposits of IgG and complement at the dermal-epidermal junction. Physical examination finds bilateral pleural effusions, the fluid from which when examined histologically reveals multiple oval eosinophilic bodies being phagocytized by phagocytic leukocytes. Which of the following is the most likely diagnosis?

- a. Dermatomyositis
- b. Rheumatoid arthritis
- c. Sjogren's syndrome
- d. Systemic amyloidosis
- e. Systemic lupus erythematosus

7. A 45-year-old man presents with vomiting, anorexia and nausea with slight yellow discoloration of his skin. Laboratory evaluation demonstrates elevated liver enzymes while a liver biopsy reveals focal acute inflammation with Councilman bodies. These apoptotic bodies are the result of the induction of apoptosis in viral infected hepatocytes by cytotoxic T lymphocytes. In the mechanism for this destruction of viral infected hepatocytes, cytotoxic T cells only recognize antigens that are bound to which of the following substances?

- a. MHC 1
- b. Fc portion of IgG
- c. MHC 2
- d. IgM
- e. C3b

8. A 25-year-old girl comes to an allergy center with complaints of runny nose and seasonal eye itch. Recurrent conjunctivitis in this patient is most likely caused by which of the following mechanisms of disease?

- a. Autoimmunity
- b. Viral infection
- c. Bacterial infection
- d. Hypersensitivity
- e. Chemical toxicity

13. Group A streptococci are the most common bacterial cause of pharyngitis in school-age children 5–15 years of age. The most important cell component involved in adherence of this bacteria to fibronectin, which covers the epithelial surface of the nasopharynx is
- a. Capsule
 - b. Lipoteichoic acid
 - c. Flagella
 - d. Lipoprotein
 - e. O-antigen
14. In the fall of 2001, a series of letters containing spores of *Bacillus anthracis* were mailed to members of the media and to U.S. Senate offices. The result was 22 cases of anthrax, with five deaths. The heat resistance of bacterial spores, such as those of *Bacillus anthracis*, is partly attributable to their dehydrated state and partly to the presence of large amounts of:
- a. Diaminopimelic acid
 - b. d-Glutamic acid
 - c. Calcium dipicolinate/ dipicolinic acid
 - d. Sulfhydryl-containing proteins
 - e. Lipid A
15. *Mycoplasma* species lack which of the following components?
- a. Ribosomes
 - b. Plasma membrane
 - c. Both DNA and RNA
 - d. Lipids
 - e. Peptidoglycan/ cell wall
16. The DNA polymerase from *Thermus aquaticus* is an important component of DNA amplification methods such as the polymerase chain reaction. This organism is capable of growing at temperatures above 100°C. Organisms that are capable of growth at such high temperatures are referred to:
- a. Mesophiles
 - b. Psychrophiles
 - c. Halophile
 - d. Thermophilic
 - e. Microaerophilic
17. The growth rate of bacteria during the exponential phase of growth is
- a. Zero
 - b. Increasing
 - c. Constant
 - d. Decreasing
 - e. Negative
18. The growth rate of bacteria during the maximum stationary phase of growth is:
- a. Zero
 - b. Increasing
 - c. Constant
 - d. Decreasing
 - e. Negative
19. Most microorganisms pathogenic for humans grow best in the laboratory when cultures are incubated at
- a. 15–20°C
 - b. 20–30°C
 - c. 30–37°C
 - d. 38–50°C
 - e. 50–55°C
20. Which of the following is NOT a mechanism for generating metabolic energy by microorganisms?
- a. Fermentation

14. Within minutes of a bee sting, a 23-year old woman develops generalized pruritis and hyperaemia of the skin, followed shortly by swelling of the face and eyelids, dyspnea, and laryngeal edema. This reaction is mediated by:

- a. Antigen-antibody complexes
- b. IgA antibodies
- c. IgE antibodies
- d. IgG antibodies
- e. Cytotoxic T cells



15. A 20 year old woman presents with malar rash, arthralgia's, low grade fever and high titer of antibodies to double stranded DNA and smith antigen. Which type of hypersensitivity reaction is seen in this disorder?

- a. Type 1 hypersensitivity
- b. Type 3 Hypersensitivity
- c. Type 2 hypersensitivity
- d. Type IV hypersensitivity
- e. Type 1 and 2 hypersensitivity



Test

15

IMMUNOLOGY

173

STUDENT NAME: ~~XXXXXXXXXX~~
MAXIMUM MARKS: 40 MARKS
MARKED OBTAINED:
TIME ALLOWED: 60 MINUTES

- A 3-month-old infant born premature at 25 weeks of gestation is being evaluated for ocular problems and seizures. An x-ray of this infant's head reveals extensive cerebral calcification in the periventricular areas. Because of this combination of clinical signs, the possibility of congenital toxoplasmosis is considered. Elevated levels (titers) of which one of the following types of antibodies, if directed against *Toxoplasma gondii*, would best support this diagnosis?

 - a. IgG
 - b. IgM
 - c. IgD
 - d. IgE
 - e. IgA

✓
- Which of the listed cytokines is secreted by macrophages and function as a major mediator of acute inflammation by stimulating acute phase reactions such as fever production along with increasing vascular permeability and stimulating fibroblasts?

 - a. Interleukin-1
 - b. Interleukin-2
 - c. Interleukin-3
 - d. Interleukin-5
 - e. Interleukin-12

✓
- After receiving incompatible blood, a patient develops a transfusion reaction in the form of back pain, fever, shortness of breath, and hematuria. Which one of the following statements best classifies this type of immunologic reaction?

 - a. Systemic anaphylactic reaction
 - b. Systemic immune complex reaction
 - c. Delayed type hypersensitivity reaction
 - d. Complement-mediated cytotoxicity reaction
 - e. T cell-mediated cytotoxicity reaction

X

- c. This bacterium is more virulent than one containing the three enzymes
d. This bacterium does not produce superoxide
e. This bacterium does not produce peroxide
6. Iron is essential in bacterial metabolism. When bacteria invade the human host they must capture iron in order to survive. Which of the macromolecules listed below is important in bacterial iron metabolism?
- a. Transferrin
 - b. Lactoferrin
 - c. Ferric oxide
 - d. Lipopolysaccharide (LPS)
 - e. Siderophores
7. Which one of the following is a prokaryote?
- a. Bacteria
 - b. Algae
 - c. Protozoa
 - d. Fungi
 - e. Slime molds
8. Which one of the following agents simultaneously contains both DNA and RNA?
- a. Bacteria
 - b. Viruses
 - c. Viroids
 - d. Prions
 - e. Plasmids
9. A 65-year-old man develops dementia, progressive over several months, along with ataxia and somnolence. An electroencephalographic pattern shows paroxysms with high voltages and slow waves, suggestive of Creutzfeldt-jakob disease (CJD). By which of the following agents is this disease caused?
- a. Bacterium
 - b. Virus
 - c. Viroid
 - d. Prion
 - e. Plasmid
10. Chloramphenicol, an antibiotic that inhibits bacterial protein synthesis, will also affect which of the following eukaryotic organelles?
- a. Mitochondria
 - b. Golgi complex
 - c. Microtubules
 - d. Endoplasmic reticulum
 - e. Nuclear membrane
11. Which of the following structures is not part of the bacterial cell envelope?
- a. Peptidoglycan
 - b. Lipopolysaccharide
 - c. Capsule
 - d. Lipid A
 - e. Gas vacuole
12. Which of the following components is present in gram-negative bacteria but not in gram-positive bacteria?
- a. Peptidoglycan
 - b. Lipid A
 - c. Capsule
 - d. Flagella
 - e. Pili

- a. Protein synthesis
- c. Respiration
- d. Photosynthesis
- e. C and D

X

21. Mutations in bacteria can occur by which of the following mechanisms?

- a. Base substitutions
- b. Deletions
- c. Inversions
- d. Rearrangements
- e. All of the above

✓

22. The form of genetic exchange in which donor DNA is introduced to the recipient by a bacterial virus is

- a. Transformation
- b. Conjugation
- c. Transfection
- d. Transduction
- e. Horizontal transfer

✓

23. A 26-year-old woman visits her physician because of an unusual vaginal discharge. On examination, the physician observes a thin, homogeneous, white-gray discharge that adheres to the vaginal wall. The pH of the discharge is 5.5 (normal, <4.3). On Gram stain, many epithelial cells covered with gram-variable rods are seen. Bacterial vaginosis is diagnosed. Which one of the following normal genital flora microorganisms is greatly decreased in bacterial vaginosis?

- a. *Corynebacterium* species
- b. *Staphylococcus epidermidis*
- c. *Prevotella* species
- d. *Candida albicans*
- e. *Lactobacillus* species

✓

24. Certain microorganisms are never considered to be members of the normal flora. They are always considered to be pathogens. Which one of the following organisms fits into that category?

- a. *Streptococcus pneumoniae*
- b. *Escherichia coli*
- c. *Mycobacterium tuberculosis*
- d. *Staphylococcus aureus*
- e. *Neisseria meningitidis*

✓

25. Antimicrobial therapy can decrease the amount of susceptible bowel flora and allow proliferation of relatively resistant colonic bacteria. Which one of the following species can proliferate and produce a toxin that causes diarrhea?

- a. *Enterococcus* species
- b. *S. epidermidis*
- c. *Pseudomonas aeruginosa*
- d. *Clostridium difficile*
- e. *Bacteroides fragilis*

X

26. Which one of the following microorganisms can be part of the normal vaginal flora and cause meningitis in newborns?

- a. *C. albicans*
- b. *Corynebacterium* species
- c. *S. epidermidis*
- d. *Ureaplasma urealyticum*
- e. Group B streptococci

✓

group B-
meningitis
BF → diarrhea

Test

15

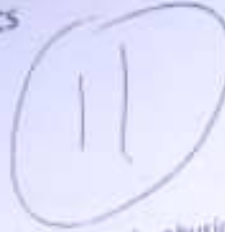
HEMODYNAMICS

STUDENT NAME: ~~XXXXXXXXXX~~ ~~XXXXXXXXXX~~

MAXIMUM MARKS: 45 MARKS

MARKED OBTAINED:

TIME ALLOWED: 45 MINUTES



1. Which of the following changes best describes the pathophysiology involved in the production of pulmonary edema in patients with congestive heart failure?
- a. Decreased plasma oncotic pressure
 - b. Widespread endothelial damage
 - c. Increased hydrostatic pressure
 - d. Increased vascular permeability
 - e. Acute lymphatic obstruction
2. 22-year-old second-year medical student develops a "red" face after being asked a question during lecture. Which of following statements best describes this vascular reaction?
- a. Active hyperemia
 - b. Acute congestion
 - c. Non palpable purpura
 - d. Passive hyperemia
 - e. Petechial hemorrhage
3. Nutmeg Liver is seen in:
- a. Liver cirrhosis.
 - b. Liver necrosis.
 - c. Chronic passive congestion.
 - d. Thrombosis of the portal veins.
 - e. Hemorrhage due to liver trauma.
4. During the autopsy of a 45-year old man who died when his motorcycle was hit by a truck, a 1.2-cm red mass is found within a branch of the left pulmonary artery. Grossly this mass is rubbery, gelatinous, and has a "chicken fat" appearance. Histologic section reveal that mass is not attached to wall of pulmonary artery, and alternating lines of Zahn are not seen. Which of the following statements best describes this intravascular mass?
- a. Postmortem blood clot
 - b. Postmortem hematoma
 - c. Postmortem embolic blood clot
 - d. Postmortem non-embolic thrombus
 - e. Postmortem non-thrombotic embolus

Test

1

GENERAL MICROBIOLOGY-1

STUDENT NAME: ~~XXXXXXXXXX~~


MAXIMUM MARKS: 60 MARKS

MARKED OBTAINED: (23)

TIME ALLOWED: 70 MINUTES

1. Uptake by a recipient cell of soluble DNA released from a donor cell is defined as
 - a. Conjugation
 - b. Recombination
 - c. Competence
 - d. Transformation
 - e. Transduction
2. Transfer of a donor chromosome fragment by a temperate bacterial virus is defined as
 - a. Conjugation
 - b. Recombination
 - c. Competence
 - d. Transformation
 - e. Transduction
3. Direct transfer of a plasmid between two bacteria is defined as
 - a. Conjugation
 - b. Recombination
 - c. Competence
 - d. Transformation
 - e. Transduction
4. Treatment of the culture with gentamicin, an inhibitor of protein synthesis, would have maximal effect on which of the phases?
 - a. Lag phase
 - b. Log phase
 - c. Stationary phase
 - d. Death phase
 - e. Static phase
5. A bacterium is examined and is found to lack superoxide dismutase, catalase, and peroxidase. Which of the following statements best describes this bacterium?
 - a. This bacterium is an anaerobe
 - b. This bacterium will survive in an O₂ environment

Test



2

GENERAL MICROBIOLOGY-2

17

STUDENT NAME: ~~XXXXXXXXXX~~
MAXIMUM MARKS: 50 MARKS
MARKED OBTAINED:
TIME ALLOWED: 60 MINUTES

1. Quinolone antibiotic with broad Gram-negative and Gram-positive activity is:
a. Piperacillin
b. Cefoperazone
c. Ceftriaxone
 d. Ciprofloxacin
e. Imipenem
2. Your superior requests that you sterilize some surgical instruments. Which one of the following agents would you use?
a. Benzoic acid (2%)
b. Isopropyl alcohol (2%)
 c. Glutaraldehyde (2%)
d. Hydrogen peroxide (2%)
e. Quaternary ammonium compound (2%)
3. Which of the following is the most resistant to destruction by chemicals and heat?
a. Spores of *Aspergillus fumigatus*
b. *Mycobacterium tuberculosis*
c. Ebola virus
d. *E. coli*
 e. Spores of *Bacillus anthracis*
4. The action of which of the following agents or processes on non-spore forming bacteria can be reversed?
a. A disinfectant
b. A bactericidal agent
 c. A bacteriostatic agent
d. Autoclaving at 121°C for 15 minutes
e. Dry heat at 160–170°C for 1 hour
5. A 22-year-old woman who works in a plant nursery presents with a history of fever and cough for 2 months. Over this period of time she has lost 5 kg. Chest radiography shows bilateral upper lobe infiltrates with cavities. A stain of her sputum shows acid-fast bacilli. The likely means by which the patient acquired her infection is:
a. Sexual activity
b. Ingesting the microorganisms in her food
c. Holding onto contaminated hand rails when she takes public transportation
 d. Breathing aerosolized droplets containing the microorganism
e. None of the above
6. During a pandemic of a well-characterized disease, a group of 175 airline passengers flew from Lima, Peru, to Los Angeles. Lunch on the plane included crab salad, which was eaten by about two thirds of the passengers. After landing in Los Angeles, many of the passengers transferred to other flights with

11. Dependent edema found in congestive heart failure is most likely due to:
- a. Lymphatic obstruction.
 - b. Increase hydrostatic pressure.
 - c. Arteriolar dilatation.
 - d. Reduced plasma oncotic pressure.
 - e. Endothelial injury.
12. Which of the following statements regarding pulmonary emboli is incorrect?
- a. Most pulmonary emboli are clinically silent.
 - b. Sudden death can result from obstruction of main pulmonary trunk.
 - c. Most cases are derived from superficial veins of the legs and periprostatic veins.
 - d. Pulmonary infarction can occur in patients who have congestive heart failure.
 - e. Paradoxical emboli may occur in patients with atrial septal defect.
13. Reduced plasma oncotic pressure is the most important mechanism of edema in:
- a. Congestive heart failure.
 - b. Edema of leg affected by venous thrombosis.
 - c. Edema of the arm in breast cancer patients.
 - d. Nephrotic syndrome.
 - e. Brain trauma.
14. Infarcts tend to be hemorrhagic when they occur in:
- a. Kidney.
 - b. Lungs.
 - c. Spleen.
 - d. Heart.
 - e. Brain.
15. The most common site of venous thrombosis is:
- a. Brain.
 - b. Kidney.
 - c. Legs.
 - d. Liver.
 - e. Lung.

destinations in other parts of California and other Western states. Two of the passengers who stayed in Los Angeles developed severe watery diarrhea. The likely cause of the diarrhea in the two passengers is:

- a. Escherichia coli O157:H7
- b. Vibrio cholerae type O139
- c. Shigella dysenteriae type 1
- d. Campylobacter jejuni
- e. Entamoeba histolytica

The first microorganism to satisfy Koch's postulates (in the late 19th century) was:

- a. Treponema pallidum
- b. Stenotrophomonas maltophilia
- c. Mycobacterium leprae
- d. Bacillus anthracis
- e. Neisseria gonorrhoeae

8. Which of the following statements about lipopolysaccharide is correct? (A)

- a. It interacts with macrophages and monocytes yielding release of cytokines.
- b. It does not cause endotoxic shock.
- c. It forms holes in red blood cell membranes yielding hemolysis.
- d. It causes hypothermia.
- e. It causes paralysis.

9. A 27-year-old man had a rhinoplasty. A nasal tampon was placed to control the bleeding. Approximately 8 hours later, he developed headache, muscle aches, and abdominal cramps with diarrhea. He then developed an erythematous rash (resembling sunburn) over much of his body, including the palms and soles. His blood pressure is 80/50 mm Hg. The nasal tampon remained in place. His liver enzyme tests were elevated, and there was evidence of moderate renal failure. This patient's illness was likely to be caused by which of the following?

- a. Lipopolysaccharide
- b. Peptidoglycan
- c. A toxin that is a superantigen
- d. A toxin that has A and B subunits
- e. Lecithinase (alpha toxin)

10. Which of the following is most likely to be associated with the formation of a bacterial biofilm?

- a. Airway colonization in a cystic fibrosis patient with a mucoid strain of P aeruginosa
- b. Urinary tract infection with E coli
- c. Meningitis with N meningitidis
- d. Tetanus
- e. Impetigo caused by S aureus

11. Which of the following best describes the mechanism of action of diphtheria toxin?

- a. Forms pores in red blood cells causing hemolysis
- b. Degrades lecithin in eukaryotic cell membranes
- c. Causes release of tumor necrosis factor
- d. Inhibits elongation factor 2
- e. Causes increased adenylate cyclase activity

12. Vaccines containing capsular polysaccharide are all except

- a. Step pneumoniae
- b. H. influenza
- c. Neisseria meningitidis
- d. Salmonella typhi
- e. Bacillus anthrax

13. During the course of his hospital stay, a severely burned 60-year old male develops a rapidly disseminating bacterial infection. Small gram negative rods that are oxidase positive are cultured from green pus taken from the burn tissue. Which of the following third-generation cephalosporin will most likely has the best primary activity against this etiologic agent?

- a. Chloramphenicol
- b. Cefazidime
- c. Penicillin

5. Generalized edema results from all the following EXCEPT:
- a. Systemic hypertension.
 - b. Congestive heart failure.
 - c. Liver cirrhosis.
 - d. Nephrotic syndrome.
 - e. Hyperaldosteronism.
6. Disorders that predispose to thrombosis include all of the following EXCEPT:
- a. Pancreatic carcinoma.
 - b. Pregnancy.
 - c. Vitamin K deficiency.
 - d. Sickle cell anemia.
 - e. Oral contraceptive pills.
7. A 19-year-old offensive tackle for a major university football team fractures his right femur during the first game of the season. He is admitted to the hospital and over the next several days develops progressive respiratory problems. Despite extensive medical intervention, he dies 3 days later. At the time of autopsy oil red O-positive material is seen in the small blood vessels of the lungs and brain. Which of the following is the most likely diagnosis?
- a. Air emboli
 - b. Amniotic fluid emboli
 - c. Fat emboli
 - d. Paradoxical emboli
 - e. Saddle emboli
8. A 9-year-old boy suddenly develops severe testicular pain & taken to emergency room, where he is evaluated and immediately taken to surgery. Left testis is found to be markedly hemorrhagic due to testicular torsion. Which mechanism has caused testicular infarction?
- a. Arterial occlusion
 - b. Septic implantation
 - c. Decreased collateral blood flow
 - d. Increased dual blood flow
 - e. Venous occlusion
9. Which of the followings is the mechanism of edema in patients with congestive heart failure?
- a. Decreased plasma oncotic pressure.
 - b. Endothelial damage.
 - c. Increase hydrostatic pressure.
 - d. Increase vascular permeability.
 - e. Lymphatic obstruction.
10. What is the most common site of origin of thrombotic pulmonary emboli?
- a. Lumen of left ventricle.
 - b. Deep leg veins.
 - c. Lumen of right ventricle.
 - d. Mesenteric veins.
 - e. Superficial leg veins.

- d. streptomycin
e. vancomycin
14. A 10-week old infant is diagnosed with meningitis. A lumbar puncture reveals numerous neutrophils and gram positive rods. She is admitted to the hospital and is thought to be allergic to beta lactam drugs. Which of the following antibiotics attaches to 50S RIBOSOME, INHIBITS PEPTIDYL TRANSFERASE and would most likely be used to treat his patient?
- a. Ampicillin
 - b. Amphotericin
 - c. Chloramphenicol
 - d. Penicillin
 - e. Trimethoprim
15. Alcohol is denaturant that rapidly kills bacteria when applied in aqueous solution in range of:
- a. 10-30%
 - b. 30-50%
 - c. 50-60%
 - d. 70-75%
 - e. 95-100%
16. For Sterilization of heat sensitive surgical instruments and sutures, which of the following sterilization method is most appropriate?
- a. Biphenol
 - b. Formalin
 - c. Ethylene oxide
 - d. Gentian violet
 - e. Acriflavin
17. Bacteria can be cultivated on artificial media which provide nutritive ingredients to them. In addition oxygen tension and pH for bacterial growth, which of the following media is having anaerobic characteristics?
- a. Blood agar
 - b. Robertson Cooked Meat medium
 - c. MacConkey's agar
 - d. Chocolate agar
 - e. Nutrient agar
18. A surgeon washed up for an operation of appendix. To take standard precautions nurse provided him pre-sterilized cap, mask, gowns and gloves in a plastic bag. These items were sterilized by:
- a. Boiling at 100°C
 - b. In hot air oven
 - c. Autoclaving
 - d. Tyndalifization
 - e. Pateurization
19. β -lactamases confer antibiotic resistance by:
- a. Affecting the DNA
 - b. Altering penicillin-binding protein
 - c. Altering 70S ribosome structure
 - d. Modifying cellular RNA polymerase
 - e. Modifying antibiotic structure
20. A-B subunit, as it relates to bacterial pathogenesis refers to the structure of:
- a. Bacterial exotoxin
 - b. Gram-negative bacteria endotoxin
 - c. Nucleic acid inhibitor antibiotics
 - d. Penicillin-binding proteins
 - e. Resistance transfer factors
21. Opsonization is a process by which:
- a. Bacteria are more easily phagocytosed
 - b. Chemokines attract neutrophils to the site of infection
 - c. Neutrophils move to the site of infection
 - d. Acute phase response is induced

- c. Botulism
- d. Morphine overdose
- e. Ricin intoxication

- e. Alternate pathway of complement is activated
20. Disease caused by which of the following bacteria is prevented by toxoid vaccine?
- a. Bacteroides
 - b. Corynebacterium diphtheria
 - c. Neisseria
 - d. Salmonella
 - e. Vibrio
21. Which one of the following drugs inhibits bacterial nucleic acid synthesis by blocking the production of tetrahydrofolic acid?
- a. Ceftriaxone
 - b. Erythromycin
 - c. Metronidazole
 - d. Rifampin
 - e. Trimethoprim (Sapron)
24. Regarding endotoxin, which statement is most accurate?
- a. The endotoxin is polypeptide, its toxic portion has two D-alanine
 - b. Endotoxin is produced by both gram negative and gram positive bacteria
 - c. Endotoxin acts by binding to MHC-2 molecule
 - d. Endotoxins are destroyed at 60°C
 - e. Endotoxins induce fever and hypotension by release of interleukin 1 and tumor necrosis factor
25. Hand washing is an important means of interrupting the chain of transmission from one person to another person. Infection by which of the following bacteria can be prevented by hand washing?
- a. Borrelia
 - b. Legionella
 - c. Staph aureus
 - d. Streptagalactiae
 - e. Treponema pallidum

tenderness when the uterus is palpated. A mass 2-3 cm in diameter is felt on the left, suggestive of tubo-ovarian abscess. Subsequently, *Neisseria gonorrhoeae* is cultured from her endocervix. The diagnosis is gonococcal pelvic inflammatory disease. A common sequela or complication of this infection is:

- a. Cancer of the cervix
- b. Urethral stricture
- c. Uterine fibroid tumors
- d. Infertility
- e. Vaginal-rectal fistula

26. A food commonly associated with *Bacillus cereus* food poisoning is:

- a. Fried reheated rice
- b. Baked potato
- c. Hot freshly steamed rice
- d. Green beans
- e. Honey

27. Tetanus toxin (tetanospasmin) diffuses to terminals of inhibitory cells in the spinal cord and brainstem and blocks which of the following?

- a. Release of acetylcholine
- b. Cleavage of SNARE proteins
- c. Release of inhibitory glycine and γ -aminobutyric acid
- d. Release of Protective Antigen
- e. Activation of acetylcholine esterase

28. *Listeria monocytogenes* is frequently a foodborne pathogen because:

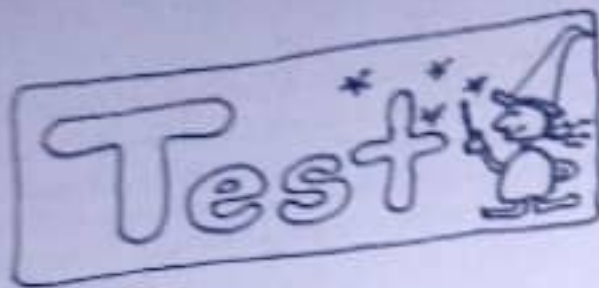
- a. It can survive at 4°C.
- b. It survives under conditions of low pH.
- c. It survives in the presence of high salt concentrations.
- d. All of the above are correct.
- e. None of the above is correct.

29. Which one of the following sets of bacteria causes diseases characterized by a pseudomembrane?

- a. *Bacillus anthracis* and *Listeria*
- b. *Bacillus cereus* and *Clostridium perfringens*
- c. *Bacillus cereus* and *Clostridium tetani*
- d. *Corynebacterium diphtheriae* and *Clostridium difficile*
- e. *Corynebacterium diphtheriae* and *Listeria*

30. A housewife who lives on a small farm is brought to the emergency department complaining of double vision and difficulty talking. Within the past 2 hours, she noted a dry mouth and generalized weakness. Last night she served home-canned green beans as part of the meal. She tasted the beans before they were boiled. None of the other family members are ill. On examination, there is symmetrical descending paralysis of the cranial nerves, upper extremities, and trunk. The correct diagnosis is which one of the following?

- a. Tetanus
- b. Strychnine poisoning



3

SPECIAL BACTERIOLOGY-1

Gram Positive Cocci/ Rods & Gram Negative Cocci

STUDENT NAME: ~~XXXXXXXXXX~~

MAXIMUM MARKS: 55 MARKS

MARKED OBTAINED:

TIME ALLOWED: 40 MINUTES

18

1. An 11-year-old boy develops a mild fever and pain in his right arm. A radiograph of his arm shows a lytic lesion (dissolution) in the upper part of the humerus with periosteal elevation over the lesion. The patient is taken to surgery, where the lesion is debrided (dead bone and pus removed). Culture from the lesion yields gram-positive cocci. A test shows that the organism is a *Staphylococcus* and not a *Streptococcus*. Based on this information, you know the organism is:

- a. Susceptible to nafcillin
- b. β -Lactamase positive
- c. A producer of protein A
- d. Encapsulated
- e. Catalase positive

2. A 36-year-old male patient has an abscess with a strain of *Staphylococcus aureus* that is β -lactamase positive. This indicates that the organism is resistant to which of the following antibiotics?

- a. Penicillin G, ampicillin, and piperacillin
- b. Trimethoprim-sulfamethoxazole
- c. Erythromycin, clarithromycin, and azithromycin
- d. Vancomycin
- e. Cefazolin and ceftriaxone

3. A group of six children younger than 8 years of age live in a semitropical country. Each of the children has several crusted weeping skin lesions of impetigo (pyoderma). The lesions are predominantly on the arms and faces. Which of the following microorganisms is a likely cause of the lesions?

- a. *Escherichia coli*
- b. *Chlamydia trachomatis*
- c. *Staphylococcus aureus*
- d. *Streptococcus pneumoniae*
- e. *Bacillus anthracis*

4. Seven days ago, a 27-year-old medical student returned from Central America, where she had spent the summer working in a clinic for indigenous people. Four days ago, she developed an erythematous sunburn-like rash, headache, muscle aches, and abdominal cramps with diarrhea.

Her blood pressure is 70/40 mm Hg. Pelvic examination shows she is having her menstrual period with a tampon in place; otherwise, the pelvic examination is normal. Her kidney function test (serum urea nitrogen and creatinine) results are abnormal, indicating mild renal failure. A blood smear for malaria is negative. Her illness is likely to be caused by which of the following?

- a. A toxin that results in greatly increased levels of intracellular cyclic adenosine monophosphate (cAMP)
- b. A toxin that degrades sphingomyelin
- c. A toxin that binds to the class II major histocompatibility complex (MHC) and act as superantigen
- d. A two-component toxin that forms pores in white blood cells and increases cation permeability
- e. A toxin that blocks elongation factor 2 (EF2)

5. A 16-year-old bone marrow transplant patient has a central venous line that has been in place for 2 weeks. He also has a urinary tract catheter, which has been in place for 2 weeks as well. He develops fever while his white blood cell count is very low and before the transplant has engrafted. Three blood cultures are done, and all grow *Staphylococcus epidermidis*. Which one of the following statements is correct?

- a. The *Staphylococcus epidermidis* organisms are likely to be susceptible to penicillin G.
- b. The *Staphylococcus epidermidis* organisms are likely to be from the surface of the urinary tract catheter.
- c. The *Staphylococcus epidermidis* organisms are likely to be resistant to vancomycin.
- d. The *Staphylococcus epidermidis* organisms are likely to be from a skin source.
- e. The *Staphylococcus epidermidis* organisms are likely to be in a biofilm on the central venous catheter surface.

6. Which of the following statements regarding the role of protein A in the pathogenesis of infections caused by *Staphylococcus aureus* is correct?

- a. It is responsible for the rash in toxic shock syndrome.
- b. It converts hydrogen peroxide into water and oxygen.
- c. It is a potent enterotoxin.
- d. It is directly responsible for lysis of neutrophils.
- e. It is a bacterial surface protein that binds to the Fc portion of IgG.

7. Which of the following staphylococcal organisms does not produce coagulase and has been implicated in urinary tract infections?

- a. *Staphylococcus intermedius*
- b. *Staphylococcus epidermidis*
- c. *Staphylococcus saprophyticus*
- d. *Staphylococcus hominis*
- e. *Staphylococcus hemolyticus*

All of the following are important infection control strategies in containing spread of MRSA in hospitals: except:

- a. Aggressive hand hygiene
- b. Routine surveillance for nasal colonization among high risk individuals
- c. Contact isolation for patients who are colonized or infected with MRSA
- d. Routine antimicrobial prophylaxis for all patients hospitalized for more than 48 hours
- e. Aseptic management of skin lesions

- b. *Neisseria lactamica*
- c. *Moraxella catarrhalis*
- d. *Neisseria gonorrhoeae*
- e. None of the above

20. All of the following are virulence factors associated with *N. gonorrhoeae* except:

- a. Pili
- b. Por proteins
- c. Lipooligosaccharide
- d. Opa proteins
- e. A thick polysaccharide capsule

21. A neonate after 24 hours of delivery presented in emergency department with high grade fever and poor feeding. On examination he was semi-conscious with neck stiffness. Lumbar puncture was done and microscopy of the CSF showed gram negative rods. What is your diagnosis

- a. Group B streptococci
 - b. *E. coli*
 - c. *Klebsiella*
 - d. *Pseudomonas*
 - e. *Proteus*
- Gram the cells*

22. A 20 year old male has wisdom tooth extraction diagnosed with bacterial endocarditis. He has congenital heart disease. Which is the most likely organism?

- a. *Staphylococcus aureus*
- b. *Staphylococcus epidermidis*
- c. *Streptococcus pneumoniae*
- d. *Streptococcus viridians*
- e. *Enterococcus faecalis*

23. A 65 year old male presents with cold like symptoms for last 4 days. He also has chills, chest pain, and productive cough with bloody sputum. Blood agar reveals alpha hemolytic colonies. If quelling test is done. Which of the following is the most likely cause?

- a. *Corynebacterium*
- b. *Enterobacter spp*
- c. *Hemophilus*
- d. *Neisseria*
- e. *Streptococcus pneumoniae*

24. A 25 year old woman was well until the sudden onset of fever with several skin lesion (purpura). The lesions are scattered over body and are not raised. Her blood pressure is 60/10. Blood culture grew gram negative diplococci. Which is the most likely agent?

- a. *Neisseria meningitidis*
- b. *E. coli*
- c. *Streptococcus pneumoniae*
- d. *Listeria*
- e. *H. influenzae*

25. An 18-year-old woman who reports unprotected sex with a new partner 2 weeks previously develops fever and left lower quadrant abdominal pain with onset in association with her menstrual period. On pelvic examination in the emergency department, she has bilateral

9. A 48-year-old alcoholic man is admitted to a hospital because of stupor. He is unkempt and homeless and lives with other homeless people, who called the authorities when he could not be easily aroused. His temperature is 38.5°C, and his blood pressure 125/80 mm Hg. He moans when attempts are made to arouse him. He has positive Kernig and Brudzinski signs, suggesting meningeal irritation. Chest radiography shows left lower lobe lung consolidation. An endotracheal aspirate yields rust-colored sputum. Examination of a Gram-stained sputum smear shows numerous polymorphonuclear cells and gram-positive lancet-shaped diplococci. Based on this information, the likely diagnosis is

- a. Pneumonia and meningitis caused by *Staphylococcus aureus*
- b. Pneumonia and meningitis caused by *Streptococcus pyogenes*
- c. Pneumonia and meningitis caused by *Streptococcus pneumoniae*
- d. Pneumonia and meningitis caused by *Enterococcus faecalis*
- e. Pneumonia and meningitis caused by *Neisseria meningitidis*

10. An 8-year-old boy develops a severe sore throat. On examination, a grayish-white exudate is seen on the tonsils and pharynx. The differential diagnosis includes group A streptococcal infection, Epstein-Barr virus infection, severe adenovirus infection, and diphtheria. The cause of the boy's pharyngitis is most likely

- a. A catalase-negative gram-positive coccus, *Streptococcus pyogenes*
- b. A single-stranded positive-sense RNA virus
- c. A catalase-positive gram-positive coccus that grows in grape-like clusters
- d. *Staphylococcus epidermidis*
- e. A double-stranded RNA virus

11. Important methods for classifying and speciating streptococci are

- a. Agglutination using antisera against the cell wall group specific substance
- b. Biochemical testing
- c. Hemolytic properties (α -, β -, nonhemolytic)
- d. Capsular swelling (quellung) reaction
- e. All of the above

12. All of the following statements regarding capsule of *S. pyogenes* are correct except:

- a. It is responsible for the mucoid appearance of the colonies in vitro.
- b. It is antiphagocytic.
- c. It binds to CD44 on human epithelial cells.
- d. It is an important virulence factor.
- e. A vaccine against the capsule is currently available.

13. An 8-year-old girl develops chorea with rapid uncoordinated facial tics and involuntary purposeless movements of her extremities, strongly suggestive of acute rheumatic fever. She has no other major manifestations of rheumatic fever (carditis, arthritis, subcutaneous nodules, skin rash). The patient's throat culture is negative for *Streptococcus pyogenes* (group A streptococci). However, she, her brother, and her mother all had sore throats 2 months ago. A test that if positive would indicate recent *S. pyogenes* infections is

- a. Antistreptolysin S antibody titer
- b. Polymerase chain reaction for antibodies against M protein
- c. ASO antibody titer
- d. Esculin hydrolysis
- e. Antihyaluronic acid antibody titer

27. Which of the following is generally not considered a potential agent of bioterrorism and biologic warfare?

- a. Yersinia pestis
- b. Botulinum toxin
- c. Streptococcus pyogenes
- d. Brucella species
- e. Bacillus anthracis

28. In a patient who has the bubonic form of plague, all of the following specimens are acceptable for diagnosis except:

- a. Stool culture on hektoen enteric agar
- b. Blood culture using routine laboratory media
- c. Culture of a lymph node aspirate on blood and MacConkey agars
- d. Acute and convalescent serology
- e. Immunohistochemical staining of lymph node tissue

29. Medical physicians working in a refugee camp in southern Punjab were receiving young children with high fever, bloody diarrhea & dehydration. Because of the remoteness of site only limited laboratory studies were available. The suspected organism was a non-motile, Gram-negative non-lactose fermenting colonies on Salmonella Shigella agar. Based on these findings, which disease is more likely?

- a. Bacillary dysentery
- b. Infection due to Campylobacter jejuni
- c. Cholera (O:1 classic biotype)
- d. Non-typhoidal salmonellosis
- e. Staphylococcal food poisoning

30. A person ate ham burger at dinner. Next day he had bloody diarrhea along with anuria. Gram stain of the stool showed gram negative rods. Culture showed lactose fermenting colonies on macConkey agar. What would be the reaction of the organism on TSI agar?

- a. Acid slant, acid butt, GAS(+) H₂S(-)
- b. Alkaline slant, acid butt GAS(-) H₂S (-)
- c. Alkaline slant, alkaline butt GAS(-) H₂S(-)
- d. Alkaline slant, acid butt GAS(+) H₂S(+)
- e. Acidic slant, alkaline butt GAS(+) H₂S(+)

14. Enterococci can be distinguished from non-enterococcal group D streptococci on the basis of which of the following characteristics?

- a. γ -Hemolysis
- b. Esculin hydrolysis
- c. Growth in 6.5% NaCl
- d. Growth in the presence of bile
- e. Gram stain morphology

15. The inhabitants of a group of small villages in rural subSaharan Africa experienced an epidemic of meningitis. Ten percent of the people died, most of them younger than the age of 15 years. The microorganism that most likely caused this epidemic was:

- a. *Streptococcus agalactiae*
- b. *Escherichia coli* K1
- c. *Haemophilus influenzae*
- d. *Neisseria meningitidis*
- e. West Nile virus

16. Which of the following cell components produced by *Neisseria gonorrhoeae* is responsible for attachment to host cells?

- a. Lipoteichoic acid
- b. Pili (fimbriae)
- c. IgA protease
- d. Outer membrane porin protein
- e. Iron-binding protein

17. A 25-year-old sexually active woman presents with purulent vaginal discharge and dysuria 7 days after having unprotected sexual intercourse with a new partner. Gram negative diplococci are the top differentials. Of the choices below, what is the most sensitive diagnostic method for determining the likely etiologic agent?

- a. Gram stain
- b. An enzyme immunoassay
- c. Bacterial culture on selective media
- d. A nucleic acid amplification test
- e. Serology

18. A 20-year-old man with severe chronic lung disease presents with fever, cough productive of purulent sputum, and worsening hypoxemia. A sputum sample is collected, and the specimen is sent promptly to the laboratory. Microscopic examination of a Gram stain reveals numerous polymorphonuclear leukocytes and predominately gram-negative diplococci. The organism grows well on chocolate agar. What is the most likely organism causing this man's illness?

- a. *Neisseria gonorrhoeae*
- b. *Neisseria lactamica*
- c. *Moraxella catarrhalis*
- d. *Haemophilus ducreyi*
- e. *Neisseria meningitidis*

19. A 25-year-old woman presents with septic arthritis of the knee. The fluid aspirate grows a gram-negative diplococcus on chocolate agar after 48 hours of incubation. The isolate is oxidase positive and oxidizes glucose but not maltose. You suspect infection with:

- a. *Neisseria meningitidis*

22. An 18-year-old woman in rural Bangladesh develops profuse (8 L/d) diarrhea, organism growing well on TCBS agar. She has no symptoms other than the diarrhea and the manifestations of the fluid and electrolyte loss caused by the diarrhea. The most likely cause of her diarrhea is:
- a. *Campylobacter jejuni*
 - b. Enterotoxigenic *Escherichia coli*
 - c. *Salmonella typhimurium*
 - d. *Vibrio cholerae*
 - e. *Shigella dysenteriae*
23. A 45-year-old man develops a gastric ulcer that can be visualized on a contrast medium-enhanced radiograph of his stomach. A biopsy specimen is taken from the gastric mucosa at the site of the ulcer. A presumptive diagnosis can be reached most rapidly by inoculating part of the specimen on which of the following?
- a. A medium containing urea
 - b. A medium containing vancomycin, polymyxin B, and trimethoprim incubated at 42°C
 - c. MacConkey agar medium incubated at 37°C
 - d. Thiosulfate-citrate-bile-sucrose medium incubated at 42°C
 - e. Blood agar medium incubated at 37°C
24. 3-month-old infant is brought to the pediatric emergency department in severe respiratory distress. The child appears dehydrated, and there is a prominent peripheral lymphocytosis. The chest radiograph reveals perihilar infiltrates. The child's grandmother, who watches the infant now that the mother has returned to work, has had a dry hacking cough for about 2 weeks. The most likely causative agent is:
- a. *Haemophilus influenzae* type b
 - b. *Bordetella pertussis*
 - c. *Streptococcus agalactiae*
 - d. *Chlamydia pneumoniae*
 - e. *Bordetella bronchiseptica*
25. All of the following cause zoonotic infections except
- a. *Francisella tularensis*
 - b. *Brucella melitensis*
 - c. *Bordetella pertussis*
 - d. *Bacillus anthracis*
 - e. *Leptospira interrogans*
26. Which of the following is not a recognized virulence factor of *Bordetella pertussis*?
- a. Heat-labile toxin
 - b. Filamentous hemagglutinin
 - c. Tracheal cytotoxin
 - d. Pertussis toxin
 - e. Dermonecrotic toxin

17. A 63-year-old man visited his favorite oyster restaurant. He ate two dozen oysters. Two days later, he was admitted to the hospital because of an abrupt onset of chills, fever, and lightheadedness when he stood up. His blood pressure was 60/40 mm Hg. He developed erythematous skin lesions that rapidly evolved into hemorrhagic bullae, which then formed ulcers. A microorganism of major concern for this patient is:

- a. *Vibrio vulnificus*
- b. *Escherichia coli*
- c. *Salmonella typhi*
- d. *Clostridium perfringens*
- e. *Streptococcus pyogenes* (group A streptococci)

18. All of the following statements regarding the etiologic agent of chancroid are correct except:

- a. The organism is a small gram-negative rod.
- b. The organism requires X factor but not V factor.
- c. The organism grows well on standard chocolate agar.
- d. On Gram stain of lesions, the organism occurs in strands.
- e. The organism is susceptible to erythromycin.

19. A family of four persons ate a meal that included undercooked chicken. Within 3 days, three members developed an illness characterized by fever, headache, myalgia, and malaise. Two of the patients had concomitant diarrhea and abdominal pain. The third person developed diarrhea after the systemic symptoms had cleared. Stool cultures grew *Campylobacter jejuni*. Which of the following culture conditions was most likely used to isolate *C. jejuni*?

- a. Thiosulfate-citrate-bile-sucrose medium (TCBS) incubated at 37°C in 5% O₂ & 10% CO₂
- b. *Salmonella-Shigella* selective medium incubated at 37°C in ambient air
- c. MacConkey agar incubated at 42°C in 5% oxygen and 10% CO₂
- d. 5% sheep blood agar incubated at 37°C in ambient air
- e. A medium containing vancomycin, polymyxin B, and trimethoprim incubated at 42°C in 5% oxygen and 10% CO₂

20. Bacteremia associated with a gastrointestinal infection is most likely to occur with which of the following?

- a. *Salmonella typhi*
- b. *Vibrio cholerae*
- c. *Shigella boydii*
- d. *Vibrio parahaemolyticus*
- e. *Campylobacter jejuni*

21. A patient presents to the emergency department with non-bloody diarrhea for 12 hours. The patient lives in Washington, DC, and has not recently traveled out of the area. Which one of the following is unlikely to be the cause of your patient's diarrhea?

- a. *Salmonella typhimurium*
- b. *Campylobacter jejuni*
- c. *Shigella sonnei*
- d. *Vibrio cholerae*
- e. *Escherichia coli*

13. 17-year-old girl with cystic fibrosis has a slight increase in her frequent cough and production of mucoid sputum. A sputum specimen is obtained and plated on routine culture media. The predominant growths are Gram-negative bacilli that form very mucoid colonies after 48 hours of incubation. These bacilli are oxidase positive, grow at 42°C, and have a grapelike odor. These Gram-negative bacilli are which of the following?

- a. *Klebsiella pneumoniae*
- b. *Pseudomonas aeruginosa*
- c. *Staphylococcus aureus*
- d. *Streptococcus pneumoniae*
- e. *Burkholderia cepacia*

14. A 37-year-old firefighter sustains smoke inhalation and is hospitalized for ventilatory support. He has a severe cough and begins to expectorate purulent sputum. Gram stain of his sputum specimen shows numerous polymorphonuclear cells and numerous Gram-negative rods. Sputum culture grows numerous Gram-negative rods that are oxidase positive. They grow well at 42°C. On clear agar medium, they produce a green color in the agar. The agar where the green color is located fluoresces when exposed to ultraviolet light. The organism causing the patient's infection is

- a. *Pseudomonas aeruginosa*
- b. *Klebsiella pneumoniae*
- c. *Escherichia coli*
- d. *Burkholderia cepacia*
- e. *Burkholderia pseudomallei*

15. A marine wounded in Afghanistan returns to her home a paraplegic. Her past medical history included surgery to amputate both her legs below the knee and the placement of a suprapubic tube to repair damage to her bladder. She is now at the outpatient clinic with a recurrent urinary tract infection that has not responded to conventional antibiotic regimens for community-acquired cystitis. Her urine is positive for small, plump Gram-negative coccobacilli. When cultured, this organism does not ferment carbohydrates, does not hydrolyze urea, does not reduce nitrates, and does not make hydrogen sulfide. The organism most likely causing this marine's infection is:

- a. *Klebsiella oxytoca*
- b. *Escherichia coli*
- c. *Staphylococcus saprophyticus*
- d. *Proteus mirabilis*
- e. *Acinetobacter baumannii*

16. Long-term carriage and shedding is most likely to occur after gastrointestinal infection with which of the following species?

- a. *Escherichia coli* O157:H7
- b. *Shigella dysenteriae*
- c. *Vibrio cholerae*
- d. *Campylobacter jejuni*
- e. *Salmonella typhi*

4. A 17-year-old woman with a history of urinary tract infections comes to the emergency department with burning on urination along with frequency and urgency. She says her urine smells like ammonia. The cause of her urinary tract infection is likely to be:

- a. *Enterobacter aerogenes*
- b. *Proteus mirabilis*
- c. *Citrobacter freundii*
- d. *Escherichia coli*
- e. *Serratia marcescens*

5. An 18-year-old student has abdominal cramps and diarrhea. A selective agar plate is inoculated and grows suspicious gram-negative rods. Triple sugar iron agar is used to identify the isolates as salmonellae or shigellae. A result suggesting one of these two pathogens would be:

- a. Production of urease
- b. Motility in the medium
- c. Inability to ferment lactose and sucrose
- d. Fermentation of glucose
- e. Production of coagulase

6. A 43-year-old man with diabetes has a 4-cm non-healing foot ulcer. Culture of the ulcer yields *Staphylococcus aureus*, *Bacteroides fragilis*, and a gram-negative bacillus that swarms across the blood agar plate covering the entire surface of the agar after 36 hours. The gram-negative bacillus is a member of the genus:

- a. *Escherichia*
- b. *Enterobacter*
- c. *Serratia*
- d. *Salmonella*

e. *Proteus*

7. A 4-year-old boy from Kansas City who recently started attending preschool and after-school daycare is brought to his pediatrician for a diarrheal illness characterized by fever to 38.2°C, severe lower abdominal pain, and initially watery diarrhea. His mother became concerned because the stools are now blood-tinged 24 hours into the illness, and the child appears quite ill. The mother reports that two other children who attend the same after-school daycare have recently had diarrheal disease, one of whom likewise had bloody stools. Which of the following is the most likely pathogen causing the illness in these children?

- a. An enterotoxigenic strain of *Escherichia coli*
- b. *Salmonella Typhi*
- c. *Shigella*
- d. *Edwardsiella tarda*
- e. *Klebsiella oxytoca*

SPECIAL BACTERIOLOGY-3

Mycobacterium/ Spirochetes/ Mycoplasma/ Chlamydia/ Rickettsia

STUDENT NAME: ~~XXXXXXXXXX~~
MAXIMUM MARKS: 45 MARKS
MARKED OBTAINED:
TIME ALLOWED: 45 MINUTES

13

1. A 60-year-old man has a 5-month history of progressive weakness and a weight loss of 13 kg along with intermittent fever, chills, and a chronic cough productive of yellow sputum, occasionally streaked with blood. A sputum specimen is obtained, and numerous acid-fast bacteria are seen on the smear. Culture of the sputum is positive for *M. tuberculosis*. Which treatment regimen is most appropriate for initial therapy?

 - a. Isoniazid and rifampin
 - b. Sulfamethoxazole-trimethoprim and streptomycin
 - c. Isoniazid, rifampin, pyrazinamide, and ethambutol
 - d. Isoniazid, cycloserine, and ciprofloxacin
 - e. Rifampin and streptomycin
2. A 47-year-old woman presents with a 3-month history of progressive cough, weight loss, and fever. Chest radiography shows bilateral cavitory disease suggestive of tuberculosis. Sputum culture grows an acid-fast bacillus that is a photochromogen (makes an orange pigment when exposed to light). The organism most likely is:

 - a. *Mycobacterium tuberculosis*
 - b. *Mycobacterium kansasii*
 - c. *Mycobacterium gordonae*
 - d. *Mycobacterium avium* complex
 - e. *Mycobacterium fortuitum*
3. A 33-year-old Asian woman is admitted to the hospital with a 7-week history of increasing malaise, myalgia, nonproductive cough, and shortness of breath. She has daily fevers of 38–39°C and a recent 5-kg weight loss. She had a negative chest radiograph when she entered the United States 7 years ago. The patient's grandmother died of tuberculosis when the patient was an infant. A current chest radiograph is normal; results of other tests show a decreased hematocrit and liver function test abnormalities. Liver and bone marrow biopsies show granulomas with giant cells and acid-fast bacilli. She is probably infected with:

 - a. *Mycobacterium leprae*
 - b. *Mycobacterium fortuitum*
 - c. *Mycobacterium ulcerans*
 - d. *Mycobacterium gordonae*
 - e. *Mycobacterium tuberculosis*
4. 8. Which of the following statements about the purified protein derivative (PPD) and the tuberculin skin test is most correct?

 - a. It is strongly recommended that medical and other health science students have PPD skin tests every 5 years.
 - b. Persons immunized with BCG rarely, if ever, convert to positive PPD skin test results.
 - c. The intradermal skin test is usually read 4 hours after being applied.
 - d. A positive tuberculin test result indicates that an individual has been infected with *M. tuberculosis* in the past and may continue to carry viable mycobacteria.
 - e. A positive PPD skin test result implies that a person is immune to active tuberculosis.

8. A 5-year-old girl attended a birthday party at a local fast food restaurant. About 48 hours later, she developed cramping abdominal pain and a low-grade fever. She is taken to a local emergency department and appears pale and lethargic. She has a temperature of 38°C, hypotensive and tachycardic. Abdominal examination reveals tenderness in the lower quadrants. He has serum creatinine of 2.0 mg/dL, a serum hemoglobin of 8.0 mg/dL, thrombocytopenia, and evidence of hemolysis. What is the most likely pathogen causing this child's illness?

- a. Escherichia coli O157:H7
- b. Salmonella Typhimurium
- c. Enteropathogenic Escherichia coli
- d. Edwardsiella tarda
- e. Shigellosis

X

9. A 55-year-old homeless man with alcoholism presents with severe multilobar pneumonia. He requires intubation and mechanical ventilation. A Gram stain of his sputum reveals numerous polymorphonuclear leukocytes and gram-negative rods that appear to have a capsule. The organism is a lactose fermenter on MacConkey agar and is very mucoid and non-motile. What is the most likely organism causing this man's illness?

- a. Serratia marcescens
- b. Enterobacter aerogenes
- c. Proteus mirabilis
- d. Klebsiella pneumoniae
- e. Morganella morganii

✓

10. Heat-labile toxin of ETEC acts by which of the following mechanisms?

- a. Attachment and effacement
- b. Activation of adenylyl cyclase
- c. Aggregative adherence
- d. Ribosomal dysfunction
- e. None of the above

✓

11. A young woman presents with recurrent urinary tract infections caused by the same Proteus mirabilis strain. What is the major concern?

- a. She does not take her medication.
- b. She is pregnant because pregnant patients are more susceptible to UTIs.
- c. She has a bladder or kidney stone.
- d. Her partner is infected.
- e. She has occult diabetes and should have a glucose tolerance test.

X

12. Acinetobacter species:

- a. Are only found in a hospital environment.
- b. May appear as Gram-positive rods.
- c. Can mimic the morphology of Hemophilus species in Gram stains of endocervical secretions.
- d. Can be a significant cause of ventilator-associated pneumonia in intensive care unit patients.
- e. Are susceptible to most antibiotics.

X

3. A 52-year-old male, returning from a travel tour in India and Southeast Asia, was diagnosed with intestinal amoebiasis and successfully treated with Iodoquinol. A month later, he returned to the clinic complaining of the following conditions. Which of the conditions is most extra-intestinal manifestation of amoebiasis?
- Liver abscess
 - CNS disease
 - Intestinal flask shaped ulcer
 - Arthritis
 - Colonic abscess
4. Patient came to the emergency department with history of fever, shivering and body aches. *Plasmodium vivax* was diagnosed as a cause of malaria. This plasmodium is responsible for which type of malaria?
- Benign tertian malaria
 - Quartan malaria
 - Malignant tertian malaria
 - Benign Quartan malaria
 - All of the above
5. A young boy had history of intermittent fever for last week, associated with dark black coloured urine. Which specie of *Plasmodium* is responsible for his disease?
- P. falciparum*
 - P. vivax*
 - P. malariae*
 - P. malariae*
 - None of the above
6. An HIV positive patient developed watery non-bloody diarrhea. His fecal smear revealed oocysts, stained positively with modified ZN staining technique. What is the most likely causative agent?
- Toxoplasma gondii*
 - Giardia lamblia*
 - Entamoeba histolytica*
 - Cryptosporidium*
 - Diphyllobothrium latum*
7. A 35 year old adult had an official trip to India. After 3-6 months of returning he developed dry, rough and pigmented lesions on skin along with fever. On physical examination he had hepatosplenomegaly. Skin biopsy revealed LD bodies. What is the most likely diagnosis?
- Leishmaniasis
 - Black water fever
 - Infantile Kala-azar
 - Malaria
 - Amoebiasis
8. A divorced working mother takes her 4 year old child to day care center. She has noticed that the child's frequent stools are non-bloody with mucus and foul smell. The child has no fever, but does complain of "tummy hurting." The increase of fat in the stool directs the pediatrician's concern toward a diagnosis of malabsorption syndrome associated with which of the following?
- Amebiasis
 - Scariasis
 - Balantidiasis
 - Enterobiasis
 - Giardiasis

11. A 40 years old woman experienced sudden onset of fever, shaking chills and profuse sweating she also complains of headache and abdominal pain but no nausea, vomiting and diarrhea. Travel history reveals that she returned from an extended trip to several countries in central Africa 1 week ago. Blood smear reveals ring shaped trophozoites within red blood cells. The patient is suffering from:
- a. Malaria
 - b. Typhoid
 - c. Pneumonia
 - d. Dengue
 - e. Hydatid cyst
12. In case of severe infection with *Entamoeba histolytica*, ulcers are formed in colon due to invasion of trophozoites. The typical shape of these ulcers is:
- a. Funnel-shaped
 - b. Cylinder-shaped
 - c. Barrel-shaped
 - d. Flask-shaped
 - e. Oval-shaped
13. A 40 year old man complains of watery, foul smelling diarrhea and flatulence for past 2 weeks. He drank untreated water on a camping trip about a month ago. Pear-shaped flagellated trophozoites are seen in stool. Which is the most likely causative agent?
- a. Rotavirus
 - b. *Taenia solium*
 - c. *Giardia lamblia*
 - d. Pinworm
 - e. *Entamoeba histolytica*
14. A 25 year old male who is a soldier in US army, returning from a tour of Middle East, has fever and weight loss for past 3 weeks. Laboratory tests revealed Anemia and leukopenia. Blood cultures for bacteria and fungi were negative. HIV test were also negative. CT scan revealed Splenomegaly. A bone marrow biopsy revealed amastigotes within mono nuclear cells. Which of the following is the cause?
- a. *Leishmania donovani*
 - b. *Plasmodium falciparum*
 - c. *Toxoplasma*
 - d. *Trypanosoma*
 - e. *Cryptosporidium*
15. Which of the following organism is not a protozoan?
- a. *Entamoeba histolytica*
 - b. *Enterobius vermicularis*
 - c. *Plasmodium*
 - d. *Leishmania*
 - e. *Trichomonas*

A 72-year-old woman has an artificial hip joint placed because of degenerative joint disease. One week after the procedure, she has fever and joint pain. The hip is aspirated, and the fluid is submitted for routine culture and for culture for acid-fast organisms. After 2 days of incubation, there is no growth on any of the media. After 4 days, however, bacilli are seen growing on the sheep blood agar plate, and similar-appearing acidfast bacilli are growing on the culture for acid-fast bacteria. The patient is most likely infected with:

- a. *Mycobacterium tuberculosis*
- b. *Mycobacterium chelonae*
- c. *Mycobacterium leprae*
- d. *Mycobacterium kansasii*
- e. *Mycobacterium avium* complex

6. A 30-year-old child has a primary pulmonary *M. tuberculosis* infection. Which of the following features of tuberculosis is most correct?

- a. In primary tuberculosis, an active exudative lesion develops and rapidly spreads to lymphatics and regional lymph nodes.
- b. The exudative lesion of primary tuberculosis often heals slowly.
- c. If tuberculosis develops years later, it is a result of another exposure to *M. tuberculosis*.
- d. In primary tuberculosis, all of the infecting *M. tuberculosis* organisms are killed by the patient's immune response.
- e. In primary tuberculosis, the immune system is primed, but the PPD skin test result remains negative until there is a second exposure to *M. tuberculosis*.

7. The definition of extensively drug-resistant (XDR) tuberculosis includes

- a. Resistance to isoniazid
- b. Resistance to a fluoroquinolone
- c. Resistance to capreomycin, amikacin or kanamycin
- d. Resistance to rifampin
- e. All of the above

8. A 28-year-old woman who is 10 weeks pregnant presents to the obstetrics clinic for prenatal care. She has a history of treatment for syphilis 7 years previously. The results of serologic tests for syphilis are as follows: Non-treponemal test, RPR, nonreactive; Treponemal test (TP-PA), reactive. Which of the following statements is most correct?

- a. The mother's previous treatment for syphilis was effective.
- b. The baby is at high risk for congenital syphilis.
- c. The mother needs to be treated again for syphilis.
- d. The mother needs a lumbar puncture and a VDRL test of her CSF for neurosyphilis.

9. A 12-year-old Boy Scout went to summer camp for 2 weeks in late August. When he returned home, his mother noticed a bull's-eyeshaped rash on the back of her son's left calf. Shortly after Labor Day, the boy developed a flu-like illness that resolved after 4 days of bed rest. Three weeks later, the boy complained to his mother that his body hurt all over whenever he moved. This prompted a visit to the pediatrician, who ordered an infectious disease workup. What is the most likely source of the boy's infection?

- a. Respiratory transmission from another sick camper
- b. Ingestion of urine-contaminated water from a stream
- c. The bite of a mosquito harboring a parasite
- d. Ingestion of fecally contaminated food
- e. The bite of a borrelia-infected tick

10. Nontreponemal serological tests:

- a. Are useful in definitively identifying a *Treponema pallidum* infection.
- b. Measure antibodies against *Treponema pallidum*.

SPECIAL BACTERIOLOGY-2

Gram Negative Enteric/ Respiratory/ Zoonotic Bacteria

STUDENT NAME: ~~XXXXXXXXXX~~ ~~XXXXXXXXXX~~

MAXIMUM MARKS: 55 MARKS

MARKED OBTAINED:

TIME ALLOWED: 60 MINUTES

13

1. A 20-year-old college student goes to the student health center because of dysuria, frequency, and urgency on urination for 24 hours. She has recently become sexually active. On urinalysis, many polymorphonuclear cells are seen. The most likely organism responsible for these symptoms and signs is:
 - a. Staphylococcus aureus
 - b. Streptococcus agalactiae
 - c. Gardnerella vaginalis
 - d. Lactobacillus species
 - e. Escherichia coli

2. A 27-year-old woman is admitted to the hospital because of fever, with increasing anorexia, headache, weakness, and altered mental status of 2 days' duration. She works for an airline as a cabin attendant. Ten days before admission, she had a diarrheal illness that lasted for about 36 hours. She has been constipated for the past 3 days. Her temperature is 39°C, heart rate is 68 beats/min, blood pressure is 120/80 mm Hg, and respirations are 18 breaths/min. She knows who she is and where she is but does not know the date. She is picking at the bedclothes. Rose spots are seen on her trunk. Blood cultures are done, and most likely cause of her illness is:
 - a. Enterotoxigenic Escherichia coli (ETEC)
 - b. Shigella sonnei
 - c. Salmonella Typhimurium
 - d. Salmonella Typhi
 - e. Enteroinvasive Escherichia coli (EIEC)

3. Blood cultures from the patient having infection with typhoid bacilli, producing non-lactose-fermenting gram-negative bacillus. Which of the following is likely to be a constituent of this organism?
 - a. O antigen 157, H antigen 7 (O157:H7)
 - b. Vi antigen (capsule; virulence antigen)
 - c. O antigen 139 (O139)
 - d. Urease
 - e. K1 (capsular type 1)

- Modified Ziehl staining with weak acid ✓
- a. PAS staining
- b. Albert staining
- c. Rhodamine-auramine staining technique
- d. Gram staining technique

24. A man who has a penile chancre appears in a hospital's emergency service. The VDRL test is negative. Which of the following is the most appropriate course of action?

- a. Perform dark-field microscopy for treponemas
- b. Perform a Gram stain on the chancre fluid.
- c. Repeat the VDRL test in 10 days
- d. Send the patient home untreated
- e. Swab the chancre and culture on Thayer-Martin agar

17. *Lyme disease*

A young boy, 10 years old, a resident of Oklahoma, took a hike through a rural wooded and brushy area near his home. The next morning, he noticed and removed a large (>1 cm) tick from his upper arm. About 1 week later, he experienced a gradual onset of fever and malaise. He now seeks medical attention because he is concerned about a possible infection transmitted by the tick. Which of the following diseases is most likely to be acquired from a tick?

- a. Dengue
- b. Rocky Mountain spotted fever
- c. Typhus
- d. Yellow fever
- e. Anisakiasis



18. An adolescent girl came to the clinic because of a new and unusual vaginal discharge. She had recently become sexually active and had two new partners during the previous month. On pelvic examination, a purulent discharge was seen at the opening of her endocervical canal. Which of the following statements about this patient is most correct?

- a. A serologic test for syphilis is not indicated because her symptoms are not those of syphilis.
- b. A Gram stain of her endocervical specimen would show *Chlamydia trachomatis* inside polymorphonuclear cells.
- c. The differential diagnosis includes infection with *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, or both.
- d. The endocervical specimen should be analyzed for herpes simplex.
- e. Initial treatment is with ampicillin.



19. The following statements about trachoma are correct except:

- a. It follows chronic or recurrent eye infection with *Chlamydia trachomatis*.
- b. Millions of people worldwide have trachoma.
- c. Trachoma is readily prevented by a chlamydial vaccine.
- d. Progression of trachoma can be slowed by intermittent treatment with azithromycin.
- e. Trachoma involves scarring of the conjunctiva, eyelid deformities, and eyelash injury to the cornea.



20. *Chlamydia pneumoniae* pneumonia most resembles infection caused by which of the following organisms?

- a. *Streptococcus pneumoniae*
- b. *Mycoplasma pneumoniae*
- c. *Haemophilus influenzae*
- d. *Chlamydia trachomatis*
- e. Rhinovirus



21. PPD is an antigen derived from:

- a. *Pseudomonas putida*
- b. *Pseudomonas aeruginosa*
- c. *Bordetella pertussis*
- d. *Mycoplasma pneumoniae*
- e. *Mycobacterium tuberculosis*



22. A patient was received in emergency department with complaints of low-grade fever, chronic cough, night sweats and body aches. *Mycobacterium tuberculosis* was among the top differentials. Which media is used to culture this pathogen?

- a. Loeffler medium
- b. Löwenstein-Jensen media
- c. Telfurite medium
- d. Chocolate agar
- e. Blood agar



23. A patient with leonine (lion like) facies and hypo-pigmented macular skin lesions came to the medical outpatient department. He was suspected to have leprosy. *Mycobacterium leprae* is stained by which of the following technique in a basic health unit laboratory?

- c. Can be used to monitor antibiotic treatment of primary or secondary syphilis.
- d. Boragin antibodies in serum reacts with cardiolipin from beef heart ✓
- e. Are useful in diagnosing a disseminated gonococcal infection.
11. A 42-year-old woman went camping in the Sierra Nevada Mountains, where she slept for two nights in an abandoned log cabin. After the second night, a tick was found on her shoulder. Six days later, she developed fever to 38°C, which lasted for 4 days. Ten days later, she had another similar episode of fever. Examination of a blood smear stained with Wright stain showed spirochetes suggestive of *Borrelia* species. Which of the following statements about relapsing fever is correct?
- a. Each relapse is associated with an antigenically distinct variant.
- b. Blood smears should be made when the patient is afebrile.
- c. *Borrelia* is not a spirochete.
- d. The main reservoir for the *Borrelia* is cat.
- e. *Borrelia* is resistant to penicillin and tetracycline.
12. Which of the following animals is the source of *Leptospira interrogans*?
- a. Alligators
- b. Ducks
- c. Frogs
- d. Catfish
- e. Swine
13. Which of the following organisms principally infects the liver and kidneys?
- a. *Leptospira interrogans*
- b. *Staphylococcus aureus*
- c. *Escherichia coli*
- d. *Enterococcus faecalis*
- e. *Treponema pallidum*
14. An 18-year-old sexually active woman develops left lower quadrant pain and fever. On pelvic examination, she has tenderness in the left adnexa, and a mass suggestive of a uterine tube abscess is palpated. The patient is diagnosed with pelvic inflammatory disease. Which of the following bacteria is considered to be a common cause of pelvic inflammatory disease?
- a. *Bacillus cereus*
- b. *Haemophilus influenzae*
- c. *Neisseria*
- d. *Mycoplasma pneumoniae*
- e. *Chlamydia trachomatis*
15. A 25-year-old medical student has contact with a patient who has pneumonia with fever and cough. Four days later, the medical student develops fever and cough, and chest radiographs show consolidation of the right lower lobe. Routine bacterial sputum culture results are negative. Pneumonia caused by *Mycoplasma pneumoniae* is considered. All of the following are methods to confirm the clinical suspicion except
- a. PCR amplification of *Mycoplasma pneumoniae* DNA in sputum
- b. Culture of sputum for *Mycoplasma pneumoniae*
- c. Gram stain of sputum smear
- d. Culture of a lung aspirate for *Mycoplasma pneumoniae*
- e. Enzyme immunoassay test of acute and convalescent sera
16. A 19-year-old man develops cough and fever. A chest radiograph shows consolidation of the left lower lobe. A diagnosis of pneumonia is made. Which of the following bacteria is a frequent cause of community-acquired pneumonia?
- a. *Legionella pneumophila*
- b. *Chlamydia pneumoniae*
- c. None of the above
- d. *Mycoplasma pneumoniae*

Test 6

PARASITOLOGY-1

STUDENT NAME: ~~XXXXXXXXXX~~

MAXIMUM MARKS: 35 MARKS

MARKED OBTAINED:

TIME ALLOWED: 50 MINUTES

8

- A sexually active 24-year-old woman complains of vaginal itching and vaginal discharge. To verify your tentative diagnosis of trichomoniasis, you should include which of the following in your workup?
 - Specific serologic test
 - Onco and parasite fecal smear
 - Wet mount of vaginal fluid
 - Enzyme-linked immunosorbent assay (ELISA) test of serum
 - Stool culture
- An 18-year-old male complains of abdominal pain, bloating, frequent loose stools, and loss of energy. He returned a month ago from a 3-week hiking and camping trek to the Mount Everest Base Camp in Nepal. Giardiasis is considered as top differentials. Which of the following is an important consideration for the diagnosis?
 - Exposure to high-level UV radiation
 - The source and purification of water
 - The use of insect repellents while hiking
 - The presence of domestic animals en route
 - The degree of contact with villagers en route
- Which one of the following diagnostic tests should be conducted for the patient having amoebiasis?
 - Blood and urine bacteriologic examination
 - Series of ova and parasite tests and fecal smears
 - ELISA or hemagglutination serologic tests for malaria
 - Skin microfilarial test
 - Endoscopic exam for whipworms
- An apparently fatigued but alert 38-year-old woman has spent 6 months as a teacher in a rural Thailand village school. Her chief complaints include frequent headaches, occasional nausea and vomiting, and periodic fever. You suspect malaria and indeed find parasites in red blood cells in a thin blood smear. To rule out the dangerous falciparum form of malaria, which one of the following is the best choice?
 - Red blood cells containing trophozoites with Schuffner's dots
 - There is no ring stage present
 - Banana-shaped or crescent-shaped gametocytes
 - Gametocytes are spherical
 - Parasites with single nuclei

- ~~a~~ Capsule
- ~~b~~ Flagellae
- ~~c~~ Endospore
- ~~d~~ Plasmid
- e. Peptidoglycan

35. A gram positive non motile prokaryote isolated from the wound swab of a 5 year old child, which of the following characteristic differentiate it from eukaryotes?

- a. Prokaryotes do not have membrane-bound organelles.
- b. The nucleoid is a region where the circular chromosome (DNA) is located
- c. Size of cell typically 0.2-2.0 μm in diameter
- d. Ribosomes larger size (80s); smaller size (70s) in organelles
- e. Cell division by mitosis.

16. Which is true regarding metaplasia:
- a. It is an adaptive change which can lead to carcinoma
 - b. It is irreversible
 - c. It occurs only in epithelium.
 - d. There is cloudy swelling of cells.
 - e. There is an increase in nucleo-cytoplasmic ratio of cells
17. A 56 year old man dies 24 hours after the onset of sub-sternal chest pain radiating down his left arm to the ulnar aspects of his fingertips. Which of the following morphological myocardial finding is indicator of irreversible injury?
- a. Cell blebs
 - b. Depletion of glycogen
 - c. Mitochondrial swelling
 - d. Myelin figures
 - e. Pyknotic nuclei
18. Fat necrosis is expected to be found in which of the following situation?
- a. Trauma to the breast
 - b. Trauma to the bowel
 - c. Brain injury
 - d. Muscle injury
 - e. Trauma to abdomen
19. 50 years old women presented with acute abdomen. At laparoscopy most of bowel loops were dark purple black. Her mesenteric veins were patent. Most probable underline pathological process is:
- a. Coagulative necrosis
 - b. Caseous necrosis
 - c. Gas gangrene
 - d. Liquefactive necrosis
 - e. Wet gangrene
20. The epithelium of the respiratory tract of a 35 year old habitual smoker, is most likely to show:
- a. Stratified squamous metaplasia.
 - b. Simple squamous metaplasia.
 - c. Mucus hyperplasia.
 - d. Smooth muscular hyperplasia.
 - e. Squamous cell anaplasia.
21. In radiation injury basic mechanism is :
- a. Free radical formation
 - b. Increase ATP production.
 - c. Decrease intracellular Na...
 - d. Decrease intracellular Ca.
 - e. Inhibit protein synthesis.
22. A lesson shows non cellular central material surrounded by large multinucleated giant cell and epitheloid cells, the most likely lesion will be:
- a. Fibrinoid necrosis.
 - b. Gangrenous necrosis.
 - c. Coagulative necrosis.
 - d. Caseous necrosis.
 - e. Liquefactive necrosis.

23. Dystrophic calcification is commonly seen in:

- a. Ureter.
- b. Kidney.
- c. Pancreas.
- d. Thyroid.
- e. Necrotic or damaged Tissues.

24. A 55-year-old male alcoholic presents with symptoms of liver disease and is found to have mildly elevated liver enzymes. A liver biopsy examined with a routine hematoxylin and eosin (H&E) stain reveals abnormal clear spaces in the cytoplasm of most of the hepatocytes. Which of the following materials is most likely forming these cytoplasmic spaces?

- a. Calcium
- b. Cholesterol
- c. Hemosiderin
- d. Lipofuscin
- e. Triglyceride

25. What is argyria?

- a. Accumulation of carbon
- b. Accumulation of silver
- c. Accumulation of lead
- d. Accumulation of melanin
- e. Accumulation of lipofuscin

13. The product of the p53 anti-oncogene is a nuclear protein that regulates DNA replication and prevents the proliferation of cells with damaged DNA. It does this by stopping the cell cycle at which point?

- a. Between G1 and S
- b. Between G2 and M
- c. Between M and G1
- d. Between S and G2
- e. During G3



14. A 17-year-old man present with a lesion on his face that measures approximately 1.5 cm in its greatest dimension. He has a history of numerous similar skin lesions that have occurred mainly in sun-exposed areas. The present lesion is biopsied and reveals an invasive squamous cell carcinoma. This patient most probably has one type of a group of inherited diseases associated with unstable DNA and increased incidence of carcinoma. Which of the following is the most likely diagnosis?

- a. Xeroderma pigmentosa
- b. Wiskott-Aldrich syndrome
- c. Familial polyposis
- d. Sturge-Weber syndrome
- e. Multiple endocrine neoplasia type I



15. A 57-year-old man presents with signs of fatigue due to anemia. Workup reveals anemia as a result of bleeding from a colon cancer located in sigmoid colon. The lesion is resected and metastatic disease is found. Which of the following markers would be most useful for future follow-up of this patient of the evaluation of possible metastatic disease from his colon cancer?

- a. α fetoprotein (AFP)
- b. Carcinoembryonic antigen (CAE)
- c. Chloroacetate esterase (CAE)
- d. Human chorionic gonadotropin (hCG)
- e. Prostate-specific antigen (PSA)



16. An 80-year-old man complains of lower abdominal pain, increasing weakness, and fatigue. He has lost 16 lb. (7.3 kg) in the past 6 months. The prostate-specific antigen test is elevated (8.5 ng/ml). Rectal examination reveals an enlarged and nodular prostate. A needle biopsy of the prostate discloses invasive prostatic adenocarcinoma. Grading of this carcinoma is based primarily on which of the following criteria?

- a. Capsular involvement
- b. Regional lymph nodes involvement
- c. Pulmonary metastases
- d. Resemblance to normal tissue of origin
- e. Volume of prostate involved by



27. Dental plaque and periodontal disease can be thought of as a continuum of what type of physiological process?

- a. Biofilm formation
- b. Normal aging
- c. Abnormal digestion
- d. Exaggerated immune response
- e. Chewing gum

Biofilm formation

28. Which one of the following microorganisms is closely associated with dental caries?

- a. C albicans
- b. Streptococcus mutans
- c. Pseudomonas
- d. Neisseria
- e. Staph epidermidis

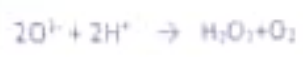
mutans - dental caries

29. Strep pneumoniae can be part of the normal flora of 5-40% of people. At what anatomic site can it be found?

- a. Conjunctiva
- b. Nasopharynx
- c. Colon
- d. Urethra
- e. Vagina

Strep pneumoniae
Nasopharynx

30. Which of the following enzymes is most likely involved in the following reaction?



- a. ATPase
- b. Catalase
- c. Oxygen permease
- d. Peroxidase
- e. Superoxide dismutase

Superoxide dismutase - different stage

31. Which of the following content is present in periplasmic space?

- a. Genetic material such as DNA or RNA
- b. Hydrolytic enzymes such as β -lactamases
- c. Lipid A
- d. Li^+
- e. Teichoic acid

32. When the base substitution result in a codon that simply cause a different amino acid to be inserted, the mutation is called.

- a. Inversion
- b. Missense
- c. Nonsense
- d. Transition
- e. Transversion

33. A week old infant is diagnosed with meningitis. A lumbar puncture reveals numerous neutrophils and gram-positive rods. She is admitted to the hospital and started on IV β -lactams. Which of the following targets would most likely play a role in the development of resistance to the antibiotics?

- a. Bactoprenol
- b. DNA gyrase
- c. Penicillin-binding proteins
- d. Reverse transcriptase
- e. RNA polymerase

34. Certain bacterial infectious diseases are diagnosed by detecting antibodies in patient's serum. Which of the following bacterial cell component is highly antigenic in nature?

10. A child 5 years of age presented in emergency with diarrhea. On examination the patient is suffering from rectal prolapsed. The patient would be suffering from heavy infestation of

- a. Hookworm
- b. Pinworm
- c. Thread worm
- d. Round worm
- e. Whipworm

11. A 40 years old male presented to you in outdoor with presenting complaints of swelling of right leg, non-pitting edema and swelling of the genitalia as well. The patient is suffering from

- a. Congestive cardiac failure
- b. Filariasis
- c. Renal insufficiency
- d. Venous thrombosis
- e. Gonococcal orchitis

12. Which of the following is definitive host for *Echinococcus granulosus*?

- a. Dog
- b. Sheep
- c. Cattle
- d. Man
- e. Goat

13. A 40 year old woman has just had a grand mal seizure. There is a history of headaches for the past week and one episode of vertigo and no previous seizures. She is afebrile MRI reveals a mass in the parietal lobe. Surgical removal of the mass reveals a larva within a cyst like sac. What is the most likely diagnosis?

- a. Taenia solium
- b. Taenia saginata
- c. Toxoplasma gondii
- d. Entamoeba histolytica
- e. Echinococcus granulosus

14. Analysis of a patient's stool reveals small structures resembling sand grains, microscope examination shows these to be proglottids. The most likely organism in this patient's stool is:

- a. Enterobius vermicularis
- b. Ascaris lumbricoides
- c. Necator americanus
- d. Taenia saginata
- e. Trichuris trichiura

15. Farmer spreads manure in his fields while he was bare footed. Later on he developed acute pruritis with some vesicles on his feet. He visited the physician after a week when he had abdominal discomfort and loss of appetite. Peripheral blood examination reveals microcytic hypochromic anemia and eosinophilia. Which of the following is the most likely cause?

- a. Anchylostoma duodenale
- b. Poor nutrition
- c. Plasmodium falciparum
- d. Pinworm
- e. Insect bite

• Increased vascular permeability

19. A man 45 years has complained of mild burning substernal pain following meals for the past 3 years. Upper GI endoscopy reveals erythematous area of the lower esophageal mucosa and the biopsies show the presence of columnar epithelium with goblet cells. Which of the following mucosal alterations is most likely represented by these findings?

- a. Dysplasia
- b. Hyperplasia
- c. Carcinoma
- d. Ischemia
- e. Metaplasia

20. In an experiment, surgical wound sites are observed following suturing. An ingrowth of new capillaries is observed to occur within the first week. A substance elaborated by macrophages is found at the wound site to stimulate this capillary proliferation. Which of the following substances is most likely to have this function?

- a. Platelet-derived growth factor
- b. Phospholipase C-gamma
- c. Fibronectin
- d. Fibroblast growth factor
- e. Epidermal growth factor

21. A young man got a lacerated wound on his left arm, which was stitched. A week later the stitches were removed. Healing at the wound site continued but the site became disfigured by prominent raised nodular scar in the next 2 months. Which of the following best describes the process:

- a. Organization
- b. Dehiscence
- c. Resolution
- d. Keloid formation
- e. Secondary Union

22. A 40-year-old man incurs a burn injury to his hands and arms while working on a propane furnace. Over the next 3 weeks, the burnt skin heals without the need for skin grafting. Which of the following is the most critical factor in determining whether the skin in the region of the burn will regenerate?

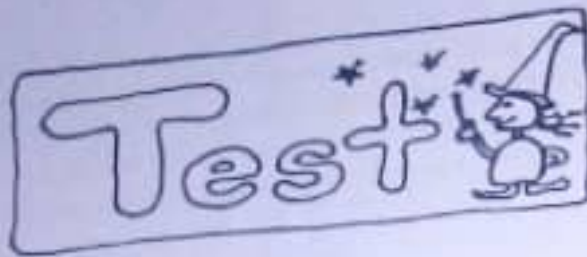
- a. Good cardiac output with tissue perfusion
- b. Persistence of skin appendages
- c. Maintenance of underlying connective tissue
- d. Diminished edema and erythema
- e. Granulation tissue formation

23. The tendency of blood vessels to recoil is provided by:

- a. Collagen
- b) Elastin
- c. Fibronectin
- d. Laminin
- e. Proteoglycan

24. A 25 year old female gave birth to a baby by C-section. She had a clean sutured wound. What type of healing will take place in such case?

- a. Healing by first intention
- b. Healing by second intention



09

GENETICS

STUDENT NAME: ~~XXXXXXXXXX~~

MAXIMUM MARKS: 32 MARKS

MARKED OBTAINED:

TIME ALLOWED: 40 MINUTES

9

1. A 13 year old boy has been drinking large quantities of fluids and has an insatiable appetite. He is losing weight and has become more tired and listless for the past month. Laboratory findings include normal CBC and fasting serum glucose of 175mg/dl. His parents, two brothers and one sister are healthy. A maternal uncle is also affected. Which of the following is the probable inheritance pattern of the disease?
- a. Autosomal dominant
 - b. Autosomal recessive
 - c. Mitochondrial DNA
 - d. Multifactorial
 - e. X-linked recessive
1. Multiple members of a family have a disease that is associated with a genetic change that involves substitution of adenine for thymine involving one base pair on homologous chromosomes. What is the best term to describe this finding?
- a. Copy number variation
 - b. Deletion
 - c. Epigenetic change
 - d. Single nucleotide polymorphism
 - e. Trinucleotide repeat mutation
2. A female infant born at term shows failure to thrive and failure to achieve developmental milestones. A pedigree reveals only this child is affected out of four generations on both sides of the family. Tissue fibroblasts obtained from this child shows a 46,XX karyotype. Cultured fibroblasts show accumulation of an intermediate product in a metabolic pathway in which multiple enzymes are involved. What is the most likely recurrence risk for this condition in siblings of this infant?
- a. 3%
 - b. 8%
 - c. 15%
 - d. 25%
 - e. 50%

Test 4

7

PARASITOLOGY-2

STUDENT NAME: ~~XXXXXXXXXX~~

MAXIMUM MARKS: 30 MARKS

MARKED OBTAINED:

TIME ALLOWED: 45 MINUTES

11

1. A mother states that she has observed her 4-year-old son scratching his anal area frequently. The most likely cause of this condition is

- a. Trichomonas vaginalis
- b. Enterobius vermicularis
- c. Ascaris lumbricoides
- d. Brucella abortus
- e. Entamoeba histolytica

pinworm / Thread worm

2. You are working in a rural medical clinic in China and a 3-year-old girl is brought to by her mother. The child appears emaciated and, upon testing, is found to have a hemoglobin level of 5 g/dl. Her feet and ankles are swollen, and there is an extensive rash on her feet, ankles, and knees. The most likely parasitic infection that causes the child's condition is

- a. Schistosomiasis
- b. Cercarial dermatitis
- c. Cyclosporiasis
- d. Hookworm infection
- e. Trichuriasis

Ancylostoma Duodenale

3. Pathologic effects of filariae in humans are caused by which of the following organisms?

- a. Brugia malayi
- b. Mansonella ozzardi
- c. Ascaris
- d. Wuchereria bancrofti
- e. Trichomonas

4. Several Papua New Guinea villagers known to eat pork during celebrations were reported to be suffering from an outbreak of epileptiform seizures. One of the first things you should investigate is

- a. The prevalence of Ascaris infections in the population
- b. The prevalence of schistosomiasis in the population
- c. The presence of Trypanosoma brucei gambiense in the villagers
- d. The presence of Giardia cysts in the drinking water
- e. The presence of Taenia solium in the pigs

Bladder Carcinoma Scenario

5. A 32-year-old male tourist traveled to Senegal for 1 month. During the trip, he swam in the Gambia river. Two months after his return, he began complaining of intermittent lower abdominal pain with dysuria. Laboratory results of ova and parasites revealed eggs with a terminal spine. Which of the following parasites is the cause of the patient's symptoms?

3. A 22 year old man has a sudden loss of vision in the eye. On physical Examination, there is a subluxation of the right crystalline lens. On auscultation of the chest, a mid systolic click is audible. An echocardiogram shows a floppy mitral valve and dilated aortic arch. The patient's brother and his cousins are similarly affected. He is prescribed a beta blocker. A genetic defect involving which of the following substances is most likely to be present in this patient?

- a. Collagen
- b. Dystrophin
- c. Fibrillin-1
- d. NF-1 protein
- e. Spectrin

4. A 22 year old primigravida notes absent fetal movement for 2 days. The fetus is delivered stillborn at 19 weeks gestation. The macerated fetus shows marked hydrops fetalis and a large posterior cystic hygroma of the neck. At autopsy, internal anomalies include aortic coarctation and a horseshoe kidney. Which of the following karyotypes is most likely to be present in cells obtained from this fetus?

- a. 45,X
- b. 47,XX,+18
- c. 47,XX,+21
- d. 47,XYY
- e. 69,XXX

5. A 23 year old woman, G2, P1, gives birth at 37 weeks to a small for gestational age male infant. The hand of the infant shows a single palmar flexion crease and a single flexion crease on the fifth digit. During the pregnancy, fetal ultrasound showed an endocardial cushion defect and polyhydramnios from probable duodenal atresia. Which of the following chromosomal abnormality is most likely to be present?

- a. Turner syndrome
- b. Down Syndrome
- c. Klinefelters syndrome
- d. None of the above

6. A 39 year old woman gives birth to a term infant with an umbilical hernia, brushfield spots on the iris, macroglossia, low set ears, oblique palpebral fissures and a heart murmur. The infant survives to childhood and exhibits only mild mental retardation. Which of the following chromosomal abnormality is most likely to be present in somatic cells of this child?

- a. Haploidy
- b. Monosomy
- c. Mosaicism
- d. Tetraploidy
- e. Triploidy

10. You are asked to participate in a research project on myocardial infarctions in a rat model. Which of the following occurs in ischemic cell injury?

- a. Efflux of K^+ and Na^+
- b. Influx of K^+ and H_2O
- c. Influx of Na^+ and Ca^{++}
- d. Influx of K^+ and Na^+

11. A 10 year old boy with known history of sickle cell disease presents to the emergency department complaining of left hypochondrial pain suggestive of a splenic infarct. Microscopic examination of the spleen would most likely reveal which of the following?

- a. Caseous necrosis
- b. Coagulative necrosis
- c. Gangrenous necrosis
- d. Liquefactive necrosis
- e. Fibrinoid necrosis

12. A 3rd year medical student is asked to write a microscopic description of a coagulative necrosis that was found in the heart of a patient who died of a heart attack. Which of the following best describes coagulative necrosis?

- a. Central amorphous acellular eosinophilic material.
- b. Eosinophilic cytoplasm with cell outlines preserved.
- c. Granular, friable mass of material devoid of cell outlines.
- d. Localized, solid, basophilic lesion with calcification
- e. Necrosis in which tissue is converted into a fluid

13. A 34-year-old obese woman has experienced heartburn from gastric reflux for the past 5 years after eating large meals. She undergoes upper gastrointestinal endoscopy, and a biopsy specimen of the distal esophagus is obtained. Which of the following microscopic changes has most likely occurred?

- a. Columnar metaplasia
- b. Goblet cell hyperplasia
- c. Lamina propria atrophy
- d. Mucosal Hypertrophy
- e. Squamous dysplasia

14. Microorganisms are cellular structures. They can grow and reproduce. Which of the following mechanism is mostly used by bacteria to divide?

- a. Mitosis
- b. Meiosis
- c. Both meiosis & mitosis
- d. Binary fission
- e. Binary fission & mitosis

15. What is the most likely cause of fatty liver in industrialized nations?

- a. Alcohol.
- b. CCl_4 .
- c. Starvation.
- d. Malnutrition.
- e. Hepatitis A.

- a. Toxoplasma gondii
- b. Schistosoma mansoni
- c. Schistosoma haematobium
- d. Ascaris lumbricoides
- e. Taenia solium

6. What type of specimen should be collected for laboratory analysis of patient with schistosoma haematobium infection?

- a. Thick blood smear
- b. Stool sample
- c. Urine sample
- d. Blood for serology
- e. Sputum sample

7. A 37-year-old sheep farmer from Australia presents with upper right quadrant pain, fever and appears slightly jaundiced. A stool exam was negative for ova and parasites but a CT scan of the liver reveals a large 14-cm cyst that appears to contain fluid. Which of the following parasites should be considered?

- a. Toxoplasma gondii
- b. Taenia solium
- c. Taenia saginata
- d. Schistosoma mansoni
- e. Echinococcus granulosus

8. A young boy had history of ingesting under cooked fish from a new restaurant and he developed megaloblastic anemia afterwards. Which of the following is the causative agent?

- a. Diphyliobothrium latum
- b. Ascaris lumbricoides
- c. Ankylostoma duodenale
- d. Enterobius vermicularis
- e. Taenia solium

9. A medical technologist visited Scandinavia and consumed raw fish daily for 2 weeks. Six months after her visit, she had a routine physical and laboratory examination, and was found to be anemic. Her vitamin B12 levels were below normal. The most likely cause of her vitamin B12 deficiency anemia is

- a. Excessive consumption of iron rich water
- b. Infection with yersinia
- c. Infection with parvovirus B19
- d. Infection with the fish tapeworm Diphyliobothrium latum
- e. Cystecercosis

17. A 50-year-old man complains of dry cough and muscle weakness for 6 months. He has been a chronic smoker 25 years. A chest X-ray shows a 3.5-cm central, left lung mass. Lab studies reveal hyperglycemia & hypertension. On trans-bronchial biopsy, small cell carcinoma was diagnosed. Metastases to liver detected by CT scan. Which of following account for the development of hyperglycemia & hypertension in this patient?
- a. Adrenal metastases
 - b. Paraneoplastic syndrome
 - c. Pituitary adenoma
 - d. Pituitary metastasis
 - e. Thrombosis of the renal artery
18. During a routine checkup, a 60-year-old man in good state of health was found to have hematuria. An abdominal CT scan reveals a 2-cm right renal mass. Staging of this tumor is key for selecting treatment and prognosis. Which of the following is the most important staging factor?
- a. Histologic grade of the tumor
 - b. Proliferative capacity of the tumor cells
 - c. Somatic mutations in the p53 tumor suppressor gene
 - d. Tumor cell karyotype (aneuploidy)
 - e. Metastases to regional lymph nodes
19. A 25 year old lady has a right cystic ovarian mass measuring 10cm. On removal of mass, the cystic cavity was found to have black hair and sebaceous material. Histology of cyst wall reveals variety of tissue containing skin, cartilage, brain and mucinous glandular epithelium. What is the diagnosis?
- a. Adenoma
 - b. Chondroma
 - c. Hamartoma
 - d. Teratocarcinoma
 - e. Teratoma
20. A 40-year-old lady with chronic bronchitis presents with shortness of breath. A chest X-ray reveals a 2-cm "coin lesion" in the upper lobe of the left lung. A histo-pathological report from coin lesion states diagnosis of hamartoma. Which of the following describes the histologic features of this lesion?
- a. Benign neoplasm of epithelial origin
 - b. Granulomatous inflammation
 - c. Disorganized normal tissue
 - d. Granulation tissue
 - e. Ectopic islands of normal tissue
21. A 73-year-old woman presents with a massively swollen abdomen. The patient was diagnosed with papillary serous cyst adenocarcinoma of the ovary 3 years ago. She dies in a hospital 1 month later. At autopsy, the peritoneum is studded with small tumors, and there are 4 liters of ascetic fluid. What will be the route of tumor metastasis in this case?
- a. Direct tumor extension
 - b. Hematogenous spread
 - c. Lymphatic spread
 - d. Seeding of body cavity
 - e. Venous spread

- c. healing by 3rd intention
 - d. None of the above
25. A 17-year-old driver of a pickup truck is involved in a collision. He incurs blunt force abdominal trauma. In response to this injury, cells in tissues of the abdomen are stimulated to enter the G1 phase of the cell cycle from the G0 phase. Which of the following cell types is most likely to remain in G0 following this injury?
- a. Smooth muscle
 - b. Fibroblast
 - c. Skeletal muscle
 - d. Endothelium
 - e. Hepatocyte

7. A 27 year old man and his 24 year old wife have been trying to conceive for 6 years. Physical examination shows he has gynecomastia, reduced testicular size, reduced body hair & increased length between soles of his feet and pubic bone. Semen analysis indicates oligospermia. Lab studies show increased FSH levels & slightly decreased testosterone levels. Identify Karyotype?
- a. 46,XI(Xq)
 - b. 47,XTY
 - c. 47,XXY
 - d. 46,XX/47XX,+21
 - e. 46,XY,del(22q11)
8. A 25 year old woman with amenorrhea has never had menarche. On physical examination she is 145cm (4 ft 9 in) tall, has webbed neck, broad chest, and widely spaced nipples. Strong pulses are palpable in upper extremities, weak pulses in the lower extremities. On MRI her ovaries are small, elongated & tubular. She is suspected to have Turner syndrome. Karyotypes will be:
- a. 45,X/46XX
 - b. 45,X,X(fra)
 - c. 47,XXY
 - d. 47,XXX
 - e. 47,XX,+16
9. An organism with two identical alleles is
- a. Dominant
 - b. Recessive
 - c. Hybrid
 - d. Homozygous
 - e. Heterozygous
10. The allele which is unable to express itself in the presence of another is called
- a. Co-dominant
 - b. Recessive
 - c. Supplementary
 - d. Complementary
 - e. Dominant
11. When a single gene affects more than one trait the phenomenon is called
- a. Epistasis
 - b. Pleiotropy
 - c. Pseudodominance
 - d. Multifactorial inheritance
 - e. Single gene polymorphism
12. When dominant and recessive alleles express itself together it is called
- a. Dominance
 - b. Pseudo dominance
 - c. Co-dominance
 - d. Amphidominance
 - e. Pleiotropy

5. While in a home improvement center warehouse buying paint, a 35-year-old man hears "Look out below!" and is then struck on the leg by a falling pallet rack, which strikes him on his left leg in the region of his thigh. The skin is not broken. Within 3 days there is a 5 x 7 cm purple color to the site of injury. Which of the following substances has most likely accumulated at the site of injury to produce a yellow-brown color 16 days after the injury?
- a. Urobilin
 - b. Bilirubin
 - c. Melanin
 - d. Hemosiderin
 - e. Glycogen
6. A 70-year-old man with hypercalcemia died suddenly. At autopsy, microscopic examination showed noncrystalline amorphous deposits of calcium salts in gastric mucosa, renal interstitium, and alveolar walls of lungs. Which of the following underlying conditions would most likely explain these findings?
- a. Chronic active hepatitis
 - b. Diffuse parathyroid hyperplasia
 - c. Disseminated tuberculosis
 - d. Generalized atherosclerosis
 - e. Normal aging process
7. A 16-year-old motor cyclist boy sustained blunt trauma to his abdomen. At laparotomy, a small portion of injured left lobe of liver was removed. Two months later, a CT scan of the abdomen showed that the liver had nearly regained its normal size. Which of the following processes best explains this CT scan finding?
- a. Apoptosis
 - b. Hypertrophy
 - c. Metaplasia
 - d. Dysplasia
 - e. Hyperplasia
8. A 20-year-old woman breastfeeds her infant. On examination, her breasts are slightly increased in size. Which of the following processes that occurred in her breasts during pregnancy enables her to breastfeed the infant?
- a. Ductal metaplasia
 - b. Epithelial dysplasia
 - c. Intracellular lipid deposition
 - d. Lobular hyperplasia
 - e. Stromal hypertrophy
9. You are asked to review an electron micrograph of a section of liver from a chronic alcoholic. Which of the following is an indicator of irreversible injury?
- a. Cellular edema
 - b. Chromatin clumping
 - c. Mitochondrial swelling
 - d. Myelin figures
 - e. Rupture of plasma membrane

Test

8

CELL INJURY

13

STUDENT NAME

MAXIMUM MARKS: 55 MARKS

MARKED OBTAINED:

TIME ALLOWED: 70 MINUTES

1. A patient is suffering from stroke and has left sided weakness and paralysis in the upper extremity. The type of necrosis associated with well-developed infarct of the brain is:

- a. Caseous necrosis
- b. Coagulative necrosis
- c. Liquefactive necrosis
- d. Gangrenous necrosis
- e. Fibrinoid necrosis

2. Neutrophils have short half-lives in tissues and die within a few hours after leaving the blood. Which of the following mechanisms is responsible for their death?

- a. Autophagy
- b. Apoptosis
- c. Autolysis
- d. Necrosis
- e. Ischemia

3. A 65-year-old man experienced severe substernal chest pain for 3 hours. An ECG showed changes consistent with an acute myocardial infarction. After thrombolytic therapy with tissue plasminogen activator (t-PA), his serum creatine kinase level increased. Which of following tissue events most likely occurred in the myocardium after t-PA therapy?

- a. Cellular regeneration
- b. Drug toxicity
- c. Myofibril atrophy
- d. Reperfusion injury
- e. Increased synthesis of CK

4. A 47-year-old man has a lung carcinoma with metastases. After one month of chemotherapy cycle, histologic examination of a metastatic lesion shows many foci in which individual tumor cells appear shrunken and deeply eosinophilic. Their nuclei exhibit condensed aggregates of chromatin under the nuclear membrane. The pathologic process affecting these shrunken tumor cells is most likely triggered by release of which of the following substances into the cytosol?

- a. BCL2
- b. Catalase
- c. Phospholipase
- d. Lipofuscin
- e. Cytochrome C

- a. Complement C3b and IgG
- b. Histamine and serotonin
- c. Prostaglandin and bradykinin
- d. Interleukin-1 and tumor necrosis factor
- e. Leukotriene and HPETE

8. A 50-year-old man had chronic cough with fever and weight loss for the past 2 months. A chest radiograph reveals multiple nodules from 1 to 4 cm in size, some of which demonstrate cavitation in the upper lobes. A sputum sample reveals the presence of acid fast bacilli. Which of the following cells is the most important in the development of his lung lesions?

- a. Fibroblast
- b. Platelet
- c. Neutrophil
- d. Mast cell
- e. None of the above

9. A 20-year-old man has experienced painful urination for 4 days. Urethritis is suspected. Numerous neutrophils are present in a smear of the exudate from the urethra. The diapedesis of neutrophils is the consequence of which of the following chemical mediators?

- a. Histamine
- b. Prostaglandin
- c. Hageman factor
- d. Bradykinin
- e. Complement C5a

10. Morphological changes seen in chronic non-specific inflammation include an increase in:

- a. Lymphocytes, Neutrophils and Liquefactive necrosis
- b. Neutrophils, macrophages and fibrosis
- c. Lymphocytes, plasma cells and fibrosis
- d. Giant cells, macrophages and coagulative necrosis
- e. Granulomatous reaction and fibrosis

11. The most important cytokine involved in the formation of epithelioid cells is:

- a. IL-8
- b. Interferon Gamma
- c. PGI₂
- d. β interferon
- e. IL-2

12. A 25 years old female is suffering from chronic bronchial asthma. She is on steroids for her symptoms. Which of the following is MOST responsible for the anti-inflammatory activity of corticosteroids?

- a. Inhibition of Phospholipase A₂
- b. Destruction of eosinophils
- c. Inhibition of cyclooxygenase
- d. Increased leukocyte adhesion to endothelial cells
- e. Inhibition of lipoxigenase

13. Which of the following is the most efficient killing mechanism of neutrophils?

- a. Collagenase
- b. Reactive oxygen species
- c. Protease

A 56-year-old man has had increasing dyspnea for 6 years. He has no cough or fever. He was inhaling silica dust for many years in his job. A chest x-ray now shows increased interstitial markings and parenchymal 1 to 3 cm nodules. His pulmonary problems are most likely to be caused by which of the following inflammatory processes?

- a. Neutrophil infiltration with release of leukotriene
- b. Histamine release by mast cells
- c. Foreign body giant cell formation
- d. Plasma cell production of immunoglobulin
- e. Release of growth factors by macrophages



6. A 45-year-old man has had a fever and dry cough for 3 days, and now has difficulty in breathing and productive cough. On physical examination his temperature is 38.5 °C. Diffuse rales are auscultated over lower lung fields. A chest radiograph shows a right pleural effusion. A right thoracentesis is performed. The fluid obtained has a cloudy appearance with a cell count showing 15,500 leukocytes per microliter, 98% of which are neutrophils. Which of the following terms best describes his pleural process?

- a. Serous inflammation
- b. Purulent inflammation
- c. Fibrinous inflammation
- d. Chronic inflammation
- e. Granulomatous inflammation



7. A 45-year-old man developed right lower quadrant abdominal pain over the last one day. Physical examination revealed rebound tenderness over the right lower quadrant. Appendectomy was performed and the appendix was swollen, erythematous, and partly covered by a yellowish exudate. It was removed, and microscopic section showed infiltration with numerous neutrophils. Which mediator causes pain?

INFLAMMATION

STUDENT NAME: ~~XXXXXXXXXX~~

MAXIMUM MARKS: 55 MARKS

MARKED OBTAINED:

TIME ALLOWED: 70 MINUTES

13

- Which of the following is an anaphylotoxin?
a. Bradykinin
b. Histamine
c. Leukotrienes
d. IL-1
 e. C3a & C5a
- Which of the following substances is produced by the action of lipoygenase of arachidonic acid, is a potent chemotactic factor for neutrophils, and causes aggregation and adhesion of leukocytes?
a. C5a
b. Prostacyclin
 c. IL-8
d. Thromboxane A₂
 e. Leukotriene b₄
- A 15-year-old girl has had episodes of sneezing with watery eyes and runny nose for the past 2 weeks. On physical examination she has red, swollen nasal mucosa. She has had similar episodes each spring and summer when the amount of pollen in the air is high. Her symptoms are most likely to be mediated by the release of which of the following chemical mediators?

22. A 45-year-old woman who has had multiple sexual partners for the past 20 years has an abnormal Pap smear with cytological changes suggesting human papillomavirus infection. Without treatment, she is most likely to develop which of the following lesions?

- a. Hodgkin's lymphoma
- b. Basal cell carcinoma
- c. Adenocarcinoma
- d. Leiomyoma
- e. Squamous cell carcinoma



23. A 65-year-old man has complained of hematuria and dysuria and fever for the past week. On cystoscopy, a slightly erythematous 1 cm area was seen on bladder mucosa. Microscopy of biopsy specimen showed cells with marked hyperchromatism and increased nuclear/cytoplasmic ratio involving the full thickness of the epithelium. However, these changes are confined to the epithelium above the basement membrane. Which of the following terms best describes these biopsy findings?

- a. Metaplasia
- b. Carcinoma in situ
- c. Minimal dysplasia
- d. Micro-invasion
- e. Hyperplasia



24. A 60-year-old man with an 80 pack per year history of smoking experiences an episode of hemoptysis. On physical examination he has puffiness of the face, some pedal edema, bruises of the skin, and a blood pressure of 165/100 mm Hg. A chest radiograph reveals a 5 cm right upper-lobe lung mass. FNAC of mass yields cells consistent with small cell anaplastic ("oat cell") carcinoma. A bone scan shows no metastases. Immunohistochemical staining of the tumor cells is likely to be positive for which of the following hormones?

- a. Parathormone related peptide
- b. Erythropoietin
- c. ACTH
- d. Insulin
- e. Gastrin



25. A child is born with a single functional allele of a tumor suppressor gene. At the age of five the remaining normal allele is lost through a point mutation. As a result, the ability to continue the transition from G1 to the S phase of cell cycle is un-checked. Which of the following neoplasms is most likely to arise via this mechanism?

- a. Infiltrating ductal carcinoma of breast
- b. Small cell anaplastic carcinoma of the lung
- c. Retinoblastoma of eye
- d. Cerebral astrocytoma
- e. Chronic myeloid leukemia



9. Each of the following statements concerning measles vaccine is correct except:
- a. The vaccine contains live, attenuated virus.
 - b. The vaccine should not be given at the same time as the mumps vaccine because the immune system cannot respond to two viral antigens given simultaneously.
 - c. Virus in the vaccine contains only one serotype.
 - d. The vaccine should not be given before 15 months of age because maternal antibodies can prevent an immune response.
10. Which of the following statements is more likely to be true of measles (rubeola) than German measles (rubella)?
- a. Koplik spots are present.
 - b. It causes birth defects.
 - c. It causes only a mild illness.
 - d. Human beings are the only natural host.
 - e. Attenuated virus vaccine is available for prevention.
11. Rabies virus is rapidly destroyed by
- a. Ultraviolet radiation
 - b. Heating at 55°C for 1 hour
 - c. Ether treatment
 - d. Trypsin treatment
 - e. All of the above
12. The presence in neurons of eosinophilic cytoplasmic inclusion bodies, called Negri bodies, is characteristic of which of the following central nervous system infections?
- a. Borna disease
 - b. Rabies
 - c. Subacute sclerosing panencephalitis
 - d. New variant Creutzfeldt-Jakob disease
 - e. Postvaccinal encephalitis
13. Which of the following statements about rabies vaccines for human use is true?
- a. Contain live, attenuated rabies virus
 - b. Contain multiple antigenic types of rabies virus
 - c. Can treat clinical cases of rabies
 - d. Can be used for postexposure prophylaxis
 - e. They are associated with Guillain-Barre syndrome

- Myeloperoxidase
- e. Defensins

14. A child has a high grade fever due to streptococcal throat infection. His peripheral smear showed WBC count of 15,000/ μ l. Which of the following substances is the most likely mediator for the fever observed in this patient?

- a. Bradykinin
- b. Histamine
- c. Nitric oxide
- Interleukin 1
- e. Leukotriene B₄

15. A 55 years old man suffered from myocardial infarction and worsening congestive heart failure. There is dyspnea and orthopnea for the last 2 months. Pleural fluid is aspirated. Which of the following characteristics of this fluid would most likely indicate that it is a transudate?

- a. Cloudy appearance
- b. Low protein content
- c. Increased lymphocytes
- d. Presence of fibrin
- e. Large size of effusion

16. A clinical study is performed on patients with pharyngeal infections. The most typical clinical course averages 3 days from the time of onset until the patient sees the physician. Most of these patients experience fever and chills. On physical examination, the most common finding would be swelling, erythema, and pharyngeal purulent exudate. Which of the following types of inflammation is most likely to occur?

- a. Granulomatous inflammation
- b. Acute inflammation
- c. Abscess formation
- d. Resolution of inflammation
- e. Chronic inflammation

17. A 90-year-old woman has developed a fever and cough over the past 2 days. Staphylococcus aureus is cultured from her sputum. She receives a course of antibiotic therapy. Two weeks later she no longer has a productive cough, but she still has a fever. A chest radiograph reveals a 3 cm rounded density in the right lower lobe whose liquefied contents form a central air-fluid level. There are no surrounding infiltrates. Which of the following is the best description for this outcome of her pneumonia?

- a. Hypertrophic scar
- b. Abscess formation
- c. Bronchogenic carcinoma
- d. Chronic inflammation
- e. Granulomatous cavitation

18. The major role of Nitric oxide (NO) in inflammation is:

- a. Inducing pain
- b. Vasodilatation
- c. Chemotaxis
- d. Adhesion of leukocytes on endothelial cells

19. Which of the following statements about dengue virus is not true?
- a. It is the most important mosquito-borne viral disease affecting humans.
 - b. It is distributed worldwide in tropical regions.
 - c. It can cause a severe hemorrhagic fever.
 - d. There is a single antigenic type.
 - e. One form of disease is characterized by increased vascular permeability.
20. A 24-year-old woman in New York City is admitted to the hospital because of jaundice. On workup, she is found to have HCV infection. The major risk factor for HCV infection in the United States is
- a. Tattoos
 - b. Injecting drug use
 - c. Blood transfusion
 - d. Sexual activity
 - e. Working in health care occupations
21. HDV (delta agent) is found only in patients who have either acute or chronic infection with HBV. Which of the following is most correct?
- a. HDV is a defective mutant of HBV.
 - b. HDV depends on HBV surface antigen for virion formation.
 - c. HDV induces an immune response indistinguishable from that induced by HBV.
 - d. HDV is related to HCV.
 - e. HDV contains a circular DNA genome.
22. A middle-aged man complained of acute onset of fever, nausea, and pain in the right upper abdominal quadrant. There was jaundice, and dark urine had been observed several days earlier. A laboratory test was positive for HAV IgM antibody. The physician can tell the patient that
- a. He probably acquired the infection from a recent blood transfusion.
 - b. He will probably develop chronic hepatitis.
 - c. He will be at high risk of developing hepatocellular carcinoma.
 - d. He will be resistant to infection with hepatitis E.
 - e. He may transmit the infection to family members by person-to-person spread for up to 2 weeks.
23. Several different viruses can cause hepatitis. One of the following statements applies to all four viruses: HAV, HCV, HDV, and HEV.
- a. It contains a single-stranded RNA genome.
 - b. It is transmitted primarily by the parenteral route.
 - c. It is transmitted primarily by the fecal-oral route.
 - d. It is associated with fulminant hepatitis.
 - e. It undergoes sequence variation during chronic infection.

- a. Complement C3b
- b. Platelet activating factor (PAF)
- c. Histamine
- d. Fibroblast growth factor
- e. Tumor necrosis factor (TNF)

2

4. In an experiment, surgical wound sites are observed following suturing. An ingrowth of new capillaries is observed to occur within the first week. A substance elaborated by macrophages is found at the wound site to stimulate this capillary proliferation. Which of the following substances is most likely to have this function?

- a. Platelet-derived growth factor
- b. Phospholipase C-gamma
- c. Fibroblast growth factor
- d. Epidermal growth factor
- e. Fibronectin

2

14. A 5-year-old boy in San Francisco reaches into a car to pet another family's dog and is bitten on the finger. Six weeks after the bite, the child develops fever, headache, and a seizure. He becomes combative and hallucinates. What is the best diagnostic test to perform on the patient to rule in rabies as a cause of his illness?

- a. Detection of serum antirabies antibody
- b. Culture of cerebrospinal fluid for virus
- c. Direct fluorescent antibody stain of a biopsy from the nape of the neck
- d. Brain biopsy
- e. Cerebrospinal fluid antirabies antibody

15. The typical course of an untreated HIV infection extends over 10 or more years. There is usually a long period (clinical latency) between the time of primary HIV infection and the development of AIDS. During this period of clinical latency

- a. HIV is not detectable in the plasma
- b. CD4 cell counts remain unchanged
- c. Virus replicates at a very low rate
- d. Virus is present in lymphoid organs
- e. Neutralizing antibodies are not elicited

16. Viral coinfections occur in HIV-1-infected individuals and may contribute to morbidity and mortality. The most common coinfection in HIV-1-positive persons in the United States involves

- a. Hepatitis C virus
- b. Hepatitis D virus
- c. HIV type 2
- d. Human T-lymphotropic virus
- e. Kaposi sarcoma herpesvirus

17. What are the most common symptoms of acute HIV infection?

- a. Rash and sore throat
- b. Fever and malaise
- c. Diarrhea
- d. Jaundice and hepatitis
- e. Neuropsychiatric and behavioral changes

18. In a person with HIV infection, potentially infectious fluids include all of the following except

- a. Blood
- b. Saliva visibly contaminated with blood
- c. Urine not visibly contaminated with blood
- d. Genital secretions
- e. Amniotic fluid

Test

11

12

NEOPLASIA

STUDENT NAME: ~~XXXXXXXXXX~~
MAXIMUM MARKS: 55 MARKS
MARKED OBTAINED:
TIME ALLOWED: 70 MINUTES

1. A 64-year-old man present with symptoms of anemia. On workup, you discover that the patient has been losing blood from the gastrointestinal (GI) tract secondary to a tumor mass in his colon. The pathology report from a biopsy specimen indicates that this mass is an invasive adenocarcinoma. Which of the following histologic appearance is most likely to be seen in a biopsy specimen taken from this tumor mass?

- a. A uniform proliferation of fibrous tissue
- b. An organized mass of proliferation fibroblasts and blood vessels
- c. A disorganized mass of cell forming keratin
- d. A uniform proliferation of glandular structures
- e. A disorganized mass of cells forming glandular structures

2. Which one of the following numbered sequences best illustrates the postulated sequence of events that precedes the formation of an infiltrating squamous cell carcinoma of the cervix?

- 1 = Carcinoma in situ
- 2 = Invasive carcinoma
- 3 = Mild dysplasia
- 4 = Moderate dysplasia
- 5 = Severe dysplasia
- 6 = Squamous metaplasia

- a. 3, then 4, then 5, then 1, then 6, then 2
- b. 3, then 4, then 5, then 6, then 1, then 2
- c. 5, then 4, then 3, then 1, then 6, then 2
- d. 6, then 3, then 4, then 5, then 1, then 2
- e. 6, then 4, then 3, then 5, then 2, then 1

3. Which of the following is known as Guardian of genome?

- a. Ras
- b. p53
- c. Myc
- d. NF-1
- e. ABL

VIROLOGY-1

DNA Enveloped & DNA Non-Enveloped Viruses

9

STUDENT NAME: ~~XXXXXXXXXX~~

MAXIMUM MARKS: 45 MARKS

MARKED OBTAINED:

TIME ALLOWED: 45 MINUTES

- A previously healthy 3-year-old boy develops a classic viral childhood illness. Which of the following primary viral infections of childhood is usually symptomatic?
a. Cytomegalovirus
b. Epstein-Barr virus
c. Hepatitis B virus
 d. Varicella-zoster virus ✓
e. Parvovirus B19
- Most herpesvirus infections are endemic worldwide. Which one of the following viruses shows marked geographic differences in sero-prevalence?
a. Cytomegalovirus
b. Epstein-Barr virus
 c. Herpes simplex virus type 2 X
 d. Kaposi sarcoma herpesvirus
e. Varicella-zoster virus
- A 19-year-old female college student has a fever, sore throat, and lymphadenopathy accompanied by lymphocytosis with atypical cells and an increase in sheep cell agglutinins. The diagnosis is most likely:
a. Infectious hepatitis
 b. Infectious mononucleosis ✓
c. Chickenpox
d. Herpes simplex infection
e. Viral meningitis
- The most common congenital infection is caused by
 a. Varicella-zoster virus
b. Herpes simplex virus type 2
 c. Human herpesvirus 8 (Kaposi sarcoma herpesvirus) X
 d. Cytomegalovirus
e. Parvovirus

5. Which of the following infectious agents is most likely to cause a pandemic?

- a. Influenza A virus
- b. Streptococcus pyogenes
- c. Influenza B virus
- d. Respiratory syncytial virus
- e. Influenza C virus

6. 4-year-old boy develops an acute febrile illness. His pediatrician diagnoses mumps. The organ most commonly exhibiting signs of mumps is the

- a. Lungs
- b. Ovary
- c. Parotid glands
- d. Skin
- e. Testes

7. A 27-year-old woman who is 2 months' pregnant develops fever, malaise, and arthralgia. A fine maculopapular rash appears on her face, trunk, and extremities. Rubella is diagnosed, and there is concern that the fetus will be infected, resulting in the congenital rubella syndrome. Which of the following statements about this syndrome is correct?

- a. The disease can be prevented by vaccination of school-age children with measles vaccine.
- b. Congenital abnormalities occur when a nonimmune pregnant woman is infected at any time during pregnancy.
- c. Deafness is a common defect associated with congenital rubella syndrome.
- d. Only rare strains of rubella virus are teratogenic.
- e. None of the above

8. A 20-month-old boy had an illness characterized by fever, irritability, conjunctivitis, and a brick-red rash initially on the face but spreading downward and outward. At age 9 years, the boy had a gradual onset of severe, generalized neurologic deterioration. Subacute sclerosing panencephalitis (SSPE) was diagnosed. Which of the following statements about SSPE is correct?

- a. Defective varicella-zoster virus is present in brain cells.
- b. High titers of measles antibody are found in cerebrospinal fluid.
- c. The incidence of the disease is rising since the introduction of MMR vaccine.
- c. Rapidly progressive deterioration of brain function occurs.
- e. The disease is a rare, late complication of rubella infection.

4. A 52-year-old man presents with symptoms of gastric pain after eating. During workup, a 3-cm mass is found in the wall of the stomach. The mass is resected and histologic examination reveals a tumor composed of cells having elongated, spindle-shaped nuclei. Which of the following is the cell of origin of this tumor?

- a. Adipocyte
- b. Endothelial cell
- c. Glandular epithelial cell
- d. Smooth-muscle cell
- e. Squamous epithelial cell



5. During a routine physical examination, a 49-year-old man is found to have a 2.5-cm "coin lesion" in the upper lobe of his left lung. The lesion is removed surgically, and histologic section reveal sheets of malignant cells with clear cytoplasm (clear cell carcinoma). Which of the following is the most likely site of origin for this metastatic lung tumor?

- a. Appendix
- b. Breast
- c. Kidney
- d. Pancreas
- e. Stomach



6. A 4-year-old African boy develops a rapidly enlarging mass that involves the right side of his face. Biopsies of this lesion reveal a prominent "starry sky" pattern produced by proliferating small, noncleaved malignant lymphocytes. Based on this microscopic appearance, the diagnosis of Burkett's lymphoma is made. This neoplasm is associated with chromosomal translocations that involve which one of the following oncogenes?

- a. bcl-2
- b. c-abl
- c. c-myc
- d. erb-B
- e. N-myc



7. A 52 years old man has had increasing fatigue for past six months. On physical examination, he has palpable spleen tip. Laboratory studies show WBC count of 189,000/microlitre. The peripheral blood smear shows many immature and mature myeloid cells. Cytogenetic analysis of cells reveal t(9:22) translocation. This translocation leads to hybrid gene that greatly increases tyrosine kinase activity. The most likely protein producing all these effects is

- a. p53
- b. Rb
- c. ABL/BCR
- d. NF-1
- e. RAS



16. Which of the following groups are at increased risk for herpes zoster?

- a. Persons at advanced age
- b. Patients with atopic dermatitis
- c. Pregnant women
- d. Persons who have been vaccinated with varicella vaccine
- e. Infants with congenital infections



17. Adenoviruses can cause eye infections that are highly contagious. Which of the following is least likely to be a means of transmission during an outbreak of epidemic keratoconjunctivitis?

- a. Swimming pools
- b. Hand towels
- c. Mosquito bites
- d. Hand-to-eye
- e. Contaminated ophthalmic equipment



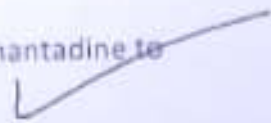
18. Which of the following human diseases has not been associated with adenoviruses?

- a. Cancer
- b. Common colds
- c. Acute respiratory diseases
- d. Keratoconjunctivitis
- e. Gastroenteritis
- f. Hemorrhagic cystitis



19. Your summer research project is to study the viruses that cause gastroenteritis. You recover a virus from a stool sample and notice that the growth medium on the infected cultures is highly acidic. You find that the viral genome is double-stranded DNA. Of the following, which one is the most appropriate conclusion you could draw?

- a. There is a high likelihood that the agent is a rotavirus.
- b. You need to determine the viral serotype to establish whether the virus was important in causing the disease.
- c. The patient should have been treated with the antiviral drug amantadine to shorten the duration of symptoms.
- d. The virus particle would contain a reverse transcriptase enzyme.



20. Which of the following statements concerning adenoviruses is incorrect?

- a. Adenoviruses are composed of a double-stranded DNA genome and a capsid without an envelope.
- b. Adenoviruses cause both sore throat and pneumonia.
- c. Adenoviruses have only one serologic type.
- d. Adenoviruses are implicated as a cause of tumors in animals but not humans.



8. A 56 years old man has chronic cough for past 10 years. He is a non-smoker. He had an episode of hemoptysis 3 days ago. No abnormal findings are noted on physical examination. A chest X-ray demonstrates a firm hilar mass. A sputum sample is collected, and sputum cytology report reads: atypical cells suggestive of squamous cell carcinoma. The following environmental exposure is likely to be associated with these findings.
- a. Asbestos
 - b. Radon
 - c. Silica
 - d. Benzene
 - e. Formaldehyde
9. A 35 years old lady was found to have firm nodule palpable on dome of uterus on routine physical examination. The nodule has slowly increased in size. On ultrasound examination the nodule is well circumscribed. The mass is excised and sent to histopathology department. On microscopy the mass is composed of interlacing bundles and fascicles of whorled smooth muscle fibers. No significant mitosis is seen. She is most likely to have:
- a. Adenocarcinoma
 - b. Leiomyosarcoma
 - c. Hamartoma
 - d. Leiomyoma
 - e. Metastasis
10. A study is performed to analyze characteristics of malignant neoplasm in biopsy specimens. The biopsies were performed on patients who had palpable mass lesions on digital examination. Of the following microscopic findings, which is most likely to indicate that the neoplasm is malignant?
- a. Pleomorphism
 - b. Atypia
 - c. Invasion
 - d. Increased N/C ratio
 - e. Necrosis
11. A 78 year old navy veteran with history of smoking, he was involved in fireproofing naval combat ships with asbestos insulation. Regarding his exposure to both asbestos and tobacco, which of these he is more prone to???
- a. bladder cancer
 - b. bronchogenic Carcinoma
 - c. esophageal Cancer
 - d. mesothelioma
12. A 68 year old man has history of metastatic prostatic cancer presents with history of weight loss, loss of appetite and energy. His current condition can be attributed to which of the following?
- a. fibroblast growth factor
 - b. interleukin 2
 - c. platelet derived growth factor
 - d. Tumor necrosis factor alpha
 - e. interferon gamma

5. A Tzanck smear of a scraping obtained from a vesicle on the skin demonstrates multinucleated giant cells. Multinucleated giant cells are associated with which of the following viruses?

- a. Varicella-zoster
- b. Variola major
- c. Coxsackievirus
- d. Molluscum contagiosum
- e. Epstein-Barr virus



6. A 28-year-old woman has recurrent genital herpes. Which of the following is true? *regarding neonatal herpes*

- a. Reactivation of latent virus during pregnancy poses no threat to the newborn.
- b. Virus cannot be transmitted in the absence of apparent lesions.
- c. Recurrent episodes caused by reactivation of latent virus tend to be more severe than the primary infection.
- d. They can be caused by either herpes simplex virus type 1 or type 2.
- e. Latent herpes simplex virus can be found in dendritic cells.

7. Which of the following conditions is least likely to be caused by adenoviruses?

- a. Conjunctivitis
- b. Pneumonia
- c. Pharyngitis
- d. Glomerulonephritis



8. Which one of the following best describes a physicochemical property of parvoviruses?

- a. Enveloped virus particle.
- b. Single-stranded DNA genome.
- c. Infectivity is inactivated by ether treatment.
- d. Virion exhibits helical symmetry.
- e. Virion is about the same size as herpesviruses.



9. Which of the following viruses causes a mononucleosis-like syndrome & excreted in urine?

- a. Cytomegalovirus
- b. Epstein-Barr virus
- c. Human herpesvirus 6
- d. Varicella-zoster virus
- e. Herpes simplex virus type 2



10. Which of the following tumors is caused by a virus other than Epstein-Barr virus?

- a. Posttransplant lymphomas
- b. Hodgkin disease
- c. Kaposi sarcoma
- d. AIDS-related central nervous system non-Hodgkin lymphomas
- e. Burkitt lymphoma



21. An 8-year-old child recently had erythema infectiosum. Her 33-year-old mother subsequently developed arthralgia followed by painful arthritis with swelling in the small joints of both hands. In addition to the apparent tropism for joints, human parvovirus B19 is highly tropic for which cell type?
- a. CD4 T lymphocytes
 - b. Renal tubule cells
 - c. Erythroid cells
 - d. Glial cells
 - e. Fever patches
22. A 42-year-old man with HIV/AIDS presented with aplastic anemia. Using the PCR, parvovirus B19 was detected in his serum. The patient presumably acquired his parvovirus B19 infection from another person. The most likely route of transmission is:
- a. By contact with respiratory secretions or droplets
 - b. By contact with a skin rash
 - c. Through sexual activity
 - d. Through a recent blood transfusion
23. Which one of the following is a disease in which the role of parvovirus B19 has not been established?
- a. Erythema infectiosum (fifth disease)
 - b. Transient aplastic crisis
 - c. Hydrops fetalis
 - d. Fulminant hepatitis
24. Laboratory infections can be acquired when working with viruses unless good laboratory safety practices are followed. Which of the following is not a good biosafety practice?
- a. Use of biosafety hoods
 - b. Use of laboratory coats and gloves
 - c. Avoidance of pipetting by mouth
 - d. Flushing experimental waste down laboratory sink
 - e. Not eating or drinking in the laboratory
25. Small viruses are in the same size range as which of the following?
- a. Staphylococcus species
 - b. Serum globulin
 - c. Red blood cells
 - d. Eukaryotic ribosomes
 - e. Mitochondria

24. A 36-year-old nurse is found to be both HBsAg positive and HB_eAg positive. The nurse most likely

- a. Has acute hepatitis and is infectious.
- b. Has both HBV and HEV infections.
- c. Has a chronic HBV infection.
- d. Has cleared a past HBV infection.
- e. Was previously immunized with HBV vaccine prepared from healthy HBsAg-positive carriers.

25. Which of the following persons are not recommended to receive hepatitis B vaccine because they have a risk factor for HBV infection?

- a. Sexually active persons who are not in long-term, mutually monogamous relationships
- b. Injection drug users
- c. Pregnant women
- d. Persons who live in a household with a person who is HBsAg positive
- e. Persons seeking treatment for a sexually transmitted disease

VIROLOGY

STUDENT NAME: ~~XXXXXXXXXX~~

MAXIMUM MARKS: 50 MARKS

MARKED OBTAINED:

TIME ALLOWED: 60 MINUTES

7

1. Which of the following statements reflects the pathogenesis of influenza?

- a. The virus enters the host in airborne droplets.
- b. Viremia is common.
- c. The virus frequently establishes persistent infections in the lung.
- d. Pneumonia is not associated with secondary bacterial infections.
- e. Viral infection does not kill cells in the respiratory tract.

2. Which of the following symptoms is not typical of influenza?

- a. Fever
- b. Muscular aches
- c. Malaise
- d. Dry cough

e. Rash

3. Which of the following statements concerning antigenic drift in influenza viruses is correct?

- a. It results in major antigenic changes.
- b. It is exhibited only by influenza A viruses.
- c. It is caused by frameshift mutations in viral genes.
- d. It results in new subtypes over time.
- e. It affects predominantly the matrix protein.

4. A 32-year-old male physician developed a "flulike" syndrome with fever, sore throat, headache, and myalgia. To provide laboratory confirmation of influenza, a culture for the virus was ordered. Which of the following would be the best specimen for isolating the virus responsible for this infection?

- a. Stool
- b. Nasopharyngeal swab
- c. Vesicle fluid
- d. Blood
- e. Saliva.

11. A 53-year-old woman develops fever and focal neurologic signs. Magnetic resonance imaging shows a left temporal lobe lesion. Which of the following tests would be most appropriate to confirm a diagnosis of herpes simplex encephalitis in this patient?

- a. Brain biopsy
- b. Tzanck smear
- c. Polymerase chain reaction assay for viral DNA in cerebrospinal fluid
- d. Serologic test for viral IgM antibody

12. Vaccines have been demonstrated to be efficacious in preventing herpesvirus disease in which one of the following situations?

- a. Herpes simplex virus type 1 primary infection
- b. Herpes simplex virus type 2 reactivation
- c. Varicella-zoster reactivation
- d. Cytomegalovirus primary infection
- e. Epstein-Barr virus reactivation.

13. Each of the following statements concerning Epstein-Barr virus is correct except

- a. Many infections are mild or inapparent.
- b. The earlier in life primary infection is acquired, the more likely the typical picture of infectious mononucleosis will be manifest.
- c. Latently infected lymphocytes regularly persist after an acute episode of infection.
- d. Infection confers immunity against second episodes of infectious mononucleosis.

14. A 3-month-old infant had watery diarrhea and fever for 10 days. Rotavirus or adenovirus types 40 and 41 are the suspected agents. What type of specimen would be most appropriate for detection of adenovirus types 40 and 41 infection in this patient?

- a. Blood
- b. Urine
- c. Conjunctival swab
- d. Stool
- e. Throat swab

15. Which of the following groups of individuals is at the lowest risk of adenovirus disease?

- a. Healthy adults
- b. Young children
- c. Bone marrow transplant recipients
- d. Military recruits
- e. AIDS patients