

Comprehensive Clinical Science Sample Items

1. A clinical trial of a potentially valuable medical treatment is planned. It is unlikely that it will directly benefit the study subjects but very likely that it will benefit future patients. There is a risk for short-term minor gastric discomfort but essentially no risk for long-term adverse effects. The investigator concludes that disclosure of the risks may discourage participation in the trial. Which of the following is the most appropriate next step?
- (A) Proceed with the trial only with disclosure, because informed consent is an absolute requirement
 - (B) Proceed with the trial only with disclosure, because the trial will not directly benefit the subjects
 - (C) Proceed with the trial using only subjects who agree to participate without disclosure
 - (D) Proceed with the trial without disclosure, because the probability of long-term harm to subjects is remote
 - (E) Proceed with the trial without disclosure, because the risks to subjects are outweighed by the possible benefits to many patients

2. A 25-year-old man comes to the emergency department because of a 1-month history of fever, chills, nonproductive cough, and progressive shortness of breath; he now becomes short of breath after walking 20 feet. He has had a 4.5-kg (10-lb) weight loss during this period. He has not seen a physician for 10 years, and he takes no medications. He has a 10-year history of intravenous heroin use and shares needles. He is in mild respiratory distress while sitting. His temperature is 38.6°C (101.4°F), pulse is 92/min, respirations are 24/min, and blood pressure is 110/70 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 90%. There is no jugular venous distention. Diffuse crackles are heard bilaterally. There is no peripheral edema. An x-ray of the chest shows diffuse interstitial infiltrates bilaterally. This patient is most likely to have which of the following immunologic abnormalities?
- (A) Decreased B-lymphocyte count
 - (B) Decreased CD4+ T-lymphocyte count
 - (C) Decreased serum complement concentrations
 - (D) Decreased serum IgA concentration
 - (E) Decreased splenic opsonization
 - (F) IgG autoantibodies

3. A 27-year-old man is brought to the emergency department 20 minutes after his roommate found him unconscious on their bathroom floor. The patient has a history of intravenous heroin use. He has no history of serious illness and takes no medications. On arrival, he appears cyanotic. He is unresponsive to verbal and painful stimuli. His temperature is 37.1°C (98.8°F), pulse is 80/min, respirations are 4/min, and blood pressure is 110/60 mm Hg. Examination shows new and old needle tracks over the upper and lower extremities. Cardiopulmonary examination shows no abnormalities. Arterial blood gas analysis on room air shows:

pH	7.20
PCO ₂	80 mm Hg
PO ₂	50 mm Hg
HCO ₃ ⁻	29 mEq/L

Which of the following is the best explanation for this patient's hypoxemia?

- (A) Decreased inspired oxygen tension
- (B) Hypoventilation
- (C) Impaired diffusion capacity of the lung for carbon monoxide
- (D) Right-to-left shunt
- (E) Ventilation-perfusion mismatch

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4. A 15-year-old boy has had pain in the knee since sustaining an injury in a high school football game 6 weeks ago. The high school trainer has been treating him with heat and ultrasound, without significant improvement. Physical examination shows tenderness of the medial femur approximately 7.5 cm above the joint. There is no ligamentous instability, joint swelling, or effusion. Which of the following is the most appropriate next step in diagnosis?
- (A) Anteroposterior and lateral x-rays
 - (B) Arthrography
 - (C) Arthroscopy
 - (D) Measurement of serum calcium concentration
 - (E) Ultrasonography
5. A 2-week-old boy is brought to the physician because of a 3-day history of persistent discharge from his eyes. He was born at term following an uncomplicated pregnancy and delivery. Examination of the eyes shows tarsal inflammation and a thin mucopurulent discharge. Testing of scrapings from the tarsal conjunctivae is positive for *Chlamydia trachomatis*. The remainder of the examination shows no abnormalities. Which of the following is the most likely mode of transmission of this patient's infection?
- (A) Aerosol exposure
 - (B) Contact with maternal cervical secretions
 - (C) Exposure to household pets
 - (D) Poor hand washing by caregivers
 - (E) Transplacental transmission
6. A 62-year-old man comes to the physician because of blood in his urine for 24 hours. Vital signs are within normal limits. Examination shows no abnormalities. Tissue obtained on bladder biopsy shows transitional cell carcinoma. Abstinence from which of the following is most likely to have prevented this condition?
- (A) Alcohol
 - (B) Coffee
 - (C) Diet soda
 - (D) Tea
 - (E) Tobacco
7. A 21-year-old nulligravid woman who is not using contraception has had irregular menstrual periods since menarche at age 13 years. She has noted increased hair growth on her face and lower abdomen. On pelvic examination, there is copious cervical mucus and slightly enlarged irregular ovaries. Which of the following is the most likely cause of these findings?
- (A) Adrenal adenoma
 - (B) Idiopathic hirsutism
 - (C) Ovarian tumor
 - (D) Pituitary adenoma
 - (E) Polycystic ovarian syndrome
8. A 50-year-old man has a 1-hour history of unremitting chest pressure and "gassiness." He has no history of cardiac problems but does have a history of peptic ulcer disease. Physical examination shows no abnormalities except for a blood pressure of 140/80 mm Hg. Which of the following is the most appropriate initial step in diagnosis?
- (A) Test of the stool for occult blood
 - (B) ECG
 - (C) X-ray series of the upper gastrointestinal tract
 - (D) Echocardiography
 - (E) Endoscopy of the upper gastrointestinal tract

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9. A 32-year-old nulligravid woman comes to the physician because of a 20-minute episode of shortness of breath when she awoke this morning. Her only medication is an oral contraceptive. She has smoked one pack of cigarettes daily for 10 years. She is sexually active with multiple partners. Physical examination shows erythema, swelling, warmth, and tenderness behind the right knee; a cord-like mass can be palpated. Which of the following is the most likely diagnosis?
- (A) Corticosteroid-induced arthritis
 - (B) Gonococcal arthritis
 - (C) Pulmonary embolism
 - (D) Steroid-induced asthma
 - (E) Systemic lupus erythematosus
10. A 4030-g (8-lb 14-oz) newborn has internal rotation of the left upper extremity at the shoulder, extension at the elbow, pronation of the forearm, and flexion of the fingers following a low forceps delivery. He was born at term following an uncomplicated pregnancy. Passive range of motion of the left upper extremity is full; the newborn does not cry or grimace when the left arm, shoulder, or clavicle is palpated. Examination shows no other abnormalities. Which of the following is the most likely underlying mechanism of this condition?
- (A) Anterior dislocation of the left shoulder
 - (B) An inherited skeletal dysostosis
 - (C) Intracerebral hemorrhage
 - (D) Posterior dislocation of the cervical vertebrae
 - (E) Traction on the brachial plexus during delivery
11. A 72-year-old man comes for a routine health maintenance examination. He has a 5-year history of progressive difficulty falling asleep at night and waking up early in the morning. He has not had snoring, nightmares, or changes in appetite or weight. He has felt energized since starting a new business venture 8 months ago. He has hypertension treated with hydrochlorothiazide. He does not smoke cigarettes, drink alcohol, or use illicit drugs. His blood pressure is 145/88 mm Hg. The lungs are clear to auscultation. Cardiac examination shows an S₄ gallop. Laboratory studies are within normal limits. Which of the following is the most likely cause of this patient's insomnia?
- (A) Hypertension
 - (B) Hyperthyroidism
 - (C) Major depressive disorder
 - (D) Malignancy
 - (E) Sleep apnea
 - (F) Normal aging
13. A 22-year-old woman comes to the physician because of a 1-year history of intermittent lower abdominal cramps associated with bloating and mild nausea. The cramps are occasionally associated with constipation and bowel movements relieve the pain. She has not had any other symptoms. She has no history of serious illness and takes no medications. Her last menstrual period was 2 weeks ago. She appears well. Abdominal examination shows mild diffuse tenderness to palpation. Which of the following is the most likely diagnosis?
- (A) Crohn disease
 - (B) Irritable bowel syndrome
 - (C) Meckel diverticulum
 - (D) Peptic ulcer disease
 - (E) Ulcerative colitis

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14. A 10-year retrospective study is conducted to determine factors that could predispose women to have children with complex congenital heart disease. A total of 1000 women were asked whether they had flu-like symptoms during their first trimester. The investigators found that women who had children with complex congenital heart disease were five times more likely than women with healthy newborns to report flu-like symptoms in their first trimester. Which of the following features of this study is most likely to affect the validity of this conclusion?
- (A) Assessment bias
 - (B) Case mix bias
 - (C) Random error
 - (D) Recall bias
 - (E) Selection bias
15. An asymptomatic 32-year-old woman comes to the physician for a follow-up examination. She has a 10-month history of hypertension that has been difficult to control with medication. Current medications include metoprolol, lisinopril, hydrochlorothiazide, and nifedipine. Her blood pressure today is 170/110 mm Hg. Abdominal examination shows a bruit in the left upper quadrant. Which of the following is the most likely cause of this patient's hypertension?
- (A) Coarctation of the aorta
 - (B) Essential hypertension
 - (C) Hyperaldosteronism
 - (D) Hypercortisolism
 - (E) Hyperthyroidism
 - (F) Pheochromocytoma
 - (G) Pituitary adenoma
 - (H) Renal artery stenosis
16. Five days after falling and hitting her chest, a 55-year-old woman has acute midsternal chest pain that radiates to the back and is exacerbated by deep inspiration. Immediately following the accident, she had acute sternal pain that resolved in 1 day. Her temperature today is 37.7°C (99.9°F). A three-component scratchy sound is heard across the precordium. An x-ray of the chest shows a normal cardiac silhouette. An ECG shows diffuse ST-segment elevation and T-wave inversion. Which of the following is the most likely diagnosis?
- (A) Acute myocardial infarction
 - (B) Pleurodynia
 - (C) Purulent pericarditis
 - (D) Traumatic pericarditis
 - (E) Viral pericarditis
17. A 19-year-old primigravid woman comes to the physician for her first prenatal visit. Her last menstrual period was 18 weeks ago. Her pregnancy has been complicated by cocaine use. She has no history of serious illness and takes no medications. Her temperature is 36.7°C (98°F), pulse is 90/min, respirations are 16/min, and blood pressure is 110/50 mm Hg. Examination shows scleral icterus and poor dentition. The fundal height is 20 cm. The remainder of the examination shows no abnormalities. This patient is at greatest risk for which of the following conditions?
- (A) Abruptio placentae
 - (B) Gestational diabetes
 - (C) Macrosomia
 - (D) Pituitary infarction
 - (E) Postdates pregnancy

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18. A 37-year-old woman comes to the emergency department 40 minutes after the onset of shortness of breath, dizziness, and an itchy rash. She says she feels a lump in her throat. Her symptoms began while she was eating at a restaurant buffet. She has an allergy to peanuts. She is alert but anxious and in respiratory distress. Her temperature is 37°C (98.6°F), pulse is 120/min, respirations are 30/min, and blood pressure is 75/50 mm Hg. Examination shows an urticarial rash on the trunk and extremities. There is swelling of the lips but no swelling of the tongue or pharynx. Diffuse wheezing is heard bilaterally. In addition to intravenous 0.9% saline and an antihistamine, which of the following drugs should be administered immediately?
- (A) Diazepam
 - (B) Dobutamine
 - (C) Epinephrine
 - (D) Phentolamine
 - (E) No additional pharmacotherapy is indicated
19. Two days after beginning primaquine for malaria prophylaxis, a 17-year-old boy is brought to the physician because of dark urine and yellowing of his eyes. His pulse is 88/min, respirations are 12/min, and blood pressure is 124/68 mm Hg. Examination shows scleral icterus and pale mucous membranes. His hemoglobin concentration is 10 g/dL. A blood smear shows erythrocyte fragments and Heinz bodies. Which of the following is the most likely explanation for these findings?
- (A) Decreased porphobilinogen deaminase activity
 - (B) Decreased production of β -globin chains
 - (C) Deficiency of glucose 6-phosphate dehydrogenase
 - (D) Deficiency of glycosylphosphatidylinositol
 - (E) Fragmentation of erythrocytes by fibrin strands
20. A 17-year-old boy comes to the physician because he believes that his penis is too large. He has been uncomfortable with the size of his genitals since he underwent puberty 4 years ago. He is concerned that people will see the bulge of his genitals under his clothing. Although he has never had sexual intercourse, he is afraid that his size will make it difficult or painful for most women. He plays intramural basketball but no longer undresses in front of teammates or uses public showers. He has not had changes in sleep or appetite. He has no history of serious illness and takes no medications. He occasionally drinks one or two beers on weekends but uses no illicit drugs. He continues to receive mostly B and C grades in school. He is 183 cm (6 ft) tall and weighs 68 kg (150 lb); BMI is 20 kg/m². Sexual maturity rating is stage 4 for genital development. Physical examination shows no abnormalities. On mental status examination, he appears embarrassed, and he describes his mood as "okay." Which of the following is the most likely diagnosis?
- (A) Body dysmorphic disorder
 - (B) Delusional disorder
 - (C) Hypoactive sexual desire disorder
 - (D) Narcissistic personality disorder
 - (E) Schizoid personality disorder
 - (F) Sexual aversion disorder
 - (G) Social phobia

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Answer Form for Comprehensive Clinical Science Sample Questions

(Questions 1–20)

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Answer Key for Comprehensive Clinical Science Sample Questions

(Questions 1–20)

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| 1. | A | 11. | F |
| 2. | B | 12. | A |
| 3. | B | 13. | B |
| 4. | A | 14. | D |
| 5. | B | 15. | H |
| 6. | E | 16. | D |
| 7. | E | 17. | A |
| 8. | B | 18. | C |
| 9. | C | 19. | C |
| 10. | E | 20. | A |