
SUBJECT EXAMINATIONS

Content Outlines and Sample Items

National Board of Medical Examiners® (NBME®)



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BEHAVIORAL SCIENCES

Progression through life cycle	1%–5%
Psychological and social factors influencing patient behavior	5%–10%
Patient interviewing, consultation, and interactions with the family	10%–15%
Medical ethics, jurisprudence, and professional behavior	5%–10%
Nutrition including vitamin deficiencies and eating disorders	1%–5%
Central & peripheral nervous systems	50%–55%
Normal processes (brain stem, brain, motor systems, autonomic nervous systems)	5%–10%
Psychopathologic disorders	30%–40%
Principles of therapy and pharmacodynamic general principles	5%–10%
Gender, ethnic, and behavioral considerations affecting disease treatment and prevention (including psychosocial, cultural, occupational, and environmental)	5%–10%

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1. A well-dressed 35-year-old man comes to the physician requesting help in losing weight. When given options, he says that he cannot afford a diet high in protein and fresh vegetables and that he has bad legs and cannot exercise. He does not want to attend Weight Watchers, saying that he does not like group activities and that it is difficult for him to drive across town that often. The physician becomes angry and wonders if the patient really wants help. Which of the following personality disorders best explains this patient's behavior?
- (A) Antisocial
(B) Avoidant
(C) Borderline
(D) Obsessive-compulsive
(E) **Passive-aggressive**
2. A 50-year-old man develops difficulty walking while receiving drug therapy for paranoid behavior. Physical examination shows masked facies and diffuse muscle rigidity. He is slow in initiating movement and walks with a shuffling narrow-based gait. Which of the following drugs is the most likely cause of these findings?
- (A) Barbiturate
(B) Benzodiazepine
(C) Monoamine oxidase inhibitor
(D) **Phenothiazine**
(E) Tricyclic compound
3. A firstborn 1-year-old girl is hospitalized for evaluation of arrested growth. Pregnancy and delivery were uncomplicated, and development was normal initially. The infant is listless and has a diaper rash. She is below the 5th percentile for length and weight. No other abnormalities are noted. After 1 week of routine hospital care, the infant has gained 1 kg (2.2 lb) and has become more responsive. Which of the following is the most likely explanation for the arrested growth?
- (A) Hypothyroidism
(B) Infantile psoriasis
(C) Milk allergy
(D) **Parental neglect**
(E) Pyloric stenosis
4. A 32-year-old man comes to the physician because of a long-standing belief that he is being followed by foreign intelligence agents. He has not had hallucinations of any type. On mental status examination, no formal thought disorder or change in mood is detected. His level of functioning at work has remained high. Which of the following is the most likely diagnosis?
- (A) **Delusional disorder, persecutory type**
(B) Obsessive-compulsive disorder
(C) Panic disorder
(D) Schizophrenia, paranoid type
(E) Schizotypal personality disorder

5. The children of a 67-year-old woman ask their family physician for advice about their mother's behavior 4 weeks after the death of her husband of 40 years. They are concerned because she weeps whenever she comes upon an object in her home that she associates with him. Her appetite has decreased, and she has had a 2-kg (4.4-lb) weight loss. She awakens 1 hour before the alarm goes off each morning. She is able to care for herself. Although she does not leave her home for any social activities, she does enjoy visits from her family. Which of the following is the most likely explanation and appropriate management?
- (A) **Normal grief reaction, and she requires no medical attention**
 - (B) Normal grief reaction, and she would benefit from diazepam therapy
 - (C) Pathologic grief reaction, and she should be treated with an antidepressant
 - (D) Pathologic grief reaction, and she should be treated with psychotherapy
 - (E) Pathologic grief reaction, and she should be encouraged to move in with one of her children
6. A 15-year-old boy with generalized tonic-clonic seizures is brought to the physician by his mother for a follow-up examination. She says he has not been taking his medication regularly. In his presence, she explains to the physician that she is baffled by her son's behavior and "can't get him to take his pills, let alone take out the trash." Even after his mother leaves, the patient stares out the window and refuses to talk. Which of the following behaviors during the interview is most appropriate to assess the patient's compliance with this regimen?
- (A) Confront the patient about his poor behavior
 - (B) Explain the patient's resistance to him
 - (C) Laugh and joke with the patient
 - (D) Project a firm, businesslike manner
 - (E) **Project a respectful, tolerant attitude and encourage free discussion**

BIOCHEMISTRY

Gene expression: DNA structure, replication, and exchange	5%–10%
Gene expression: transcription (including defects)	5%–10%
Gene expression: translation (including defects)	5%–10%
Structure and function of proteins	5%–10%
Energy metabolism	15%–20%
Metabolic pathways of small molecules	15%–20%
Biology of cells	5%–10%
Human development and genetics	1%–5%
Biology of tissue response to disease	1%–5%
Nutrition	5%–10%
Pharmacodynamic and pharmacokinetic processes	1%–5%
Normal processes	10%–15%
Hematopoietic & lymphoreticular system	1%–5%
Central & peripheral nervous system	1%–5%
Endocrine system	5%–10%

1. In order to determine the rate of DNA synthesis in various mammalian tissues, the administration of which of the following labeled substances would be most specific in labeling DNA?
- (A) Adenosine
 (B) Cytosine
 (C) Guanosine
(D) Thymidine
 (E) Uridine
2. An otherwise healthy 20-year-old woman of Mediterranean descent is given sulfamethoxazole to treat a bladder infection. Three days after beginning the antibiotic regimen, the patient has moderately severe jaundice and dark urine. Pain with urination and a low-grade fever have resolved. Her hematocrit is 20%. Substantial numbers of erythrocytes contain Heinz bodies. Her condition worsens until day 6 of antibiotic therapy, when it begins to resolve. Symptoms are completely gone by day 9 of continued antibiotic therapy. Which of the following conditions is the most likely explanation for these findings?
- (A) Aplastic anemia
 (B) Generalized cytochrome-*b*₅ reductase deficiency
(C) Glucose 6-phosphate dehydrogenase deficiency
 (D) Pyruvate kinase deficiency
 (E) Systemic infection cured by antibiotic therapy
3. A married couple is screened to assess the risk for Tay-Sachs disease in their children. The activities of hexosaminidase A in the sera of the mother and father are 45% and 55%, respectively, of the reference value. The couple has one child. What is the probability of the child possessing one or more alleles of the Tay-Sachs mutation?
- (A) 0
 (B) 0.25
 (C) 0.5
(D) 0.75
 (E) 1.0
4. During normal screening for phenylketonuria, a male newborn has a serum phenylalanine concentration of 35 mg/dL (greater than 20 mg/dL is considered a positive test). Signs of tyrosine deficiency are also apparent. Enzymatic analysis using cultured fibroblasts, obtained after circumcision, show normal activity of phenylalanine hydroxylase. A possible explanation for these findings is a deficiency in function of which of the following coenzymes?
- (A) Adenosylcobalamin
(B) Biotin
 (C) Dihydroquinone
 (D) Pyridoxal phosphate
 (E) Tetrahydrofolic acid

5. A 45-year-old woman has the sudden onset of severe headaches. During one of these episodes, her blood pressure is 190/115 mm Hg. Her usual blood pressure is 130/90 mm Hg. Her sister had similar episodes several years ago. Urinalysis shows increased concentrations of metanephrine and vanillylmandelic acid. The patient is most likely to have a neoplasm that secretes which of the following?
- (A) ACTH
 - (B) Aldosterone
 - (C) Catecholamine**
 - (D) Cortisol
 - (E) Renin
6. An inherited disorder of carbohydrate metabolism is characterized by an abnormally increased concentration of hepatic glycogen with normal structure and no detectable increase in serum glucose concentration after oral administration of fructose. These two observations suggest that the disease is a result of the absence of which of the following enzymes?
- (A) Fructokinase
 - (B) Glucokinase
 - (C) Glucose 6-phosphatase**
 - (D) Phosphoglucomutase
 - (E) UDPG-glycogen transglucosylase

GROSS ANATOMY AND EMBRYOLOGY

GROSS ANATOMY

System

Hematopoietic & lymphoreticular	1%–5%
Central & peripheral nervous	10%–15%
Skin & related connective tissue	1%–5%
Musculoskeletal	20%–25%
Respiratory	5%–10%
Cardiovascular	15%–20%
Gastrointestinal	10%–15%
Renal/urinary	5%–10%
Reproductive	10%–15%
Endocrine	5%–10%

Process

Normal	60%–75%
Abnormal	25%–40%

EMBRYOLOGY

System

Hematopoietic & lymphoreticular	5%–10%
Central & peripheral nervous	5%–10%
Skin & related connective tissue	5%–10%
Musculoskeletal	5%–10%
Respiratory	5%–10%
Cardiovascular	5%–10%
Gastrointestinal	5%–10%
Renal/urinary	5%–10%
Reproductive	5%–10%
Endocrine	5%–10%

Process

Normal	100%
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HUMAN DEVELOPMENTAL BIOLOGY

Human Development and Genetics	(100%)
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- A 45-year-old woman has a uterine leiomyoma that is 5 cm in diameter and is pressing on the urinary bladder, causing urinary frequency. Which of the following is the most likely location of the leiomyoma?
 - Cervical canal
 - Lateral margin of the uterine cavity
 - Subendometrially in the uterine cavity
 - (D) Subperitoneally on the anterior surface of the uterine corpus**
 - Subperitoneally on the posterior surface of the uterine fundus
 - A 6-year-old boy has a large intra-abdominal mass in the midline just above the symphysis pubis. During an operation, a cystic mass is found attached to the umbilicus and the apex of the bladder. Which of the following is the most likely diagnosis?
 - Hydrocele
 - Meckel's cyst
 - Meckel's diverticulum
 - Omphalocele
 - (E) Urachal cyst**
 - A 3-year-old girl with mild craniofacial dysmorphism has profound hearing deficits. Further evaluation indicates profound sensory auditory deficits and vestibular problems. Altered development of which of the following is most likely to account for these observations?
 - Ectodermal placode
 - Intermediate mesoderm
 - Lateral plate mesoderm
 - (D) Neural crest cell**
 - Paraxial mesoderm
 - Prochordal mesoderm
 - A 22-year-old man is brought to the emergency department because of a suprahyoid stab wound that extends from one side of the neck to the other. His tongue deviates to the right when protruded; there is no loss of sensory modality on the tongue. The injury most likely involves which of the following nerves?
 - Left hypoglossal
 - (B) Right hypoglossal**
 - Right glossopharyngeal
 - Right lingual
 - Left vagus

5. A 70-year-old man has a 90% blockage at the origin of the inferior mesenteric artery. He does not have intestinal angina. Which of the following arteries is the most likely additional source of blood to the descending colon?
- (A) Left gastroepiploic
 - (B) Middle colic**
 - (C) Sigmoid
 - (D) Splenic
 - (E) Superior rectal
6. A 60-year-old man has tenderness in the region distally between the tendons of the extensor pollicis longus and extensor pollicis brevis (anatomic snuff box) after falling on the palm of his right hand. A fracture of which of the following carpal bones is most likely in this patient?
- (A) Hamate
 - (B) Lunate
 - (C) Scaphoid**
 - (D) Trapezium
 - (E) Triquetrum
7. A 7-year-old boy tires easily while running. On auscultation, a harsh continuous murmur is heard at the left of the sternum between the first two ribs. Arterial blood oxygen content is slightly higher in the right hand than in the left hand. X-ray films of the chest show no abnormalities. Which of the following is the most likely diagnosis?
- (A) Anomalous return of pulmonary blood to the right atrium
 - (B) Patent ductus arteriosus**
 - (C) Patent foramen ovale
 - (D) Stenosis of the aortic valve
 - (E) Tricuspid atresia

HISTOLOGY AND CELL BIOLOGY

<i>General Principles</i>	30%–35%
Biochemistry and molecular biology	1%–5%
Cell biology	25%–30%
Signal transduction	1%–5%
Cell components	5%–10%
Nucleus	1%–5%
Cytoskeleton	1%–5%
Secretion and exocytosis, endocytosis, transcytosis	1%–5%
Cell cycle, mitosis, meiosis	5%–10%
Epithelial cells	5%–10%
Muscle cells	1%–5%
Human development and genetics	1%–5%
Biology of tissue response	1%–5%
Immune responses	1%–5%
<i>Organ Systems</i>	
Hematopoietic & lymphoreticular	1%–5%
Central & peripheral nervous	10%–15%
Skin & related connective tissue	5%–10%
Musculoskeletal	5%–10%
Respiratory	5%–10%
Cardiovascular	5%–10%
Gastrointestinal	5%–10%
Renal/urinary	5%–10%
Reproductive	5%–10%
Endocrine	5%–10%

1. A 55-year-old woman notes a gradually increasing number of episodes of cramping abdominal pain and diarrhea that occur after ingestion of milk products. A decrease in which of the following best explains her condition?

(A) Ability of enterocytes to transport calcium
 (B) Ability of Paneth cells to secrete lactase
 (C) Ability of Paneth cells to secrete lysozyme
(D) β -Galactosidase activity at the cell surface of enterocytes
 (E) Sucrase activity within lysosomes of enterocytes
2. A 40-year-old woman has reduced two-point discrimination on the distal phalanges of her fingers. Which of the following skin cell types is most likely affected in this patient?

(A) Keratinocytes
 (B) Langerhans' cells
 (C) Lymphocytes
 (D) Melanocytes
(E) Merkel's cells
3. A 35-year-old man develops erosive lesions in his cartilaginous nasal septum as a result of inhaling cocaine. Which of the following types of collagen makes up the matrix fibers that are liberated during this septal degradation?

(A) I
(B) II
 (C) III
 (D) IV
 (E) V
 (F) X
4. A 12-year-old girl with chronic asthma is coughing up large amounts of mucus. Which of the following respiratory structures are the most likely source of the mucus?

(A) Alveolar ducts
 (B) Alveolar sacs
 (C) Respiratory bronchioles
 (D) Terminal bronchioles
(E) Tertiary bronchi

5. After swimming in cool water, a woman with fair complexion notes that her skin becomes pale and cold because the blood is diverted away from the capillary bed in the superficial layers of the dermis. Which of the following structures are most likely responsible for this diversion?

- (A) Arterioles
- (B) Arteriovenous shunts**
- (C) Capillaries
- (D) Muscular venules
- (E) Sinusoids

MICROBIOLOGY

Microbiology Module

<i>General Principles</i>	65%–70%
Biochemistry, Molecular Biology, Genetics	5%–10%
Tissue Response to Disease	1%–5%
Pharmacodynamic/Pharmacokinetic Processes	1%–5%
Microbial Biology and Infection	50%–55%
Microbial classification and its basis	1%–5%
Bacteria and bacterial diseases	25%–30%
Viruses and viral diseases	20%–25%
Fungi and fungal infections	1%–5%
Parasites and parasitic diseases	1%–5%
Principles of sterilization and pure culture technique	1%–5%
Immune Responses	1%–5%
 <i>Organ Systems</i>	 10%–15%
Hematopoietic & lymphoreticular	1%–4%
Central & peripheral nervous	1%–4%
Skin & related connective tissue	1%–4%
Musculoskeletal	1%–4%
Respiratory	1%–4%
Cardiovascular	1%–4%
Gastrointestinal	1%–4%
Renal/urinary	1%–4%
Reproductive	1%–4%
 <i>Immunology Module (25 items)</i>	
Immunologic Processes	12%–15%
Immunologic Diseases	8%–10%

- A 45-year-old woman comes to the physician because of progressive facial swelling and pain during the past week. She has a 10-year history of poorly controlled type 1 diabetes mellitus. Physical examination shows ecchymoses over the left orbital and periorbital regions with proptosis. There is a necrotic lesion with a black eschar in the left nares. Findings on microscopic examination of material from the lesion include broad, irregularly shaped, nonseptate hyphae with branches at right angles. Which of the following is the most likely cause of the nasal lesion?

(A) *Histoplasma capsulatum*
(B) *Rhizopus oryzae*
(C) *Sporothrix schenckii*
(D) *Torulopsis glabrata*
(E) *Trichophyton rubrum*
- Bacterium Y acquires resistance to streptomycin from bacterium X after 24 hours of cocultivation of the two bacterial strains. Acquisition of resistance is not affected by incubation of bacteria with DNase, but it is abolished by separation of donors and recipients by a filter with pores of 0.45 μ in diameter. This is an example of DNA exchange by which of the following processes?

(A) **Conjugation**
(B) Transduction
(C) Transfection
(D) Transformation
(E) Transposition

3. A 35-year-old woman delivers a neonate who develops meningitis. The mother has a streptococcus isolated from her vagina. The organism agglutinates with antiserum directed against type B surface carbohydrate. The virulence of this organism is related to a bacterial constituent that interferes with which of the following host phagocyte functions?
- (A) Aggregation
 - (B) Chemotaxis
 - (C) Ingestion**
 - (D) Intracellular killing
 - (E) Pseudopod formation
4. Three weeks after traveling to California to study desert flowers, a 33-year-old man develops fever, chest pain, and muscle soreness. Two days later, red, tender nodules appear on the shins, and the right ankle is tender and painful. An x-ray film of the chest shows a left pleural effusion. Which of the following is the most likely diagnosis?
- (A) Blastomycosis
 - (B) Coccidioidomycosis**
 - (C) Histoplasmosis
 - (D) *Mycobacterium marinum* infection
 - (E) *Mycoplasma pneumoniae* infection
5. At a banquet, the menu includes fried chicken, home-fried potatoes, peas, chocolate eclairs, and coffee. Within 2 hours, most of the diners become violently ill, with nausea, vomiting, abdominal pain, and diarrhea. Analysis of the contaminated food is most likely to yield large numbers of which of the following organisms?
- (A) *Enterococcus faecalis*
 - (B) *Escherichia coli*
 - (C) *Proteus mirabilis*
 - (D) *Salmonella typhimurium*
 - (E) Staphylococcus aureus**
6. A 2-year-old child has a history of multiple bacterial infections beginning at about 6 months of age. His immunoglobulin concentrations are <1% of normal, except for IgM, which is 10 times normal. These data suggest a defect at which level of development of B lymphocytes?
- (A) Antigen presentation
 - (B) Class switching**
 - (C) Migration from bone marrow
 - (D) Production in bone marrow
 - (E) VJ or VDJ rearrangement
7. A 35-year-old woman is admitted to the hospital because of fever and dry cough for 3 days. An x-ray film of the chest shows abnormal findings. Laboratory tests show cold agglutinating antibodies in serum. Results of routine cultures of blood and sputum are negative. Which of the following is the most likely pathogen?
- (A) Influenza virus
 - (B) *Mycobacterium tuberculosis*
 - (C) Mycoplasma pneumoniae**
 - (D) *Staphylococcus aureus*
 - (E) *Streptococcus pneumoniae*
8. A mutation that causes the loss of the 3', 5' exonuclease activity of DNA-dependent DNA polymerase is most likely to also cause *Escherichia coli* to have problems with which cellular process?
- (A) Replacing misincorporated bases**
 - (B) Segregating sister chromosomes
 - (C) Supercoiling of DNA
 - (D) Synthesizing an RNA primer
 - (E) Transferring DNA strands during conjugation

NEUROSCIENCE

Biology of cells (signal transduction, muscle cells)	1%–5%	Abnormal processes	25%–30%
Central/peripheral nervous system	95%–99%	Infectious, inflammatory, immunologic disorders	1%–5%
Normal processes	65%–70%	Traumatic/mechanical disorders	1%–5%
Embryonic development	1%–5%	Neoplastic disorders	1%–5%
Organ structure and function	50%–55%	Metabolic/regulatory disorders	1%–5%
Spinal cord	5%–10%	Vascular disorders	1%–5%
Brain stem	5%–10%	Systemic disorders	1%–5%
Brain	5%–10%	Idiopathic disorders	1%–5%
Sensory systems	5%–10%	Congenital/metabolic disorders	1%–5%
Motor systems	5%–10%	Degenerative disorders	1%–5%
Autonomic nervous systems	1%–5%	Paroxysmal disorders	1%–5%
Peripheral nerve	1%–5%	Disorders of the special senses	1%–5%
Cell/tissue structure and function	5%–10%	Principles of therapeutics	1%–5%
Repair, regeneration, and changes associated with stage of life	1%–5%		

NEUROPATHOLOGY

Nutrition	1%–5%
Central/peripheral nervous system	95%–99%
Infectious, inflammatory, immunologic disorders	20%–25%
Traumatic/mechanical disorders	1%–5%
Neoplastic disorders	20%–25%
Vascular disorders	15%–20%
Congenital/metabolic disorders	5%–10%
Degenerative disorders	20%–25%

PSYCHOPATHOLOGY/PSYCHOPHARMACOLOGY

Personality traits or coping style	1%–5%
Central/peripheral nervous system	95%–99%
Psychopathologic disorders	70%–75%
Early-onset disorders	1%–5%
Substance use disorders	10%–15%
Schizophrenia	10%–15%
Mood disorders	15%–20%
Anxiety disorders	10%–15%
Somatoform disorders	1%–5%
Physical and sexual abuse	5%–10%
Other disorders	1%–5%
Psychopharmacologic agents	20%–25%

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1. A 43-year-old man sustains a wound to the lateral neck. This results in weakness of elevation and retraction of the shoulder on the ipsilateral side and difficulty turning the head up and toward the contralateral side. No sensory changes are present. Which of the following nerves most likely has been injured?
- (A) Axillary
 (B) Lateral cord of the brachial plexus
 (C) Phrenic
 (D) **Spinal accessory**
 (E) Suprascapular
2. A 53-year-old woman dies 4 days after an automobile collision. She sustained multiple injuries including a femoral fracture. Widespread petechiae are found in the cerebral white matter at autopsy. Which of the following is the most likely cause of these findings?
- (A) Acute respiratory distress syndrome
 (B) Contrecoup injury
 (C) **Fat embolization**
 (D) Septicemia
 (E) Subdural hematoma

3. A 65-year-old man has loss of pain and temperature sensation on the right side of the face and from the neck down on the left. Examination shows partial paralysis of the soft palate, larynx, and pharynx, and ataxia, all on the right. The most likely cause of these findings is thrombosis to which of the following arteries?
- (A) Basilar
 - (B) Right posterior inferior cerebellar**
 - (C) Left posterior inferior cerebellar
 - (D) Right superior cerebellar
 - (E) Left superior cerebellar
4. A 50-year-old man has had gradually progressive hand weakness. He has atrophy of the forearm muscles, fasciculations of the muscles of the chest and arms, hyperreflexia of the lower limbs, and extensor plantar reflexes. Sensation is not impaired. Which of the following is the most likely diagnosis?
- (A) Amyotrophic lateral sclerosis**
 - (B) Dementia, Alzheimer's type
 - (C) Guillain-Barré syndrome
 - (D) Multiple cerebral infarcts
 - (E) Multiple sclerosis
5. Drug X applied to a nerve axon decreases the duration of the action potential without affecting the resting potential or peak amplitude of the action potential. Which of the following is the most likely mechanism of action of Drug X?
- (A) Block of voltage-dependent Na⁺ permeability
 - (B) Decrease in the rate of Na⁺ inactivation
 - (C) Decrease in voltage-dependent Na⁺ permeability
 - (D) Increase in the rate of voltage-dependent changes in K⁺ permeability**
 - (E) Inhibition of the Na⁺-K⁺ pump

PATHOLOGY

<i>General Principles</i>	35%–40%
Cell Biology	1%–5%
Human Development and Genetics	1%–5%
Biology of Tissue Response	10%–15%
Multisystem Processes	5%–10%
Microbial Biology and Infection	1%–5%
Immune Responses	5%–10%
<i>Organ Systems</i>	60%–65%
Hematopoietic & lymphoreticular	5%–10%
Central & peripheral nervous	5%–10%
Skin & related connective tissue	5%–10%
Musculoskeletal	1%–5%
Respiratory	1%–5%
Cardiovascular	5%–10%
Gastrointestinal	5%–10%
Renal/urinary	5%–10%
Reproductive	5%–10%
Endocrine	1%–5%

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1. A 16-year-old boy is undergoing evaluation for jaundice. Laboratory studies show normal hepatic enzyme activities, a negative direct antiglobulin (Coombs') test, increased mean corpuscular hemoglobin concentration, and increased osmotic fragility of erythrocytes. Which of the following types of erythrocyte is most likely to be seen on a peripheral blood smear?
- (A) Ovalocyte
 (B) Schistocyte
 (C) **Spherocyte**
 (D) Target cell
 (E) Teardrop cell
2. At autopsy, the heart of a 30-year-old man weighs 550 g. The left ventricle is dilated and hypertrophied. The aortic root is markedly dilated, and the aortic valve cusps are intact. The external iliac arteries contain irregular, focal cystic areas within the media with pools of mucopolysaccharide and fraying fragmentation of the elastica. Which of the following is the most likely diagnosis?
- (A) Ankylosing spondylitis
 (B) Cardiovascular syphilis
 (C) **Marfan's syndrome**
 (D) Osteogenesis imperfecta, type II (recessive)
 (E) Systemic lupus erythematosus
3. A 45-year-old man with chronic pancreatitis has a 9-kg (20-lb) weight loss and diarrhea. Analysis of a 24-hour stool sample shows 28 g of fat. A deficiency of which of the following enzymes is the most likely cause?
- (A) Amylase
 (B) Carboxypeptidase
 (C) Lactase
 (D) **Lipase**
 (E) Lipoprotein lipase
4. An autopsy of a 24-year-old woman shows pleuritis, membranous thickening of glomerular capillary walls, concentric rings of collagen around splenic arterioles, and excrescences on the underside of the mitral valve. Analysis of blood is most likely to show which of the following?
- (A) **Antinuclear antibody**
 (B) Increased C3 concentration
 (C) Lymphocytosis
 (D) Monoclonal gammopathy
 (E) Positive bacterial cultures

5. A 62-year-old man who has smoked 2 packs of cigarettes daily for 40 years develops shortness of breath, cough, and weight loss. An x-ray film of the chest shows a large mass in the right upper lobe of the lung, and sputum cytology discloses malignant cells consistent with squamous cell carcinoma. Serum studies show:

Ca ²⁺	13.2 mg/dL
Phosphorus	1.9 mg/dL
Urea nitrogen (BUN)	12.2 mg/dL
Creatinine	0.8 mg/dL
Alkaline phosphatase	17 U/L

Normal serum concentrations of middle and C-terminal parathyroid hormone (PTH) are detected by radioimmunoassay. Which of the following best explains the serum calcium and phosphorus concentrations?

- (A) Production of intact PTH by an ectopic neoplasm
- (B) Production of interleukin-1 (IL-1) by a neoplasm
- (C) Production of PTH-like humoral factor by a neoplasm**
- (D) Renal phosphate retention with compensatory hyperparathyroidism
- (E) Skeletal metastases with bone resorption

6. A 2-year-old boy has eczema and recurrent skin infections. Laboratory studies show thrombocytopenia and defects in T and B lymphocytes. Which of the following is the most likely diagnosis?

- (A) Chédiak-Higashi syndrome
- (B) Granulomatous disease of childhood
- (C) Thymic dysplasia
- (D) Wiskott-Aldrich syndrome**
- (E) X-linked agammaglobulinemia

PHARMACOLOGY

<i>General Principles</i>	40%–45%
Pharmacokinetics, Pharmacodynamics	5%–10%
Antimicrobial Drugs	10%–15%
Carcinogens, Environmental Insults, Antineoplastic/Immunosuppressant Drugs	5%–10%
<i>Organ Systems (including mechanism of action, therapy, adverse effect)</i>	55%–60%
Hematopoietic & lymphoreticular	5%–10%
Central & peripheral nervous	35%–40%
Anesthetics	1%–5%
Hypnotics	1%–5%
Psychopharmacologic agents	1%–5%
Anticonvulsants	1%–5%
Stimulants, amphetamines	1%–5%
Antiparkinsonian drugs	1%–5%
Botulinum toxin	1%–5%
Neuromuscular junction blocking agents	1%–5%
Antiglaucoma drugs	1%–5%
Drugs used to decrease intracranial pressure	1%–5%
Antimigraine agents	1%–5%
Drugs affecting autonomic nervous system	5%–10%
Skin & related connective tissue	1%–5%
Musculoskeletal	1%–5%
Respiratory	1%–5%
Cardiovascular	15%–20%
Gastrointestinal	1%–5%
Renal/urinary	5%–10%
Reproductive	1%–5%
Endocrine	1%–5%

-
1. Ten months after starting procainamide therapy for cardiac arrhythmias, a 56-year-old man develops arthritis and other symptoms consistent with drug-induced systemic lupus erythematosus. Results of a blood test are positive for antinuclear antibodies. This finding is consistent with which of the following genetic polymorphisms in drug metabolism?
- (A) Debrisoquine 4-hydroxylase deficiency
 (B) Erythrocyte catechol-*O*-methyltransferase deficiency
 (C) Glucose 6-phosphate dehydrogenase deficiency
 (D) Phenytoin hydroxylase deficiency
 (E) **Slow acetylator phenotype**
2. A 42-year-old woman who is a biochemist is brought to the emergency department because of a 1-hour history of severe abdominal cramps, nausea and vomiting, hypotension, bradycardia, sweating, and difficulty breathing due to bronchospasm and congestion. Exposure to which of the following is most likely?
- (A) Acrylamide
 (B) Cyanogen bromide
 (C) **Isoflurophate (DFP)**
 (D) Phentolamine
 (E) Propranolol

3. A 53-year-old woman is brought to the emergency department because of dizziness, dry mouth, and nasal stuffiness for 4 hours. Physical examination shows dry skin, dilated pupils, severe postural hypotension, and a rapid pulse. There is a fine tremor and muscular rigidity. Her speech is sometimes irrational. While trying to get up, she faints. Which of the following drugs is the most likely cause of these findings?
- (A) Chlorothiazide
(B) Chlorpromazine
 (C) Nitroglycerin
 (D) Phenytoin
 (E) Tubocurarine
4. A 45-year-old man with cardiogenic shock is treated with drug X. This drug increases blood flow through the mesenteric and renal vascular beds, activates α_1 -adrenergic receptors in several other vascular beds, and directly and indirectly stimulates β_1 -adrenergic receptors in the myocardium. Drug X increases blood flow through the mesenteric and renal vascular beds by activating which of the following receptors?
- (A) α -Adrenergic
 (B) β -Adrenergic
(C) Dopaminergic
 (D) Muscarinic-cholinergic
 (E) Serotonergic
5. A 23-year-old man who is seropositive for HIV has *Pneumocystis carinii* pneumonia. Therapy is started with trimethoprim-sulfamethoxazole, and his pneumonia resolves. The pharmacotherapy was effective because of inhibition of which of the following?
- (A) Cell wall synthesis
(B) Dihydrofolate reductase
 (C) Incorporation of *p*-aminobenzoic acid
 (D) Incorporation of sterol into membranes
 (E) Topoisomerase II
6. A 20-year-old woman comes to the emergency department after ingesting at least 30 tablets of an unknown drug. Initial physical examination shows no abnormalities. Thirty-six hours later, serum aspartate aminotransferase (AST, GOT) activity is 1500 U/L, and serum alanine aminotransferase (ALT, GPT) activity is 2000 U/L. The drug she ingested is most likely which of the following?
- (A) Acetaminophen**
 (B) Aspirin
 (C) Chlorpheniramine
 (D) Ibuprofen
 (E) Prednisone

PHYSIOLOGY

Physiology

Cell Biology	10%–15%
Multisystem Processes (Nutrition, Acid-Base, Temperature/Environment)	10%–15%
Organ Systems	
Skin & related connective tissue	1%–5%
Musculoskeletal	1%–5%
Respiratory	5%–10%
Cardiovascular	15%–20%
Gastrointestinal	10%–15%
Renal/urinary	15%–20%
Reproductive	5%–10%
Endocrine	5%–10%

Neurophysiology (25 items optional)

Nerve Organ Structure and Function (brain, sensory systems, motor systems, autonomic nervous system)	45%–50%
Nerve Cell/Tissue Structure and Function (neurons, neurotransmitters, brain metabolism, glia/myelin, brain homeostasis)	50%–55%

- A hormone is known to activate phospholipase C with subsequent release of calcium from internal stores. The release of calcium most likely occurs as a result of an increase in the concentration of which of the following intracellular second messengers?

(A) Calcium
(B) cAMP
(C) cGMP
(D) Diacylglycerol
(E) Inositol 1,4,5-trisphosphate
- A 5-year-old girl falls through the ice while skating on an outdoor pond. She is removed from the water within 1 minute, but dry clothing is not available, and she is still cold and wet 20 minutes later. Which of the following mechanisms helps maintain her core temperature during the period following her rescue?

(A) Cutaneous vasodilation
(B) Diving response
(C) Increased thermoregulatory set point
(D) Release of endogenous pyrogen
(E) Shivering
- A 60-year-old man comes to the physician because of a 6-month history of gradual progression of fatigue and a 4.5-kg (10-lb) weight gain. He has had only occasional shortness of breath during this period. He has smoked 2 packs of cigarettes daily for 35 years. Physical examination shows ankle edema. Crackles are heard at the lung bases. Which of the following is most likely to be decreased in an arterial blood sample?

(A) Bicarbonate concentration
(B) Erythropoietin activity
(C) Hematocrit
(D) PO₂
- After an overnight fast, a 52-year-old man undergoes infusion of acid through a catheter into the upper duodenum. This most likely will increase pancreatic secretion mainly through the action of which of the following substances?

(A) Cholecystokinin
(B) Gastrin
(C) Glucagon
(D) Secretin
(E) Vasoactive intestinal polypeptide

5. A 35-year-old man has an adenoma of the parathyroid gland, with increased serum concentrations of parathyroid hormone (PTH) and calcium. In this patient, PTH induces which of the following processes to cause hypercalcemia?
- (A) Production of 25-hydroxycholecalciferol
 - (B) Shift of Ca^{2+} from the intracellular to the extracellular fluid compartment
 - (C) Stimulation of osteoclast activity**
 - (D) Suppression of renal production of 1,25-dihydroxycholecalciferol

CLINICAL NEUROLOGY

<i>General Principles</i>	1%–5%
<i>Organ Systems</i>	
Mental Disorders	5%–10%
Diseases of the Nervous System and Special Senses	
Promoting Health and Health Maintenance	5%–10%
Understanding Mechanisms of Disease	15%–20%
Establishing a Diagnosis	
Disorders of the special senses	1%–5%
Structural disorders (trauma, cerebrovascular disease, infections)	10%–15%
Toxic, metabolic, and degenerative disorders	5%–10%
Paroxysmal and sleep disorders	1%–5%
Neuromuscular disorders	10%–15%
Applying Principles of Management	15%–20%
Other Organ Systems	5%–10%

- A 39-year-old man is brought to the hospital by his brother for evaluation of increasing forgetfulness and confusion over the past month. His brother reports that the patient has been drinking heavily and eating very little, and he has been slightly nauseated and tremulous. He wanders at night because he cannot sleep. On admission to the hospital, intravenous administration of 5% dextrose in water is initiated. Two hours later, the patient has ophthalmoplegia and is completely confused. Which of the following is the most appropriate next step in management?

 - Administration of an anticoagulant
 - Administration of diazepam
 - Administration of large doses of vitamin B₁ (thiamine), intravenously**
 - Administration of large doses of vitamin C, intravenously
 - Continued administration of intravenous fluids with magnesium
- A 45-year-old man has had a 1-week history of increasing neck pain when he turns his head to the right. He has also had a pins-and-needles sensation starting in the neck and radiating down the right arm into the thumb. His symptoms began 3 months ago when he developed severe pain in the neck and right shoulder. Neurologic examination shows limitation of motion on turning the neck to the right. There is 4+/5 weakness of the right biceps and decreased pinprick over the right thumb. Deep tendon reflexes are 1+ in the right biceps and brachioradialis; all others are 2+. Which of the following is the most likely diagnosis?

 - Carpal tunnel syndrome
 - Cervical root compression**
 - Multiple sclerosis
 - Thoracic outlet syndrome
 - Ulnar nerve compression

- (A) Alcohol-induced amnestic episode (blackout)
- (B) Alcohol withdrawal
- (C) Apathetic hyperthyroidism
- (D) Bipolar disorder, depressed
- (E) Delirium due to a medical condition
- (F) Dementia, alcohol-related
- (G) Dementia, Alzheimer's type
- (H) Generalized anxiety disorder
- (I) Masked depression
- (J) Medication toxicity
- (K) Normal age-associated memory decline
- (L) Normal pressure hydrocephalus
- (M) Parkinson's disease
- (N) Pick's disease
- (O) Pseudodementia
- (P) Residual schizophrenia
- (Q) Multi-infarct (vascular) dementia

For each patient with a memory problem, select the most likely diagnosis.

3. A 29-year-old woman with an 11-year history of bipolar disorder comes to the physician because she is concerned about memory loss over the past 2 weeks. She has had difficulty remembering appointments that she has made, and on one occasion, she got lost going to the health club where she has been a member for years. She has taken lithium carbonate for 8 years, and she has been taking a friend's diuretic for perimenstrual weight gain over the past 3 months. Physical examination shows a resting tremor of both hands and mild ataxia. On mental status examination, she is oriented to person, place, and time, but recalls only one of three objects at 5 minutes.

Answer=J

4. A 63-year-old man is brought to the physician by his daughter because she is concerned about his memory loss over the past year. Yesterday he could not remember his 18-month-old granddaughter's name. Although he denies that there is any problem, she says he has been forgetful and becomes easily confused. There is no history of alcohol abuse. His temperature is 37 C (98.6 F), blood pressure is 118/84 mm Hg, pulse is 77/min, and respirations are 12/min. On mental status examination, his mood is normal. He is oriented to person and place but initially gives the wrong month, which he is able to correct. He recalls memories from his youth in great detail but only recalls one of three words after 5 minutes. He has difficulty recalling the names of common objects and does not remember the name of the current US President. Physical examination, laboratory studies, and thyroid function tests show no abnormalities.

Answer=G

5. A 65-year-old man has had increasingly severe headaches and diffuse myalgias over the past 3 months. Over the past month, he has had jaw pain when chewing food and decreasing visual acuity in his left eye. His temperature is 38 C (100.4 F). Visual acuity in his left eye is 20/100, and the left optic disc is slightly atrophic. His muscle strength is normal. Which of the following tests should be obtained next?

- (A) **Measurement of erythrocyte sedimentation rate**
- (B) Antinuclear antibody assay
- (C) Examination of cerebrospinal fluid
- (D) CT scan of the head
- (E) Electroencephalography

FAMILY MEDICINE

The Family Medicine examination predominantly comprises patient encounters in an ambulatory setting.

Distribution Across Age Groups

Childhood	5%–15%
Adolescence	5%–10%
Adulthood	65%–75%
Geriatric	5%–15%

General Principles

Infancy and childhood (normal growth and development)	1%–5%
Adolescence (sexuality, separation from parents/autonomy; puberty)	
Senescence (normal physical and mental changes associated with aging)	
Medical Ethics and Jurisprudence	

Organ Systems

Immunologic Disorders	5%–10%
Diseases of the Blood and Blood-forming Organs	5%–10%
Mental Disorders	5%–10%
Diseases of the Nervous System and Special Senses	5%–10%
Cardiovascular Disorders	10%–15%
Diseases of the Respiratory System	10%–15%
Nutritional and Digestive Disorders	10%–15%
Gynecologic Disorders	5%–10%
Renal, Urinary, and Male Reproductive System	5%–10%
Disorders of Pregnancy, Childbirth, and the Puerperium	1%–5%
Disorders of the Skin and Subcutaneous Tissues	1%–5%
Diseases of the Musculoskeletal System and Connective Tissue	5%–10%
Endocrine and Metabolic Disorders	5%–10%

Physician Tasks

Promoting Health and Health Maintenance	15%–20%
Understanding Mechanisms of Disease	20%–25%
Establishing a Diagnosis	35%–40%
Applying Principles of Management	20%–25%

- An 18-year-old college student is brought to the emergency department by her friend because she has been crying for 3 hours. The friend reports that earlier in the day, the patient gave away her books, furniture, and other personal items as gifts to friends and spent the rest of the day writing letters and crying. The patient states that she is displeased with her academic performance and upset about a recent failed relationship. She has not been sleeping well. Which of the following is the most appropriate next step in management?
 - Recommend a study skills course
 - Arrange a family conference
 - Prescribe a benzodiazepine
 - Prescribe a tricyclic antidepressant
 - Immediate psychiatric evaluation**
- A 38-year-old woman has had eight to ten episodes of shortness of breath over the past 2 years. The episodes begin with a sensation of tightness in the chest that gradually increases over 24 hours and lasts up to 2 days. Audible wheezing and a slight cough occur during severe episodes. She feels well between episodes. Physical examination shows no abnormalities except mild prolongation of expiration. Which of the following is the most likely diagnosis?
 - Chronic aspiration
 - Congestive heart failure
 - Hyperventilation syndrome
 - Intrinsic asthma**
 - Periarthritis nodosa

3. A 50-year-old man has had progressive weakness and dyspnea with exertion for 3 months. He appears malnourished; the conjunctivae are pale, and there are scattered petechiae. Laboratory studies show:

Hemoglobin	6 g/dL
Mean corpuscular volume	115 μm^3
Leukocyte count	2500/mm ³ with hypersegmented neutrophils
Reticulocyte count	0.5%
Platelet count	60,000/mm ³

The most likely cause of his condition is a deficiency of which of the following?

- (A) Folic acid
 - (B) Iron
 - (C) Vitamin B₁ (thiamine)
 - (D) Vitamin B₆
 - (E) Vitamin C
4. A 27-year-old man has a 5-day history of mucoid urethral discharge, dysuria, and urethral pruritus. A tentative diagnosis of gonococcal urethritis is made. Treatment is started with ceftriaxone while awaiting results of a urethral culture. Three days later, the laboratory report shows the culture to be negative for *Neisseria gonorrhoeae*. His symptoms remain unchanged. Treatment should be directed at which of the following organisms?

- (A) *Chlamydia trachomatis*
- (B) *Escherichia coli*
- (C) *Haemophilus ducreyi*
- (D) Herpes simplex virus 2
- (E) *Ureaplasma urealyticum*

5. A 14-year-old boy with a 9-year history of type 1 diabetes mellitus has become increasingly noncompliant with his medication regimen. He occasionally refuses the mixture of regular and NPH insulin, which is administered subcutaneously by his mother twice daily. His mother reports that his behavior and eating patterns are increasingly erratic. Which of the following is the most appropriate next step?

- (A) Reassure the mother that such difficulties are common at this age
- (B) Encourage the father to take a more prominent role in the patient's care
- (C) Advise the mother of the risk for long-term complications without better compliance
- (D) **Assess the patient's understanding of his illness and willingness to manage his own disease**
- (E) Change the injection schedule to once daily

MEDICINE

<i>General Principles</i>	1%–5%
<i>Organ Systems</i>	
Immunologic Disorders	5%–10%
Diseases of the Blood and Blood-forming Organs	5%–10%
Diseases of the Nervous System and Special Senses	5%–10%
Cardiovascular Disorders	15%–20%
Diseases of the Respiratory System	15%–20%
Nutritional and Digestive Disorders	10%–15%
Gynecologic Disorders	1%–5%
Renal, Urinary, and Male Reproductive System	10%–15%
Disorders of the Skin and Subcutaneous Tissues	5%–10%
Diseases of the Musculoskeletal System and Connective Tissue	5%–10%
Endocrine and Metabolic Disorders	5%–10%
<i>Physician Tasks</i>	
Promoting Health and Health Maintenance	10%–15%
Understanding Mechanisms of Disease	20%–25%
Establishing a Diagnosis	40%–45%
Applying Principles of Management	20%–25%

1. A 28-year-old woman has palpitations that occur approximately once a week, last 1–5 minutes, and consist of rapid, regular heart pounding. The episodes start and stop suddenly and have not been associated with chest discomfort or dyspnea. There is no history of heart problems. She drinks two to three cups of coffee daily. She rarely drinks alcohol and does not smoke. Her blood pressure is 120/88 mm Hg, and pulse is 96/min and regular. A stare and lid lag are noted. The thyroid gland is firm and 1.5 times larger than normal. There is a midsystolic click at the apex and a grade 2/6, early systolic murmur at the left upper sternal border. An ECG is normal except for evidence of sinus tachycardia. Which of the following is the most appropriate next step in diagnosis?

- (A) Ambulatory ECG monitoring
- (B) Measurement of serum thyroid-stimulating hormone level**
- (C) Measurement of urine catecholamine level
- (D) MUGA scan
- (E) Echocardiography

2. Two days after receiving 3 units of packed red blood cells for postpartum hemorrhage, a 24-year-old woman has fatigue and slight jaundice. Laboratory studies show:

Hemoglobin	8.8 g/dL
Hematocrit	28%
Serum total bilirubin	5 mg/dL

Liver tests are otherwise within normal limits. Which of the following is the most appropriate next step in diagnosis?

- (A) Cytomegalovirus antibody titer
- (B) Direct and indirect antiglobulin (Coombs') tests**
- (C) Monospot test
- (D) Serology for hepatitis B markers
- (E) Ultrasonography of the gallbladder

3. A 22-year-old woman has had shortness of breath and wheezing for the past 3 hours. Her blood pressure is 160/96 mm Hg, pulse is 120/min, and respirations are 34/min. There is diminished air exchange and bilateral wheezes. Arterial blood gas analysis on room air shows:

pH	7.45
PCO ₂	30 mm Hg
PO ₂	68 mm Hg

Serum theophylline concentration is 15 µg/mL (therapeutic=10 ADI-20). She is given nasal oxygen, methylprednisolone (125 mg, intravenously), and a β-adrenergic agonist via a jet nebulizer. After 4 hours, there are no wheezes, but respirations are 50/min, and the patient looks tired. Arterial blood gas analysis on nasal oxygen shows:

pH	7.28
PCO ₂	50 mm Hg
PO ₂	50 mm Hg

After admission to the intensive care unit, which of the following is the most appropriate next step in treatment?

- (A) Readminister the β-adrenergic agonist via a jet nebulizer
- (B) Begin antibiotic therapy
- (C) Administer aminophylline, intravenously
- (D) Administer additional methylprednisolone, intravenously
- (E) Intubate the patient**

4. A 66-year-old woman comes to the emergency department with the acute onset of retrosternal chest discomfort accompanied by nausea and diaphoresis. She has hypotension, jugular venous distention, and a murmur of tricuspid regurgitation. An ECG shows ST-segment elevation in the right precordial leads. Which of the following is the most likely diagnosis?

- (A) Constrictive pericarditis
- (B) Dissecting aortic aneurysm
- (C) Pericardial tamponade
- (D) Pulmonary emboli
- (E) Right ventricular infarction**

5. A 50-year-old man is admitted to the hospital within 2 hours of the onset of nausea, vomiting, and acute crushing pain in the left anterior chest. He has a family history of early coronary artery disease. The pain does not subside with the administration of nitroglycerin, sublingually. An ECG shows ST-segment elevation in leads aVL and V₂ through V₄. Which of the following is the most appropriate management to decrease myocardial damage and mortality?

- (A) Administration of digitalis
- (B) Administration of lidocaine
- (C) Administration of quinidine
- (D) Coronary artery bypass grafting within 1 week
- (E) Thrombolytic therapy**

OBSTETRICS & GYNECOLOGY

<i>General Principles</i>	1%–5%
<i>Gynecology</i>	
Promoting Health and Health Maintenance	5%–10%
Understanding Mechanisms of Disease	15%–20%
Establishing a Diagnosis	15%–20%
Applying Principles of Management	5%–10%
<i>Obstetrics</i>	
Promoting Health and Health Maintenance	5%–10%
Understanding Mechanisms of Disease	10%–15%
Establishing a Diagnosis	15%–20%
Applying Principles of Management	10%–15%

- A 27-year-old nulligravid woman has had severe dysmenorrhea that has caused her to miss at least 2 days of work during each menstrual cycle for the past year. She has occasional pain during sexual intercourse. She weighs 50 kg (110 lb) and is 160 cm (63 in) tall. Pelvic examination shows a normal-appearing vulva and vagina. The cervix is pink with minimal endocervical gland eversion. The uterus is normal in size. The left ovary is 2 x 3 cm; the right ovary is 4 x 6 cm. Which of the following is the most likely cause of her condition?

 - (A) Chronic appendicitis
 - (B) Endometriosis**
 - (C) Pelvic congestion syndrome
 - (D) Polycystic ovarian disease
 - (E) Premenstrual syndrome
- An asymptomatic 24-year-old primigravid woman at 36 weeks' gestation comes for a routine prenatal visit. A grade 2/6, systolic ejection murmur is heard at the left upper sternal border. The S₂ varies with inspiration, and the pulmonic component is soft; diastole is clear. Which of the following is the most likely diagnosis?

 - (A) Anomalous pulmonary venous return
 - (B) Atrial septal defect
 - (C) Flow murmur**
 - (D) Patent ductus arteriosus
 - (E) Pulmonary valve stenosis
- A 27-year-old nulligravid woman and her husband have been unable to conceive for 12 months. She has never used contraception. Menses occur at 28-day intervals, and her last menstrual period was 2 weeks ago. She had a single episode of pelvic inflammatory disease 4 years ago and was treated with oral antibiotics. Vaginal examination shows no abnormalities. Cervical cultures are normal. Which of the following is the most appropriate next step in diagnosis?

 - (A) Reevaluation in 6 months
 - (B) Ultrasonography of the abdomen
 - (C) Sperm penetration assay
 - (D) Hysterosalpingography**
 - (E) Endometrial biopsy
- A 30-year-old woman, gravida 2, para 1, comes for her first prenatal visit at 26 weeks' gestation. Uterine size is greater than expected for dates. Ultrasonography shows fetal hydrops. Which of the following is the most appropriate next step in diagnosis?

 - (A) Maternal HIV antibody test
 - (B) Maternal Rh status with antibody screening**
 - (C) Cervical and urine cultures for group B streptococcus
 - (D) MRI of the fetus
 - (E) Amniocentesis for measurement of α-fetoprotein level

5. At her 6-week postpartum visit, a 17-year-old woman, gravida 1, para 1, tells her physician that she has a pinkish vaginal discharge that has persisted since her delivery, although it is decreasing in amount. On physical examination, the uterus is fully involuted, and there are no adnexal masses. Which of the following is the most appropriate next step in management?
- (A) Administer ampicillin
 - (B) Order a quantitative β -hCG test
 - (C) Order a serum prolactin measurement
 - (D) Reassure the patient that this is normal**
 - (E) Schedule a dilatation and curettage

PEDIATRICS

<i>Normal Development</i>	5%–10%
<i>Organ Systems</i>	
Immunologic Disorders	5%–10%
Diseases of the Blood and Blood-forming Organs	5%–10%
Mental Disorders	1%–5%
Diseases of the Nervous System and Special Senses	5%–10%
Cardiovascular Disorders	10%–15%
Diseases of the Respiratory System	10%–15%
Nutritional and Digestive Disorders	10%–15%
Gynecologic Disorders	1%–5%
Renal, Urinary, and Male Reproductive System	10%–15%
Disorders of Pregnancy, Childbirth, and the Puerperium	1%–5%
Disorders of the Skin and Subcutaneous Tissues	1%–5%
Diseases of the Musculoskeletal System and Connective Tissue	5%–10%
Endocrine and Metabolic Disorders	5%–10%
<i>Physician Tasks</i>	
Promoting Health and Health Maintenance	5%–10%
Understanding Mechanisms of Disease	25%–30%
Establishing a Diagnosis	40%–45%
Applying Principles of Management	10%–15%

- (A) Ankyloglossia (tongue-tie)
- (B) Attention-deficit/hyperactivity disorder
- (C) Autistic disorder
- (D) Hearing loss
- (E) Neurodegenerative disorder
- (F) Normal language development
- (G) Mental retardation
- (H) Parental neglect
- (I) Selective mutism
- (J) Serous otitis media

For each child brought for a well-child examination, select the most likely diagnosis.

1. A 4-year-old boy squeals and cries but uses no words. His gross and fine motor skills are well developed. He is preoccupied with objects and does not play with other children. The child responds normally to sounds but appears disinterested and detached.

Answer=C

2. A 16-month-old infant babbled at 6 months, began to mimic sounds at 10 months, and began to use a few recognizable words between 12 and 14 months. At 16 months, the child is continuing to use single words but is not using simple two-word phrases.

Answer=F

3. A 2-month-old infant has a 5-cm strawberry hemangioma on the cheek that is increasing in size. No other lesions are noted. Which of the following is the most appropriate next step in management?
- (A) **Observation of the lesion**
 - (B) Solid carbon dioxide application to the lesion
 - (C) Intralesional corticosteroid treatment
 - (D) Radiation of the lesion
 - (E) Surgical removal of the lesion
4. A newborn receives silver nitrate prophylaxis at birth. Twelve hours later, she has puffy eyelids, injected conjunctivae, and scant clear ocular discharge. Which of the following is the most likely diagnosis?
- (A) Allergic conjunctivitis
 - (B) **Chemical conjunctivitis**
 - (C) Chlamydial conjunctivitis
 - (D) Dacryocystitis
 - (E) Gonococcal conjunctivitis
5. One week after a "breathing treatment" in the emergency department for an initial episode of coughing and wheezing, a 10-year-old girl is brought to the physician for a follow-up examination. She has a 3-year history of nasal allergies; both her parents have allergic rhinitis. She is afebrile. The chest is clear to auscultation. An x-ray film of the chest shows normal findings. Which of the following medications is most appropriate on an as-needed basis?
- (A) **Inhaled β -adrenergic agonist**
 - (B) Inhaled corticosteroids
 - (C) Inhaled cromolyn sodium
 - (D) Oral β -adrenergic agonist
 - (E) Oral theophylline

PSYCHIATRY

<i>General Principles</i>	5%–10%
<i>Organ Systems</i>	
Mental Disorders	
Promoting Health and Health Maintenance	1%–5%
Understanding Mechanisms of Disease	10%–15%
Establishing a Diagnosis	
Mental disorders usually first diagnosed in infancy, childhood, or adolescence	5%–10%
Substance-related disorders	5%–10%
Schizophrenia and other psychotic disorders	5%–10%
Mood disorders	5%–10%
Anxiety disorders	5%–10%
Somatoform disorders	1%–5%
Other disorders/conditions	5%–10%
Applying Principles of Management	20%–25%
Diseases of the Nervous System and Special Senses	10%–15%

-
1. A previously healthy 17-year-old girl is brought to the physician for evaluation because of loss of appetite, sleeplessness, and extreme irritability for 3 weeks. After missing many practices, she quit the softball team that she previously enjoyed. She often feels tired and has difficulty sitting still and concentrating on schoolwork. Her menses occur at regular intervals. She weighs 50 kg (110 lb) and is 168 cm (66 in) tall. Her blood pressure is 110/70 mm Hg, pulse is 74/min, and respirations are 16/min. Which of the following is the most likely diagnosis?
- (A) Adjustment disorder with mixed disturbance of emotions and conduct
 (B) Anorexia nervosa
 (C) Attention-deficit/hyperactivity disorder
 (D) Dysthymic disorder
 (E) **Major depressive disorder**
2. A 45-year-old man is brought to the physician by his spouse. He has been drinking heavily since he was passed over for a job promotion 3 days ago. He stayed in bed over the weekend. He has no personal history of psychiatric disorders and no personal or family history of alcohol abuse. He is crying and states, "I can't believe it," when addressed. When asked what he will do, he states, "I don't know, but if I don't go back to work tomorrow, I'll lose my job." Which of the following is the most likely diagnosis?
- (A) **Adjustment disorder with depressed mood**
 (B) Bipolar disorder
 (C) Dysthymic disorder
 (D) Major depressive disorder
 (E) Substance abuse
3. A 52-year-old woman whose husband died 2 months ago consults a physician because of headaches and feelings of uncertainty. She describes the headaches as a band around her head; they occur unpredictably and are not accompanied by any other symptoms. She has no history of psychiatric illness. While talking with the physician, the patient begins to cry and talk about her deceased husband; she feels her life is empty now and worries about her future. Which of the following is most appropriate at this point?
- (A) **Allow her to express herself**
 (B) Prescribe an antianxiety drug
 (C) Prescribe an antidepressant drug
 (D) Refer her for psychological testing
 (E) Obtain a psychiatric consultation
4. A 10-year-old boy is brought to the physician because of increasing behavior problems in school since starting 5th grade 3 months ago. His teacher states that he is unable to sit quietly through a classroom period and frequently disrupts the class and interrupts other children while they are talking. His parents report that he has always been an active child and are concerned because he is inattentive when he runs or walks. During the examination, he fidgets with his hands and feet and is easily distracted from completing a task. Which of the following is the most appropriate pharmacotherapy?
- (A) Amitriptyline
 (B) Fluoxetine
 (C) Haloperidol
 (D) Imipramine
 (E) **Methylphenidate**

5. A 32-year-old woman is brought to the emergency department because of fever, hallucinations, agitation, and confusion for 8 hours. She has a history of alcohol, cocaine, and benzodiazepine abuse. Her temperature is 37.8 C (100 F), blood pressure is 150/90 mm Hg, pulse is 110/min, and respirations are 16/min. She is tremulous. The lungs are clear to auscultation. She has a holosystolic murmur; the abdomen is tender, and the liver edge is palpable 3 cm below the costal margin. Rectal examination shows no abnormalities. She has telangiectasia. A complete blood count and liver function tests show no abnormalities. Her serum alkaline phosphatase activity is 200 U/L, serum alanine aminotransferase (ALT, GPT) activity is 60 U/L, and serum aspartate aminotransferase (AST, GOT) activity is 90 U/L. Which of the following is the most likely cause of this condition?
- (A) Acute cocaine toxicity
 - (B) Alcohol withdrawal**
 - (C) Benzodiazepine withdrawal
 - (D) Panic disorder
 - (E) Schizophreniform disorder

SURGERY

<i>General Principles</i>	1%–5%
<i>Organ Systems</i>	
Immunologic Disorders	1%–5%
Diseases of the Blood and Blood-forming Organs	5%–10%
Diseases of the Nervous System and Special Senses	5%–10%
Cardiovascular Disorders	10%–15%
Diseases of the Respiratory System	10%–15%
Nutritional and Digestive Disorders	25%–30%
Gynecologic Disorders	5%–10%
Renal, Urinary, and Male Reproductive System	5%–10%
Disorders of Pregnancy, Childbirth, and the Puerperium	1%–5%
Disorders of the Skin and Subcutaneous Tissues	1%–5%
Diseases of the Musculoskeletal System and Connective Tissue	5%–10%
Endocrine and Metabolic Disorders	5%–10%
<i>Physician Tasks</i>	
Promoting Health and Health Maintenance	1%–5%
Understanding Mechanisms of Disease	20%–25%
Establishing a Diagnosis	45%–50%
Applying Principles of Management	25%–30%

-
1. Ten years ago, a 60-year-old woman underwent an aortic valve replacement with a porcine heterograft. She now has dyspnea on exertion. Examination and x-ray film of the chest show evidence of congestive heart failure. Which of the following is the most likely explanation for these findings?
- (A) **Degeneration of the valve**
 (B) Development of an ascending aortic aneurysm
 (C) Development of mitral stenosis
 (D) Development of a ventricular septal defect
 (E) Embolus to the coronary circulation
2. Two hours after undergoing a right hepatic lobectomy, a 59-year-old woman has a distended abdomen. Her blood pressure is 100/60 mm Hg, and pulse is 120/min. Which of the following is the most likely cause of these findings?
- (A) Deficiency of factor III
 (B) Deficiency of factor VII
 (C) Deficiency of factor XII
 (D) Deficiency of platelets
 (E) **Poor mechanical hemostasis**
3. A 70-year-old man is admitted to the hospital for elective coronary artery bypass grafting. On the day of his operation, an asymptomatic carotid bruit is found. Which of the following is the most appropriate immediate next step in diagnosis?
- (A) **Duplex scan of the neck**
 (B) CT scan of the head
 (C) PET scan of the brain
 (D) MRI of the brain
 (E) Cerebral angiography
4. Ten days after admission to the hospital because of acute pancreatitis, a 56-year-old man with alcoholism develops chills and temperatures to 39.4 C (103 F). Examination shows a tender abdomen with hypoactive bowel sounds. Which of the following is the most likely diagnosis?
- (A) **Pancreatic abscess**
 (B) Pancreatic insufficiency
 (C) Perforated duodenal ulcer
 (D) Retroperitoneal hemorrhage
 (E) Splenic vein thrombosis

5. A 24-year-old nulligravid woman is brought to the emergency department after a syncopal episode at work. She has had progressively severe cramps in the lower abdomen over the past 6 hours. She has had spotty vaginal bleeding for 2 days; her last menstrual period began 7 weeks ago. She is diaphoretic and anxious. Her temperature is 37 C (98.6 F), blood pressure is 80/60 mm Hg, pulse is 130/min, and respirations are 26/min. Examination shows blood in the vaginal vault and diffuse abdominal tenderness; there is pain with cervical motion. Which of the following is the most appropriate next step in management?

- (A) **Intravenous administration of fluids**
- (B) Intravenous administration of broad-spectrum antibiotics
- (C) Transfusion of O-negative blood
- (D) Transfusion of type-specific blood
- (E) Culdocentesis

INTRODUCTION TO CLINICAL DIAGNOSIS

<i>General Principles</i>	15%–20%
Human development and genetics	1%–5%
Gender, ethnic, and behavioral considerations	
affecting disease treatment and prevention	10%–15%
Progression through life cycle	1%–5%
Psychologic and social factors influencing patient behavior	1%–5%
Patient interviewing, consultation, and interactions	
with the family	5%–10%
Medical ethics, jurisprudence, and professional behavior	1%–5%
Nutrition	1%–5%
<i>Organ Systems</i>	80%–85%
Hematopoietic & lymphoreticular	1%–5%
Central & peripheral nervous	15%–20%
Skin & related connective tissue	1%–5%
Musculoskeletal	5%–10%
Respiratory	10%–15%
Cardiovascular	15%–20%
Gastrointestinal	10%–15%
Renal/urinary	1%–5%
Reproductive	5%–10%
Endocrine	1%–5%

- A 6-month-old boy is brought to the physician because of left knee swelling for 24 hours. Three months ago, he had three large hematomas on his forehead that resolved without treatment. His two sisters and his mother have no history of similar symptoms. His mother's maternal uncle and her brother died before the age of 30 years of massive cerebral hemorrhages. Physical examination shows deep ecchymoses over the buttocks and severe swelling of the left knee. The most likely explanation for these findings is a deficiency of which of the following?

 - Factor I (fibrinogen)
 - Factor V (proaccelerin)
 - Factor VIII (antihemophilic factor)**
 - Factor XIII (transglutaminase)
 - von Willebrand factor
- A 39-year-old man has the acute onset of pain, corneal clouding, and diffuse redness in the left eye. There is no discharge. Vision is 20/20 in the right eye and 20/100 in the left eye. The left pupil is dilated. Which of the following is the most likely cause of these findings?

 - Acute glaucoma**
 - Acute hordeolum
 - Bacterial conjunctivitis
 - Corneal abrasion
 - Subconjunctival hemorrhage
- A 56-year-old man had a small, slowly growing nodule on his chin during the past 3 years. The lesion is 1.3 cm in diameter, the center is ulcerated, and the border is waxy. Examination of tissue obtained on excision of the lesion is most likely to show which of the following?

 - Actinic keratosis
 - Basal cell carcinoma**
 - Malignant melanoma
 - Seborrheic keratosis
 - Squamous cell carcinoma
- A 45-year-old man has had a slow, progressive loss of hearing in his right ear, spontaneous nystagmus, and weakness of muscles on the right side of his face. Which of the following is the most likely site of the lesion?

 - Cerebral cortex
 - Inferior colliculus
 - Inner ear
 - Pontomedullary junction**
 - Posterior thalamus

5. A 68-year-old woman is brought to the physician by her husband because of strange behavior. The previous evening, she had gotten up suddenly from the dinner table and started to undress in front of guests. Further questioning discloses a 1-year history of a progressive change in behavior. She writes everything down on a notepad; otherwise, she forgets. She cannot remember the names of her four grandchildren or the date of her wedding anniversary. These symptoms are most likely associated with a deficit in which of the following?
- (A) Acetylcholine
 - (B) Dopamine
 - (C) Glucose 6-phosphate dehydrogenase
 - (D) Insulin
 - (E) Serotonin
6. A previously healthy 34-year-old woman had a single rigor 3 days ago. Since then she has had temperatures to 38.9°C (102°F), shortness of breath with minimal exertion, and cough productive of rust-colored sputum. An x-ray film of the chest shows consolidation in the right lower lobe of the lung. Which of the following is the most likely diagnosis?
- (A) Mycoplasmal pneumonia
 - (B) **Pneumococcal pneumonia**
 - (C) Pseudomonas pneumonia
 - (D) Toxoplasmosis
 - (E) Tuberculosis
7. A 22-year-old football player is brought to the emergency department 1 hour after he sustained a left leg injury during a tackle. Physical examination shows mild tenderness and anterior instability of the tibia with the knee in 90 degrees of flexion (positive drawer sign). Active range of motion of the left knee is limited by pain. Which of the following best explains these findings?
- (A) Hemarthrosis
 - (B) Patellar fracture
 - (C) **Tear of the anterior cruciate ligament**
 - (D) Tear of the medial ligament
 - (E) Tear of the medial meniscus

COMPREHENSIVE BASIC SCIENCE EXAMINATION

The Comprehensive Basic Science Examination is a general, integrated achievement test covering material typically learned during basic science education, with somewhat more emphasis on second-year courses. The exam reflects content coverage on USMLE Step 1 and uses the same item formats.

System

General Principles	40%–50%
Individual Organ Systems	50%–60%
Hematopoietic & lymphoreticular	
Central & peripheral nervous	
Skin & related connective tissue	
Musculoskeletal	
Respiratory	
Cardiovascular	
Gastrointestinal	
Renal/urinary	
Reproductive	
Endocrine	

Process

Normal	30%–50%
Abnormal	30%–50%
Principles of therapeutics	15%–25%
Psychosocial, cultural, occupational, and environmental considerations	10%–20%

1. A wound of the lateral neck results in weakness of elevation and retraction of the shoulder on the ipsilateral side and difficulty turning the head up and toward the contralateral side. No sensory changes are present. Which of the following nerves has most likely been injured?

(A) Axillary
 (B) Lateral cord of the brachial plexus
 (C) Phrenic
(D) Spinal accessory
 (E) Suprascapular
3. A 77-year-old woman is visited by the home care nurse who notes that the patient is more lethargic than usual. Her skin and mucous membranes are dry. An increase in the serum concentration or activity of which of the following provides the strongest indication that the patient is dehydrated?

(A) **Albumin**
 (B) Alkaline phosphatase
 (C) Bilirubin
 (D) Calcium
 (E) Uric acid
2. In a steady state, the difference in CO₂ content between the venous blood leaving a tissue and the arterial blood entering the tissue is determined by which of the following ratios?

(A) Alveolar ventilation to tissue blood flow
 (B) Alveolar ventilation to tissue O₂ consumption
(C) Tissue CO₂ production to tissue blood flow
 (D) Tissue CO₂ production to tissue O₂ consumption
 (E) Tissue CO₂ production to venous PCO₂
4. A 20-year-old college student develops fever, severe pharyngitis, hepatosplenomegaly, and lymphadenopathy. The pathogenesis of this syndrome most likely involves a double-stranded DNA virus infection of which of the following cells?

(A) **B lymphocytes**
 (B) Kupffer's cells
 (C) Macrophages
 (D) Neutrophils
 (E) T lymphocytes

5. A 35-year-old woman has hypertension and truncal obesity. Serum studies show:

Cortisol (AM)	100 µg/dL (N=5–20 µg/dL)
Cortisol (PM)	100 µg/dL (N=2.5–10 µg/dL)
ACTH (AM)	130 pg/mL (N=20–100 pg/mL)
Cortisol 8 h after 1 mg dexamethasone	95 µg/dL
Cortisol 8 h after 8 mg dexamethasone	30 µg/dL

Which of the following is the most likely cause of this woman's increased serum cortisol concentration?

- (A) Adrenocortical adenoma
- (B) Ectopic corticotropin-releasing hormone-producing neoplasm
- (C) Ectopic corticotropin-secreting neoplasm
- (D) Pituitary microadenoma**
- (E) Self-administration of synthetic glucocorticoids

6. A 1-day-old neonate has hemolytic disease of the newborn. The parents are both Rh-positive, but IgG isohemagglutinins are found in the mother's blood. Which of the following parental blood types is most likely to cause this condition?

	Mother	Father
(A)	A	O
(B)	AB	O
(C)	B	A
(D)	B	O
(E)	O	AB

COMPREHENSIVE CLINICAL SCIENCE EXAMINATION

The Comprehensive Clinical Science Examination is a general, integrated achievement test covering material typically learned during core clinical clerkships. The exam reflects content coverage on USMLE Step 2 and uses the same item formats.

<i>Normal Growth and Development and General Principles of Care</i>	10-20%
<i>Organ Systems</i>	80-90%
Immunologic Disorders	
Diseases of the Blood and Blood-forming Organs	
Mental Disorders	
Diseases of the Nervous System and Special Senses	
Cardiovascular Disorders	
Diseases of the Respiratory System	
Nutritional and Digestive Disorders	
Gynecologic Disorders	
Renal, Urinary, and Male Reproductive System	
Disorders of Pregnancy, Childbirth, and the Puerperium	
Disorders of the Skin and Subcutaneous Tissues	
Diseases of the Musculoskeletal System and Connective Tissue	
Endocrine and Metabolic Disorders	
<i>Physician Tasks</i>	
Promoting Health and Health Maintenance	15%–20%
Understanding Mechanisms of Disease	20%–35%
Establishing a Diagnosis	25%–40%
Applying Principles of Management	15%–25%

1. 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 film 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
2. 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-ray films**
 - (B) Arthrography
 - (C) Arthroscopy
 - (D) Measurement of serum calcium level
 - (E) Ultrasonography

3. 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 disease**
4. 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
5. 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