



The Pharmacy Examining Board of Canada

Le Bureau des examinateurs en pharmacie du Canada

Pharmacist Evaluating Examination Sample Questions

The following sample questions are **NOT** intended or designed to be a sample examination, and do **NOT** represent an exact model of the Pharmacist Evaluating Examination in terms of difficulty and proportion of topics. However, individually, these questions are intended to be representative, in **format and phrasing style**, of the types of questions found on the Pharmacist Evaluating Examination. They also illustrate a variety of the subject areas contained in the examination blueprint. Please note that, although these questions are reviewed and updated annually to ensure currency of content, if guidelines or legislation change in the interim, the answers may not be accurate.

Please see below for the [ANSWERS](#) to these sample questions.

BIOMEDICAL SCIENCES

1. An oxidative reaction that converts a lipid into its free radical is called:
 - a. initiation.
 - b. synthesis.
 - c. termination.
 - d. complexation.
 - e. ionization.

2. Which of the following releases enkephalins?
 - a. Pineal gland
 - b. Thyroid gland
 - c. Periaqueductal grey matter
 - d. Reticular activating system
 - e. Pituitary gland

3. For the treatment of cardiac glycoside-induced hypokalemia, stimulation of the Na^+, K^+ -ATPase pump is achieved by administering:
 - a. magnesium.
 - b. caffeine.
 - c. mannitol.
 - d. potassium.
 - e. sodium.

4. Which of the following statements regarding transcription is correct?
- The enzyme responsible for initiating transcription is RNA polymerase.
 - The enzyme responsible for initiating transcription is DNA polymerase.
 - During transcription, the genetic information contained in the nucleotide sequence of tRNA is translated into a protein structure.
 - The process of transcription includes the splicing of exons.
 - Following initiation, the next stage of transcription is termination.
5. Which of the following organisms is an obligate intracellular bacteria, making it resistant to cell wall-active antibiotics?
- Escherichia coli*
 - Legionella pneumophila*
 - Staphylococcus aureus*
 - Streptococcus pneumoniae*
 - Chlamydia pneumoniae*
6. Muscle contraction produced by the binding of calcium to calmodulin is a characteristic of:
- cardiac muscle.
 - striated muscle.
 - smooth muscle.
 - skeletal muscle.
 - myosin and actin.
7. The spleen is located in which of the following abdominal regions?
- Right hypochondriac region
 - Right lumbar region
 - Epigastric region
 - Left hypochondriac region
 - Left lumbar region
8. In adults, community-acquired pneumonia caused by which of the following organisms is associated with the highest mortality rate?
- Pseudomonas aeruginosa*
 - Mycoplasma pneumoniae*
 - Haemophilus influenzae*
 - Streptococcus pneumoniae*
 - Pneumocystis jirovecii*
9. Which of the following anatomical structures is most responsible for the production of male hormones?
- Adrenal gland
 - Epididymis
 - Prostate
 - Testes
 - Vas deferens

- 10.** In the central nervous system, the internal capsule of the body connects which of the following body parts?
- The left and right cerebral hemispheres
 - The left parietal and occipital lobes
 - The spinal cord and cerebellum
 - The cerebral cortex and medulla
 - The hippocampus and mammillary bodies
- 11.** Which of the following amino acid residues of proteins contains a side chain hydroxyl group that can be phosphorylated by protein kinases?
- Glycine
 - Alanine
 - Serine
 - Cysteine
 - Isoleucine
- 12.** If systemic blood pressure decreases, which of the following would occur to help return blood pressure to normal?
- Increased urine production
 - Increased acetylcholine release
 - Increased aldosterone secretion
 - Increased diameter of systemic arterioles
 - Increased erythropoietin production
- 13.** Which of the following muscle groups are innervated by the sciatic nerve?
- Calf muscles
 - Deep back muscles
 - Shoulder muscles
 - Quadriceps femoris muscles
 - Abdominal muscles
- 14.** In the respiratory system, which of the following cell types produces pulmonary surfactant?
- Type 1 pneumocytes
 - Type 2 pneumocytes
 - Alveolar macrophages
 - Chondrocytes
 - Olfactory cells
- 15.** Achieving a high level of herd immunity is an important public health strategy because it:
- reduces immunization costs in communities.
 - enhances individual immunologic responses.
 - facilitates animal handling.
 - protects people who cannot be immunized.
 - requires fewer booster doses.

PHARMACEUTICAL SCIENCES

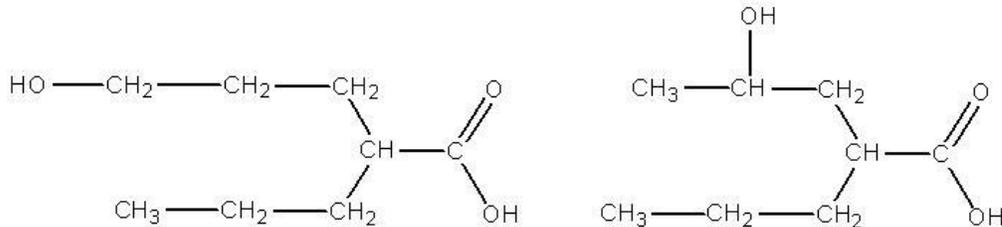
16. Dopamine is useful in the treatment of cardiogenic shock because it:

- a. selectively dilates renal and mesenteric vascular beds.
- b. does not induce peripheral vasoconstriction.
- c. decreases the force of myocardial contraction.
- d. delays the atrioventricular (AV) conduction time.
- e. prolongs the QT interval on the ECG.

17. Drug A is administered by continuous IV infusion at a rate of 2 mg/min. It has an average half-life of 1.5 h and a volume of distribution of 150 L in an average 70 kg patient. Using this information, what is the steady-state concentration of Drug A in plasma?

- a. 1.5 mg/L
- b. 1.7 mg/L
- c. 2.1 mg/L
- d. 2.4 mg/L
- e. 2.7 mg/L

18. Valproic acid is metabolized by aliphatic hydroxylation to the two structures shown below. The relationship between the two metabolites illustrates the concept of:



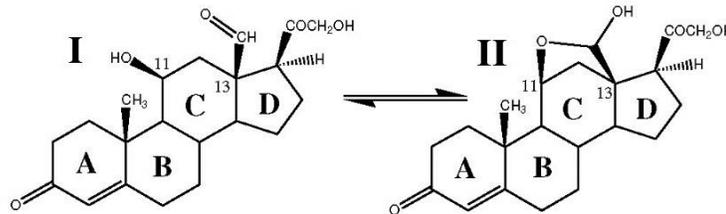
- a. conformational isomerism.
- b. structural isomerism.
- c. geometric isomerism.
- d. optical isomerism.
- e. diastereoisomerism.

19. Which of the following medications induces an isoform of cytochrome P450?

- a. Carbamazepine
- b. Clarithromycin
- c. Amiodarone
- d. Metronidazole
- e. Bosentan

20. Which of the following directly influences the *in vitro* physical stability of an oil-in-water emulsion in which the drug is incorporated in the dispersed phase?
- Amount of preservative added
 - Molecular weight of the drug
 - Solubility of the emulsifier in water
 - Particle size of the internal phase
 - Type of suspending agent used
21. Abatacept acts by:
- stimulating adenosine receptors.
 - binding to MHC Class II on B cells.
 - inhibiting B cell receptors.
 - activating T cell receptors.
 - binding CD80/86 on antigen-presenting cells.

22. The aldosterone structure (structure I shown below) is in equilibrium with a more biologically active form (structure II shown below) where on ring C the aldehyde group at carbon 13 has bridged across to carbon 11. The resultant functional group on ring C of structure II is a(n):

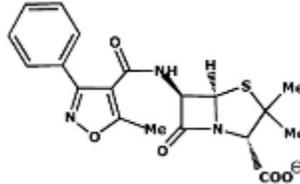


- Schiff base.
 - isoprene.
 - succinate.
 - hemiacetal.
 - acylglycerol.
23. Which of the following terms indicates a loss of moisture?
- Deliquescence
 - Efflorescence
 - Hygroscopicity
 - Polymorphism
 - Condensation
24. Factors that determine bioequivalence of two brands of a drug include the:
- taste of the preparations.
 - physical appearance of the preparations.
 - pharmacokinetic parameters of the preparations.
 - cost of the preparations.
 - package size of the preparations.

25. Glycosaminoglycan and sulfated polysaccharide are structural descriptions of which of the following?

- a. Heparin
- b. Tobramycin
- c. Doxorubicin
- d. Cyclosporine
- e. Hydrochlorothiazide

26. The substituent (in the penicillin structure shown below) which provides the β -lactam ring with some protection against both acid hydrolysis and β -lactamase enzymes is the:



- a. sulfur atom.
- b. amide group.
- c. carboxyl group.
- d. isoxazolyl group.
- e. dimethyl moiety.

27. Imatinib is an anticancer agent used in the treatment of chronic myelogenous leukemia that acts by inhibiting the activity of:

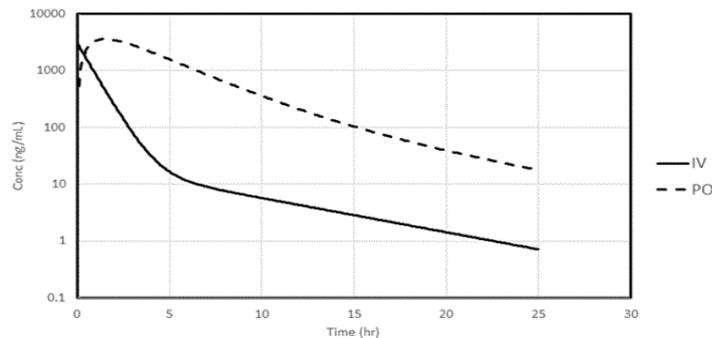
- a. tyrosine kinase of Bcr-Abl.
- b. tyrosine kinase of HER-2.
- c. tyrosine kinase of FGFR.
- d. histone deacetylases.
- e. serine/threonine kinase mTOR.

28. Which of the following is a selective adrenergic β_1 -blocker with endothelium-dependent vasodilating properties?

- a. Nebivolol
- b. Metoprolol
- c. Acebutolol
- d. Nadolol
- e. Carvedilol

- 29.** Which of the following statements is correct regarding the use of monoclonal antibody drug therapies?
- a. Flu-like symptoms commonly occur at the start of therapy.
 - b. T cells are stimulated and will initiate a host rejection process.
 - c. Adalimumab is a murine-derived immunoglobulin monoclonal antibody product.
 - d. Use of chimeric monoclonal antibodies is associated with increased immunogenicity.
 - e. Use of Fc fragments avoid raising an immune response against the FAB part.
- 30.** In some parenteral formulations, sodium metabisulphite is included as:
- a. an antioxidant.
 - b. a chelator.
 - c. a solubilizer.
 - d. a cosolvent.
 - e. an emulsifier.
- 31.** Which of the following medications is a cytochrome P450 inhibitor?
- a. Phenytoin
 - b. Trastuzumab
 - c. Rituximab
 - d. Itraconazole
 - e. St. John's wort
- 32.** How much NaCl is required to make 100 mL of isotonic 0.5% phenylephrine HCl solution? (NaCl equivalent of phenylephrine HCl is 0.32)
- a. 100 mg
 - b. 300 mg
 - c. 500 mg
 - d. 740 mg
 - e. 900 mg
- 33.** Which of the following nonparenteral routes of administration yields the best bioavailability of biotechnology protein drugs?
- a. Oral
 - b. Rectal
 - c. Ocular
 - d. Pulmonary
 - e. Transdermal
- 34.** Theoretically, the shelf life of a pharmaceutical tablet preparation is best measured by a change in which of the following?
- a. Permeability of the drug
 - b. Dissolution of the drug
 - c. Strength of the drug
 - d. Solubility of the drug
 - e. Partitioning of the drug

- 35.** A drug that is considered to be low clearance and is metabolized entirely by the liver is sensitive to changes in:
- drug binding to plasma proteins.
 - bile secretion.
 - hepatic blood flow.
 - renal blood flow.
 - p-glycoprotein transport activity.
- 36.** Which of the following statements is correct about transdermal drug administration?
- Most drugs can permeate the skin and enter the systemic circulation.
 - Transdermal absorption achieves a fast onset of drug action.
 - The skin is tolerant to most drugs and chemicals in transdermal delivery systems.
 - Transdermal administration produces minimal variations in drug absorption.
 - Hair follicles are a determinant in limiting transdermal drug absorption.
- 37.** Two drugs (Drug A and Drug B) were administered at a dose of 10 mg/kg to two subjects. Drug A was administered intravenously and Drug B was administered orally. Plasma samples were collected and concentrations of both drugs were measured. A semilog plot of concentration vs. time is shown below. The concentration of Drug A is represented by the solid line and Drug B by the dashed line.



- Which of the following statements is correct?
- The absorption rate constants for Drug A and Drug B can be estimated from the plot.
 - Drug B has a lower clearance than Drug A.
 - Drug A has a larger distribution volume than Drug B.
 - Drug B has a higher plasma protein binding than Drug A.
 - The volume of distribution for Drug A can be estimated from the plot.
- 38.** Which of the following drugs is an antagonist at the central presynaptic α_2 -adrenergic receptors?
- Clonidine
 - Terazosin
 - Mirtazapine
 - Risperidone
 - Venlafaxine

39. A monoclonal antibody was tested in patients using the following dose ranges and resulted in the following $t_{1/2}$ values:

<u>Dose</u>	<u>Half-life</u>
0.2 mg/kg	2 days
1 mg/kg	8 days
2 mg/kg	18 days
3 mg/kg	18 days
5 mg/kg	18 days

What is the reason for the dose-dependent $t_{1/2}$? The biologic drug:

- a. eliminates primarily by the lymphatic system at lower doses.
- b. eliminates primarily by the liver resulting in nonlinear pharmacokinetics.
- c. eliminates by catabolism.
- d. distributes rapidly to peripheral organs at lower doses.
- e. exhibits target-mediated drug disposition.

40. Pravastatin inhibits:

- a. PCSK9 protein.
- b. lipoprotein lipase.
- c. vascular oxidative stress.
- d. scavenger receptor function.
- e. HDL synthesis.

41. Orlistat exerts its action by inhibiting:

- a. intestinal motility.
- b. the gastric proton pump.
- c. the hydrolysis of carbohydrates.
- d. gastrointestinal lipases.
- e. the metabolic rate.

42. What is the first process used when evaluating the integrity of a recombinant protein after each purification step?

- a. ELISA
- b. Quantitative PCR
- c. Peptide mapping
- d. SDS-polyacrylamide gel electrophoresis
- e. Amino acid sequencing

- 43.** Which of the following types of neurotransmitter receptors is most responsible for the decreased risk of extrapyramidal side effects observed with some second-generation antipsychotics relative to first-generation antipsychotics?
- Serotonergic
 - Histaminergic
 - Muscarinic
 - Noradrenergic
 - Alpha-adrenergic
- 44.** In tablets made from wet granulation processing, which of the following substances is commonly included as a lubricant?
- Lactose
 - Potato starch
 - Croscarmellose
 - Dicalcium phosphate
 - Sodium lauryl sulfate
- 45.** Permeation enhancers increase drug absorption from buccal dosage forms by which of the following mechanisms?
- Decreasing drug solubility
 - Extracting oral mucosal lipids
 - Disrupting saliva secretion
 - Increasing drug particle size
 - Prolonging oral retention
- 46.** The organophosphates commonly found in insecticides are thought to act by which of the following mechanisms?
- Combining with acetylcholine
 - Potentiating the action of acetylcholinesterase
 - Forming a very stable complex with acetylcholinesterase
 - Reacting at the cholinergic receptor
 - Preventing the release of acetylcholine from the nerve ending

PHARMACY PRACTICE - Clinical Sciences

- 47.** DR is in her third trimester of pregnancy and has a history of preterm labour. During a physical exam, she is diagnosed with bacterial vaginosis. She reports that her symptoms are mild. Appropriate management of DR is to:
- follow a watchful waiting approach and only initiate treatment if DR develops severe symptoms.
 - treat with lactic acid vaginal gel for five days.
 - treat with terconazole 0.75% vaginal cream for seven days.
 - treat with clindamycin 300 mg po bid for seven days.
 - treat with metronidazole 500 mg po bid for seven days.

- 48.** In a blood test for an older patient, what is the most probable physiological outcome consistent with the detection of normal 25(OH) vitamin D levels and undetectable levels of 1,25(OH)₂ vitamin D?
- Hypertension
 - Osteoporosis
 - Hypothyroidism
 - Normal aging
 - Obesity
- 49.** Which of the following lists represents appropriate antibiotic options that are useful for treating Lyme disease?
- Doxycycline, amoxicillin, ceftriaxone
 - Rifampin, cephalexin, ciprofloxacin
 - Nitrofurantoin, trimethoprim, cloxacillin
 - Norfloxacin, levofloxacin, moxifloxacin
 - Sulfamethoxazole, isoniazid, penicillin V
- 50.** A mother presents at the pharmacy with her 8 year old daughter, DW, who has been experiencing a sore throat and nasal congestion for three days. The throat pain has progressively worsened over the last two days and DW reports that it "hurts to swallow". The mother reports that DW's forehead is "a bit warm to touch", but she has not measured her temperature. In trying to rule out strep throat, which of the following is the most appropriate next step for the pharmacist?
- Ask the mother whether DW has had previous episodes of strep throat
 - Ask the mother whether there is any swelling or tenderness of the lymph nodes in DW's neck
 - Examine DW's face and neck for any evidence of a scarlatiniform rash
 - Examine DW's pharynx and tonsils for evidence of an exudate
 - Perform a rapid antigen test in DW to detect the presence of group A streptococcus
- 51.** Which of the following is the most appropriate recommendation for calcium supplementation for a 70 year old postmenopausal female who gets approximately 250 mg of elemental calcium daily from dietary sources?
- Calcium citrate 300 mg po bid
 - Calcium citrate 1000 mg po bid
 - Calcium lactate 650 mg po bid
 - Calcium carbonate 1250 mg po bid
 - Calcium carbonate 1500 mg po daily

- 52.** An ophthalmic side effect that can occur with the use of sildenafil is:
- blue vision.
 - corneal deposits.
 - blepharospasm.
 - pupil fixation.
 - seeing flashing lights.
- 53.** Which of the following is correct regarding asthma?
- Age of onset is usually greater than 40 year old.
 - There is no direct association between allergies and asthma.
 - Production of thick, coloured sputum often occurs with an asthma exacerbation.
 - Daytime symptoms less than three times per week indicates satisfactory control.
 - The course of disease is progressive, worsening with time.
- 54.** Which of the following natural products may be useful for osteoarthritis of the knee?
- Feverfew
 - St. John's wort
 - Evening primrose oil
 - Ginkgo biloba
 - Hyaluronic acid
- 55.** A 57 year old female has been receiving oxycodone for the past three months for severe, chronic back pain that remains only partially controlled. Which of the following statements is correct regarding opioid tolerance in this patient?
- For adequate pain management, this patient will likely require increasing opioid doses over time.
 - This patient would likely benefit from switching to methadone for pain management.
 - If this patient becomes tolerant to one opioid, she will have equal cross-tolerance to other opioids.
 - Switching from oxycodone to equivalent doses of another opioid would likely improve pain control.
 - Addition of an analgesic adjuvant such as gabapentin will permit tapering and discontinuation of the oxycodone.
- 56.** A 72 year old male is receiving treatment for prostate cancer. After two weeks of drug therapy, he complains to the pharmacist of bothersome hot flashes. The medication most likely to be causing this effect is:
- bicalutamide.
 - tamsulosin.
 - prednisone.
 - tamoxifen.
 - sildenafil.

57. Which of the following medications is known to lower the esophageal sphincter pressure and possibly exacerbate gastroesophageal reflux disease?
- Enalapril
 - Nifedipine
 - Naproxen
 - Potassium chloride
 - Ferrous gluconate
58. An elderly, bedridden patient has developed a stage II pressure ulcer with ruptured blisters on the sacrum. The wound is not necrotic. Which of the following is the most appropriate recommendation for treatment?
- Use sutures to close the wound.
 - Apply a transparent film dressing to allow moist wound healing.
 - Irrigate the wound with hydrogen peroxide.
 - Keep the patient immobilized, to allow the ulcer to heal.
 - Debride the wound daily.

QUESTIONS 59 and 60 REFER TO THE FOLLOWING:

TK is a 63 year old male with chronic kidney disease (CrCl = 29 mL/min/1.73m²) and gout. He experienced his last gout attack about two months ago. Today his toe is extremely painful, hot, red, and swollen. At a walk-in clinic, he receives a prescription for naproxen 500 mg po bid for five days. TK's other current medication is pravastatin 20 mg po at bedtime.

59. What drug therapy problem should the pharmacist identify for TK?
- Naproxen is inferior to indomethacin for the treatment of acute gout.
 - The duration of naproxen treatment is too short.
 - Naproxen should be avoided in patients taking pravastatin.
 - Naproxen should be avoided in patients with renal dysfunction.
 - The frequency of naproxen dosing is too low.
60. Following successful resolution of the acute episode, TK's physician decides that he should initiate allopurinol. TK should be advised to:
- limit fluid intake.
 - take medication on an empty stomach.
 - use precautions to avoid photosensitivity.
 - report any skin rash or itching to the physician.
 - avoid dairy products or multivitamins within two hours of each dose.

- 61.** At typical dosing, which of the following antidepressant medications is associated with the highest incidence of nausea?
- Sertraline
 - Fluoxetine
 - Duloxetine
 - Escitalopram
 - Desvenlafaxine
- 62.** Which of the following statements is correct regarding the use of fluoroquinolones?
- Fluoroquinolones can cause blood glucose alterations in elderly patients who take oral antihyperglycemic medications.
 - Healthy women with acute uncomplicated cystitis should be treated for a minimum of seven days with a fluoroquinolone.
 - Therapeutic drug monitoring is recommended with prolonged fluoroquinolone therapy, to avoid ototoxicity.
 - In the case of treatment failure, another fluoroquinolone should be tried before switching to a different antibiotic class.
 - All fluoroquinolones have equal efficacy when used to treat patients with community-acquired pneumonia.
- 63.** Which of the following medications requires monitoring for the adverse effect of dyslipidemia?
- Ciprofloxacin
 - Allopurinol
 - Isotretinoin
 - Ramipril
 - Raloxifene
- 64.** Which of the following oral antifungal agents is the most likely to cause hepatotoxicity?
- Fluconazole
 - Nystatin
 - Ketoconazole
 - Terbinafine
 - Itraconazole

QUESTIONS 65 and 66 REFER TO THE FOLLOWING:

QB, a 72 year old male, presents to the pharmacy with a new prescription for vancomycin 250 mg po qid for 10 days for treatment of an infection.

- 65.** QB's infection is mostly likely caused by which of the following organisms?
- Viridans streptococci
 - Staphylococcus aureus*
 - Pseudomonas aeruginosa*
 - Escherichia coli*
 - Clostridioides difficile*

- 66.** QB experienced "vancomycin flushing syndrome" after receiving intravenous vancomycin two years ago for a bloodstream infection. What is the most appropriate course of action for the pharmacist?
- Dispense the vancomycin
 - Dispense the vancomycin and advise QB to pre-medicate with diphenhydramine
 - Dispense the vancomycin and advise QB to take the first dose while being observed at the pharmacy
 - Do not dispense the vancomycin and contact the prescriber to discuss an alternative
 - Do not dispense the vancomycin and contact the prescriber to discuss allergy testing for QB

- 67.** WS, a 30 year old, otherwise healthy male suffering from allergic rhinitis, requests an oral, non-sedating antihistamine. Which of the following antihistamines should the pharmacist recommend?
- Chlorpheniramine
 - Diphenhydramine
 - Promethazine
 - Loratadine
 - Brompheniramine

- 68.** A community pharmacist conducts a medication review for a 67 year old patient who has a 20-year history of COPD, diabetes and depression. The patient's current medications include the following:

Aclidinium 400 mcg inhaler, one inhalation bid
Budesonide 200 mcg/formoterol 6 mcg Turbuhaler®, 2 inhalations bid
Salbutamol 100 mcg MDI, 2 inhalations qid
Sitagliptin 100 mg, one tablet po daily
Metformin 500 mg, one tablet po tid
Venlafaxine ER 150 mg, one capsule po at bedtime

Which of the following drug therapy problems should be identified for this patient?

- Taking too high a dosage of aclidinium
 - Taking too high a dosage of metformin
 - Inappropriate dosing time for venlafaxine
 - Drug interaction between sitagliptin and metformin
 - Duplication of therapy with salbutamol and formoterol
- 69.** Which of the following would be the most appropriate treatment for moderate to severe atopic dermatitis in an 8 year old child?
- Urea 20% cream
 - Tacrolimus 0.03% ointment
 - Pimecrolimus 1% cream
 - Betamethasone dipropionate 0.05% ointment
 - Clobetasone propionate 0.05% cream

- 70.** Which of the following is a normal host defense that helps to prevent pneumonia?
- Low sputum pH
 - Aspiration
 - Thick, tenacious sputum
 - Neutropenia
 - Epiglottal closure
- 71.** Tadalafil is preferred over sildenafil in which of the following patient situations?
- After using sublingual nitroglycerin
 - After eating a high-fat meal
 - If receiving hemodialysis
 - If taking testosterone supplementation
 - For males over the age of 60 years
- 72.** Which of the following vitamins is found at reduced levels in cigarette smokers compared to nonsmokers?
- Vitamin A
 - Vitamin B₁₂
 - Vitamin C
 - Vitamin D
 - Vitamin K
- 73.** Which of the following is a reasonable goal of therapy for a patient with active inflammatory bowel disease?
- Prevent infection
 - Prevent mortality
 - Maintain quality of life
 - Achieve endoscopic remission
 - Limit the number of colectomies
- 74.** BC is a 25 year old female with depression who has had an adequate trial with each of sertraline and escitalopram. She has tolerated the medications but has only achieved a partial response to escitalopram 20 mg po once daily. Which of the following is the most appropriate next step for BC?
- Increase escitalopram to 40 mg po once daily
 - Add diazepam 5 mg po once daily to escitalopram
 - Add aripiprazole 2 mg po once daily to escitalopram
 - Stop escitalopram and start fluoxetine 20 mg po once daily
 - Stop escitalopram and start venlafaxine XR 150 mg po once daily

- 75.** An appropriate empiric treatment for community-acquired pneumonia (CAP) in a previously healthy adult patient would be:
- amoxicillin.
 - penicillin G.
 - ciprofloxacin.
 - nitrofurantoin.
 - metronidazole.
- 76.** Lactose intolerance is classified as a(n):
- allergy.
 - enzyme deficiency.
 - mineral deficiency.
 - transporter abnormality.
 - vitamin deficiency.
- 77.** In the treatment of a patient who has a solid tumour, which of the following side effects typically occurs one to two weeks after chemotherapy?
- Neuropathy
 - Cardiotoxicity
 - Neutropenia
 - Emesis
 - Nephrotoxicity
- 78.** A community pharmacist would like to begin a diabetic education program for local patients newly diagnosed with type 2 diabetes mellitus. Beneficial information for this group includes all of the following **EXCEPT**:
- strategies to minimize cardiac risk factors.
 - the facts on diabetes and its complications.
 - the role of blood glucose monitoring.
 - appropriate dietary recommendations.
 - the technique for the mixing of insulins.
- 79.** Which of the following is characterized as an autoimmune disorder?
- Alzheimer disease
 - Systemic lupus erythematosus
 - Osteoarthritis
 - Parkinson disease
 - Paget disease

- 80.** A pregnant female presents with a prescription for an antibiotic for treatment of a urinary tract infection. She tells the pharmacist that she doesn't know why the doctor gave her the medication, because she isn't experiencing any symptoms. Her presentation is consistent with which of the following diagnoses?
- a. Cystitis
 - b. Septicemia
 - c. Urinary retention
 - d. Pyelonephritis
 - e. Asymptomatic bacteriuria

PHARMACY PRACTICE – Professional Practice Skills

- 81.** The web site of which of the following would be most appropriate to consult in order to determine whether there are any safety alerts associated with a prescription drug product?
- a. Canadian Agency for Drugs and Technologies in Health
 - b. Health Canada
 - c. Institute for Safe Medication Practices
 - d. Canadian Patient Safety Institute
 - e. Canadian Institute for Health Information
- 82.** Aerosol OT (AOT) is used in veterinary medicine as a laxative. If 250 g of AOT is dissolved in 1,000 mL of glycerin (density of glycerin is 1.25 g/mL), the concentration of AOT in the solution is:
- a. 12.5% w/w.
 - b. 16.7% w/w.
 - c. 20% w/w.
 - d. 23.8% w/w.
 - e. 25% w/w.
- 83.** The effect of a health policy change is typically assessed by a(n):
- a. interrupted-time series study.
 - b. ecological study.
 - c. cross-sectional study.
 - d. N-of-1 study.
 - e. case-control study.
- 84.** At which of the following phases of the medication use process are medication errors most prevalent?
- a. Identifying that a medication is needed
 - b. Prescribing the medication
 - c. Labelling the medication
 - d. Administering the medication
 - e. Monitoring the medication therapy

- 85.** Which of the following medications requires an auxiliary label regarding avoiding the consumption of grapefruit or grapefruit juice?
- Felodipine
 - Amlodipine
 - Levetiracetam
 - Divalproex
 - Gabapentin
- 86.** A physician wants to switch a terminally-ill patient from slow release morphine sulfate tablets, 15 mg tablets. If a morphine sulfate solution containing 5 mg per mL is prescribed q4h, what volume should be dispensed for a 20-day supply to provide the same pain relief as the tablet regimen?
- 20 mL
 - 60 mL
 - 80 mL
 - 100 mL
 - 120 mL
- 87.** According to the federal Food and Drugs Regulations, after receiving or becoming aware of a serious adverse drug reaction in Canada, the manufacturer of the drug must submit a report to the Minister within how many days of the event?
- 5
 - 10
 - 15
 - 20
 - 30
- 88.** For a pharmacist manager of a pharmacy that strives to provide optimal clinical services, which of the following strategies should be implemented to help reduce barriers to medication adherence?
- Ensure that all patients are assessed by a pharmacist upon receiving a new prescription.
 - Ensure that all patients are assessed by a pharmacist after taking a medication for at least 6 months.
 - Restrict pharmacy services to those patients who verbally request assistance from a pharmacist.
 - Focus resources on reducing the costs of medications for patients.
 - Provide only written information for all patients who receive a new prescription.
- 89.** Rx Timolol 0.25 % drops
Mitte : 15 mL
Sig: gtt. i o.d. bid
- On the prescription label the instructions to the patient should read:
- apply one drop into both eyes twice daily.
 - instill one drop into the left eye twice daily.
 - instill one drop into the right eye twice daily.
 - shake well and instill one drop into the left eye twice daily.
 - shake well and instill one drop into the right ear twice daily.

- 90.** Which of the following groups is at higher risk of low health literacy? Those who:
- are of the Caucasian race.
 - have middle class socioeconomic status.
 - received their university education in another country.
 - are age 65 years or older.
 - speak only one language fluently.
- 91.** The recommended pediatric dosage for azithromycin therapy is 12 mg/kg po once daily on Days 1 through 5. For a child weighing 8.3 kg, calculate the total volume needed for the total course of treatment, if a product supplying 200 mg/5 mL is supplied for this order.
- 12.5 mL
 - 15 mL
 - 25 mL
 - 37.5 mL
 - 50 mL
- 92.** A biological safety cabinet is required when preparing a parenteral formulation of:
- tenecteplase.
 - doxorubicin.
 - magnesium sulfate.
 - nitroglycerin.
 - penicillin.
- 93.** Which of the following statements is correct regarding hypothesis testing?
- A type I error frequently occurs when sample sizes are small.
 - A type II error is more serious than a type I error.
 - Small p-values suggest that the null hypothesis is likely to be true.
 - The larger the p-value, the more likely the null hypothesis is false.
 - P-value is the probability of wrongly rejecting the null hypothesis if it is in fact true.
- 94.** An adequately powered, randomized controlled trial conducted over two years demonstrated that the primary outcome (a serious cardiovascular event) occurred in 15% of the patients who received the new drug, whereas the primary outcome occurred in 25% of the patients who received a placebo. The relative risk reduction achieved with the new drug is:
- 10%.
 - 15%.
 - 25%.
 - 40%.
 - 50%.

- 95.** In an adequately powered, randomized controlled trial conducted over three years, a specific serious side effect (i.e., reduction in leukocytes) with conventional therapy is seen in 0.5% of the study sample. In patients who receive a newly discovered drug, only 0.45% experience the same side effect. Based on these results, the minimum number of patients that would have to receive the new drug for three years to statistically demonstrate the prevention of one episode of this side effect in at least one patient is:
- 15.
 - 20.
 - 150.
 - 200.
 - 2000.
- 96.** In a study comparing two drug treatment regimens, a type II error occurs when:
- the statistical conclusion is that there is a difference between the two treatment regimens when a difference does not actually exist.
 - the statistical conclusion is that there is no difference between the two treatment regimens when a difference actually does exist.
 - the p level is > 0.05 .
 - the drug treatments studied are not appropriate comparators for the disease.
 - the exclusion criteria are too restrictive.
- 97.** Schedule A of Canada's Food and Drugs Act contains a list of:
- vitamins and minerals.
 - narcotic preparations.
 - medical conditions.
 - radiopharmaceuticals.
 - controlled drugs.
- 98.** Which of the following statements regarding a disruption in the cold chain for vaccines is correct?
- Vaccines exposed to temperatures above the recommended range can have an increase in potency and should not be administered to any patient.
 - Vaccines exposed to temperatures below the recommended range should be labelled "do not use" and kept at room temperature until their integrity is determined.
 - Inactivated vaccines are more likely than live attenuated vaccines to have a shortened half-life when exposed to high temperatures (up to 37°C).
 - Diluents of vaccines that have been frozen can be used as they do not contain any active ingredients.
 - Vaccines containing an aluminum adjuvant experience a permanent loss of potency when subjected to freezing.
- 99.** Which of the following is a significant barrier perceived by physicians, that impedes effective pharmacist-physician collaboration in the provision of patient care?
- Provision of patient-specific counselling by pharmacists
 - Lack of adequate education and training of pharmacists
 - Lack of pharmacist follow up in assessing patient outcomes
 - Increased patient demands for more frequent medical appointments
 - Interruption of physician workflow due to pharmacist communications

- 100.** Which of the following exemplifies the pharmacist professional identity?
- To think, act, and feel like a pharmacist.
 - To provide the best possible patient care.
 - To present oneself consistently in an appropriate manner.
 - To complete all tasks associated with prescription drug therapy.
 - To encompass the knowledge and skills expected of a pharmacist.
- 101.** Which of the following drug orders is incomplete and requires follow-up with the prescriber?
- Zithromax Z-Pak® (azithromycin 250 mg), 2 tabs po on day 1 and 1 tab po on days 2-5.
 - Flonase® (fluticasone) 100 mcg spray, 1 or 2 sprays in each nostril bid x 1 bottle
 - Actonel® (risedronate), 35 mg po once weekly x 12 tabs
 - Cozaar® (losartan), 50 mg po bid x 1 month
 - Zocor® (simvastatin), 1 tab po hs for 3 months
- 102.** A pharmacist has received information regarding a new drug to treat hypertension. The information is based on a two-month, placebo controlled, randomized study of 1000 adults that showed a statistically significant average decrease in systolic pressure from 160 mm Hg to 141 mm Hg and in diastolic pressure from 98 mm Hg to 86 mm Hg. The most common adverse reactions were stomach upset and dizziness. Which of the following is the most significant limitation of this study?
- The study size was too small to assess efficacy.
 - The patients did not achieve guideline targets for hypertension.
 - Blood pressure is a surrogate outcome.
 - Long-term safety and efficacy were not assessed.
 - Placebo is not an appropriate comparator.

BEHAVIOURAL, SOCIAL AND ADMINISTRATIVE PHARMACY SCIENCES

- 103.** The gross margin for Pharmacy A was higher last year compared to the current year. Which of the following is the best explanation for the change in margin?
- More medications expired last year compared to the current year.
 - The prescription mix has been weighted to brand name manufacturers for the current year.
 - There was an increase in the amount of time spent providing education on nonprescription products during the current year.
 - There were more sales in the pharmacy's loss leader category during the current year.
 - Patients were more adherent in taking their prescription medications during the current year.
- 104.** What type of analysis should a provincial drug plan perform to estimate the effect that adding a new drug to their formulary will have on the total costs of the provincial drug plan?
- Workforce analysis
 - Liquidity analysis
 - Cost utility analysis
 - Cash flow analysis
 - Budget impact analysis

- 105.** Which of the following is an example of a pharmacy's ability to provide a high net delivered customer value?
- Using a low dispensing fee to compete with other pharmacies and attract new customers
 - Offering compounding services in addition to standard prescription dispensing
 - Offering disease-prevention programs for a service fee
 - Providing compliance packaging and delivery to a local long-term care facility
 - Offering personal follow ups on a weekly basis with new product and service proposals
- 106.** The Patented Medicine Prices Review Board reports to the:
- provincial Ministers of Health.
 - Public Health Agency of Canada.
 - Canadian Parliament.
 - Canadian Pharmacists Association.
 - National Association of Pharmacy Regulatory Authorities.
- 107.** “Medically necessary” services are established in Canada by the:
- provincial governments.
 - provincial drug plans.
 - Canadian Medical Association.
 - federal government.
 - Royal College of Physicians and Surgeons of Canada.
- 108.** Vaccines are approved for use in Canada by the:
- Public Health Agency of Canada.
 - Biologic and Radiopharmaceutical Drugs Directorate.
 - Canadian Agency for Drugs and Technologies in Health.
 - Therapeutic Products Directorate.
 - National Advisory Committee on Immunization.
- 109.** In Canada, which of the following is responsible for initiating a recall of a potentially hazardous drug product?
- The Public Health Agency of Canada
 - The drug product’s manufacturer
 - Each provincial ministry of health
 - Institute for Safe Medication Practices (ISMP) Canada
 - Canadian Agency for Drugs and Technologies in Health (CADTH)
- 110.** The term ‘perspective’ in the context of a pharmacoeconomic study refers to the:
- source of funding for conducting the pharmacoeconomic analysis.
 - approach the researcher takes to analyze the research problem.
 - approach the researcher uses to limit confounding factors.
 - stakeholder whose interest is most represented in the study’s conclusions.
 - method used to facilitate communication of the study results in a journal publication.

- 111.** Customer loyalty should be important to a pharmacy manager because it:
- reduces the amount of time that pharmacists must spend with patients.
 - generates a stream of high revenue from an identifiable customer base.
 - helps the pharmacy staff to greet customers by their first names.
 - protects the pharmacy manager from liability claims arising from dispensing errors.
 - is costly to attract new customers.
- 112.** Including a cost assessment in the protocol for a randomized, controlled clinical trial is called a:
- cost-benefit analysis.
 - cost-minimization analysis.
 - cost-feasibility analysis.
 - cost-efficacy analysis.
 - cost-utility analysis.
- 113.** An identical screening test for a disease is used in two Communities (A and B), but the proportion of false positive results among those who test positive in Community A is lower than those who test positive in Community B. What is the most likely explanation for this finding?
- The specificity of the test is lower in Community A.
 - The specificity of the test is higher in Community A.
 - The prevalence of disease is lower in Community A.
 - The prevalence of disease is higher in Community A.
 - It is not possible to explain the difference between Community A and B.
- 114.** What minimal sample size is needed in a clinical trial to detect an adverse event occurring at the rate of 1 per 1,000?
- 3,000
 - 6,000
 - 30,000
 - 60,000
 - 300,000
- 115.** Which of the following would be the most effective method to prevent “inventory shrinkage” due to internal theft within a pharmacy?
- Assigning the responsibility of ordering and receiving inventory to one employee.
 - Implementing an employee bag check program at the end of shifts.
 - Hiring a uniformed security guard to monitor the pharmacy exits.
 - Offering incentives such as employee discounts on merchandise.
 - Installing mirrors and security cameras strategically throughout the pharmacy.

Answers to Sample Questions

1. (a)	26. (d)	51. (d)	76. (b)	101. (e)
2. (c)	27. (a)	52. (a)	77. (c)	102. (d)
3. (d)	28. (a)	53. (d)	78. (e)	103. (b)
4. (a)	29. (a)	54. (e)	79. (b)	104. (e)
5. (e)	30. (a)	55. (a)	80. (e)	105. (e)
6. (c)	31. (d)	56. (a)	81. (b)	106. (c)
7. (d)	32. (d)	57. (b)	82. (b)	107. (a)
8. (d)	33. (d)	58. (b)	83. (a)	108. (b)
9. (d)	34. (c)	59. (d)	84. (b)	109. (b)
10. (d)	35. (a)	60. (d)	85. (a)	110. (d)
11. (c)	36. (c)	61. (a)	86. (e)	111. (e)
12. (c)	37. (e)	62. (a)	87. (c)	112. (d)
13. (a)	38. (c)	63. (c)	88. (a)	113. (d)
14. (b)	39. (e)	64. (c)	89. (c)	114. (a)
15. (d)	40. (c)	65. (e)	90. (d)	115. (b)
16. (a)	41. (d)	66. (a)	91. (a)	
17. (b)	42. (d)	67. (d)	92. (b)	
18. (b)	43. (c)	68. (e)	93. (e)	
19. (a)	44. (e)	69. (b)	94. (d)	
20. (d)	45. (b)	70. (e)	95. (e)	
21. (e)	46. (c)	71. (b)	96. (b)	
22. (d)	47. (e)	72. (c)	97. (c)	
23. (b)	48. (b)	73. (d)	98. (e)	
24. (c)	49. (a)	74. (c)	99. (e)	
25. (a)	50. (b)	75. (a)	100.(a)	