



THE PHARMACY EXAMINING BOARD OF CANADA
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Sample Questions

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 Folic acid has tetrahydrofolate coenzyme activity which is based on the:
 - a. pyrimidine ring.
 - b. purine ring.
 - c. pyrazine ring.
 - d. pteridine ring.
 - e. pyridine ring.
- 2 Enkephalins are peptides that:
 - a. have narcotic antagonist activity.
 - b. exert actions resembling those of opioids.
 - c. are found only in the central nervous system.
 - d. cause blood vessel wall relaxation.
 - e. transmit pain impulses.
- 3 β -Carotene is the precursor of:
 - a. retinol.
 - b. thiamine.
 - c. calciferol.
 - d. riboflavin.
 - e. retinoic acid.
- 4 Which of the following statements regarding transcription is correct?
 - a. The enzyme responsible for initiating transcription is RNA polymerase.
 - b. The enzyme responsible for initiating transcription is DNA polymerase.
 - c. During transcription, the genetic information contained in the nucleotide sequence of tRNA is translated into a protein structure.
 - d. The process of transcription includes the splicing of exons.
 - e. 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?
 - a. *Escherichia coli*
 - b. *Legionella pneumophila*

- c. *Staphylococcus aureus*
- d. *Streptococcus pneumoniae*
- e. *Chlamydomonada pneumoniae*

6 Which of the following blood vessels transports nutrient rich blood from the intestines to the liver?

- a. Hepatic artery
- b. Hepatic portal vein
- c. Great saphenous vein
- d. Inferior vena cava
- e. Superior vena cava

7 The blood volume of the average adult is approximately:

- a. 5 L.
- b. 10 L.
- c. 15 L.
- d. 20 L.
- e. 25 L.

8 In adults, community-acquired pneumonia caused by which of the following organisms is associated with the highest mortality rate?

- a. *Chlamydomonada pneumoniae*
- b. *Mycoplasma pneumoniae*
- c. *Haemophilus influenzae*
- d. *Streptococcus pneumoniae*
- e. *Pneumocystis jirovecii*

9 Which of the following is the major inhibitory neurotransmitter in the brain?

- a. Gamma-aminobutyric acid
- b. Dopamine
- c. Glutamate
- d. Acetylcholine
- e. Glycine

10 Which of the following enzymes catalyzes the synthesis of DNA from viral RNA?

- a. Reverse transcriptase
- b. DNA polymerase
- c. RNA polymerase
- d. Endonuclease
- e. Aminoacyl-tRNA synthetase

11 Of the essential transition metal ions found in the human body, the one present at highest overall concentration is:

- a. copper.
- b. cobalt.
- c. iron.
- d. manganese.
- e. zinc.

12 The optic disc is also called the:

- a. blind spot.
- b. cornea.
- c. iris.
- d. pupil.
- e. macula lutea.

13 If systemic blood pressure decreases, which of the following would occur to help return blood pressure to normal?

- a. Increased urine production

- b. Increased acetylcholine release
- c. Increased aldosterone secretion
- d. Increased diameter of systemic arterioles
- e. Increased erythropoietin production

PHARMACEUTICAL SCIENCES

14 If the pK_a of phenobarbital is 7.4, what approximate fraction of the drug would be ionized at pH 8.4?

- a. 10%
- b. 30%
- c. 50%
- d. 90%
- e. 100%

15 All of the following statements concerning the lyophilization of a parenteral product are correct, **EXCEPT**:

- a. there is minimal loss of activity in heat labile materials.
- b. the liquid must be frozen to below the eutectic temperature.
- c. the solute usually forms an amorphous glass.
- d. the eutectic temperature is the freezing point of the drug solution.
- e. water is removed from the frozen mixture by sublimation.

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 Concentration of a drug in breast milk exceeds that in plasma, if the drug:

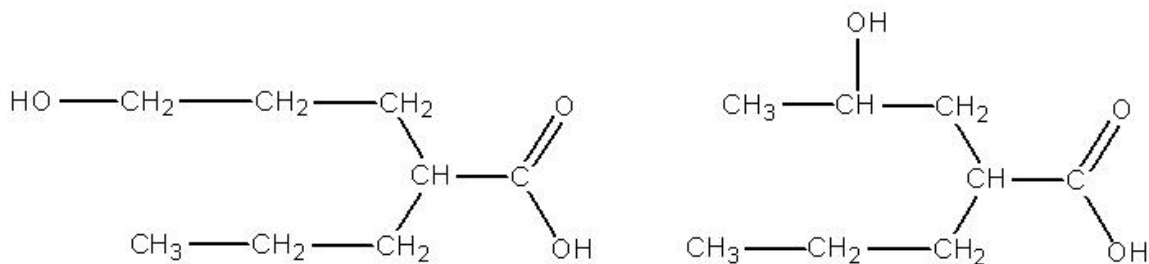
- a. is basic.
- b. is protein bound.
- c. is acidic but not protein bound.
- d. has a small volume of distribution.
- e. has a large volume of distribution.

18 Mercapturic acid derivatives in phase II metabolism can result from reactions of:

- a. glutathione conjugates.
- b. glucuronide conjugates.
- c. glycine conjugates.
- d. glutamate conjugates.
- e. sulfate conjugates.

19 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



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

- conformational isomerism.
- structural isomerism.
- geometric isomerism.
- optical isomerism.
- diastereoisomerism.

21 Which of the following medications induces an isoform of cytochrome P450?

- Carbamazepine
- Clarithromycin
- Amiodarone
- Metronidazole
- Bosentan

22 Diazepam Injection U.S.P

Diazepam 5 mg/ml

Ethanol 10%

Propylene glycol 40%

Benzyl alcohol 1.5%

Water for Injection qs 100%

In the formulation given above, propylene glycol functions as a(n):

- emulsifier.
- antioxidant.
- cosolvent.
- buffer.
- preservative.

23 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

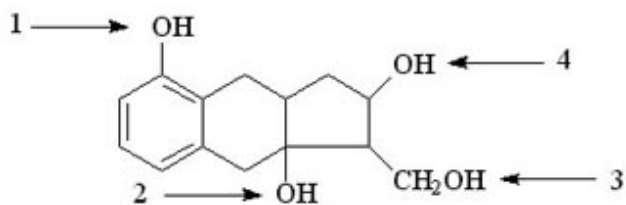
24 Abatacept acts by:

- 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.

25 With respect to bioequivalence, the parameter " C_{max} " is:

- affected by the extent of absorption only.
- affected by the rate of absorption only.
- affected by neither rate nor extent of absorption.
- affected by both rate and extent of absorption.
- the only significant parameter.

26



Which of the hydroxyls in the compound above is a tertiary alcohol?

- a. Hydroxyl 1
- b. Hydroxyl 2
- c. Hydroxyl 3
- d. Hydroxyl 4
- e. Hydroxyls 1 and 2

27



The above structures are related to one another as:

- a. bioisosteres.
- b. enantiomers.
- c. homologs.
- d. rotamers.
- e. positional (structural) isomers.

28 Five subjects given a single intravenous dose of a drug have the following elimination half-lives: 3, 9, 6, 5 and 4 h (hours). The mean half-life is:

- a. 4 h.
- b. 5 h.
- c. 5.4 h.
- d. 5.8 h.
- e. 6 h.

29 Reasons for using coatings on tablets include all of the following, **EXCEPT**:

- a. to mask the taste of the drug.
- b. to mask the odor of the drug.
- c. to improve the appearance of the tablet.
- d. to increase the drug's release rate.
- e. to protect the drug from stomach acid.

30 Which of the following terms indicates a loss of moisture?

- a. Deliquescence
- b. Efflorescence
- c. Hygroscopicity
- d. Polymorphism
- e. Condensation

31 Which of the following statements is **FALSE** regarding tablet formulation?

- a. Diluents are fillers to add bulk to the tablet.
- b. Lubricants help the patient to swallow the tablet more easily.

- c. Binding agents may be added dry or in solution.
- d. Disintegrants draw water into the tablet causing it to burst.
- e. Glidants promote the flow of materials during compression.

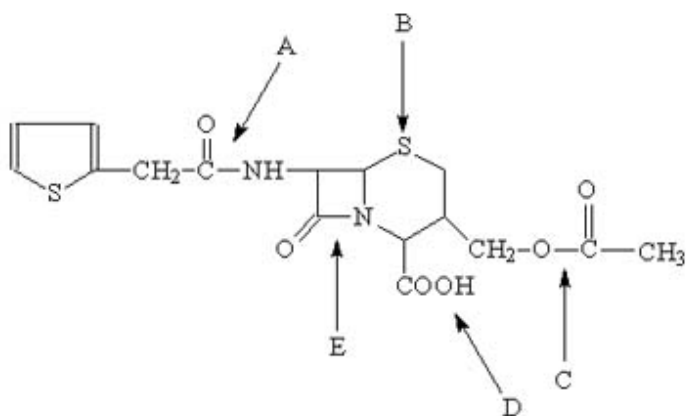
32 Factors that determine bioequivalence of two brands of a drug include the:

- a. taste of the preparations.
- b. physical appearance of the preparations.
- c. pharmacokinetic parameters of the preparations.
- d. cost of the preparations.
- e. package size of the preparations.

33 The total body clearance of a drug is 200 mL/min in a normal healthy adult and the renal clearance is 10 mL/min. This is most likely explained by the fact that the drug:

- a. is extensively metabolized.
- b. accumulates in patients with moderate renal failure
- c. undergoes significant entero-hepatic recycling.
- d. is not bound to plasma proteins.
- e. is concentrated in adipose tissue.

34 The major pathway for the biotransformation of the following compound is by hydrolysis. Identify the site which would be most susceptible to hydrolysis.



- a. A
- b. B
- c. C
- d. D
- e. E

35 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.

36 Which of the following diuretics is used to block the Na⁺-H⁺ exchange system of the renal tubule?

- a. Furosemide
- b. Hydrochlorothiazide
- c. Spironolactone
- d. Acetazolamide
- e. Amiloride

37 Atropine poisoning can be recognized by all of the following signs or symptoms, **EXCEPT**:

- a. dry skin.
- b. flushed appearance.

- c. delirium and restlessness.
- d. mydriasis.
- e. diarrhea.

38 The organophosphates commonly found in insecticides are thought to act by which of the following mechanisms?

- a. Combining with acetylcholine
- b. Potentiating the action of acetylcholinesterase
- c. Forming a very stable complex with acetylcholinesterase
- d. Reacting at the cholinergic receptor
- e. Preventing the release of acetylcholine from the nerve ending

39 Which of the following is a selective adrenergic beta₁-blocker with endothelium-dependent vasodilating properties?

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

40 Which of the following statements is true 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 avoids raising an immune response against the FAB part.

QUESTIONS 41 TO 43 INCLUSIVE REFER TO THE FOLLOWING:

A 3 year old child was admitted to the hospital following ingestion of an overdose of acetylsalicylic acid. The child was semi-comatose, flushed and flaccid. Her pupils were fixed and dilated. Respirations were deep and rapid. Laboratory investigation indicated serum salicylate level of 5.8 mmol/L and a urinary pH of 6.

41 The syndrome of deep and rapid respirations would initially lead to:

- a. respiratory acidosis.
- b. respiratory alkalosis.
- c. renal excretion of acid.
- d. marked reduction in body temperature.
- e. increased chloride elimination in urine.

42 As a result of other mechanisms the child would likely progress to:

- a. hyperglycemia.
- b. hypoglycemia.
- c. metabolic alkalosis.
- d. systemic acidosis.
- e. renal failure.

43 One form of therapy to hasten the excretion of salicylate involves the administration of:

- a. vasopressin (ADH).
- b. probenecid.
- c. ammonium chloride.
- d. sodium bicarbonate.
- e. aluminum hydroxide.

- 44 In some parenteral formulations, sodium metabisulphite is included as:
- an antioxidant.
 - a chelator.
 - a solubilizer.
 - a cosolvent.
 - an emulsifier.
- 45 The carbonic anhydrase inhibitor dorzolamide is structurally classified as a:
- biguanide.
 - butyrophenone.
 - sulfonamide.
 - sulfonylurea.
 - thiazolidinedione.
- 46 Which of the following statements is **FALSE** regarding virus vectors used in the production of biotechnology drugs?
- Viruses can be introduced by nutrients.
 - Viruses can be generated by an infected production cell line.
 - The most frequent source of virus introduction is the growth media.
 - Viruses can be inactivated by physical or chemical treatment of the product.
 - There is a trend toward using better-defined growth media in which serum levels are significantly reduced.
- 47 Which of the following excipients is **NOT** commonly found in biotechnology formulations?
- Albumin
 - Lysine
 - Tween 20
 - Saline
 - Phosphate
- 48 An angiotensin-converting enzyme (ACE) inhibitor for which both renal elimination and metabolism are important in the elimination of the drug and its active metabolites is:
- enalapril.
 - fosinopril.
 - lisinopril.
 - quinapril.
 - ramipril.
- 49 Once daily dosing of aminoglycosides is effective due to:
- prolonged residence of the antibiotic in the body.
 - post-antimicrobial effect.
 - enhanced tissue accumulation.
 - reduced renal clearance.
 - higher peak-trough differences.
- 50 The method of ionization of mass spectrometry which results in well-established diagnostic fragmentation patterns that are useful in the identification of compounds of unknown structure is called:
- atmospheric pressure chemical ionization (APCI).
 - chemical ionization (CI).
 - electron impact (EI) ionization.
 - electrospray ionization (ESI).
 - fast atom bombardment (FAB) ionization.
- 51 An ophthalmic solution contains zinc sulfate 0.25%, phenylephrine HCl 0.12% and boric acid 1.1% (NaCl equivalents: zinc sulfate 0.15, phenylephrine HCl 0.32, boric acid 0.5). Relative to lacrimal fluid, the solution is:
- isotonic.
 - hypotonic.

- c. hypertonic.
- d. hyperosmotic.
- e. isoosmotic.

PHARMACY PRACTICE - Clinical Sciences

52 At typical dosing, which of the following antidepressant medications is associated with the highest incidence of nausea?

- a. Sertraline
- b. Fluoxetine
- c. Duloxetine
- d. Escitalopram
- e. Desvenlafaxine

53 The shock and airway edema of anaphylaxis are best treated with:

- a. salbutamol.
- b. diphenhydramine.
- c. epinephrine.
- d. acetazolamide.
- e. aminophylline.

54 Which of the following statements is true regarding the use of fluoroquinolones?

- a. Fluoroquinolones can cause blood glucose alterations in elderly patients who take oral antihyperglycemic medications.
- b. Healthy women with acute uncomplicated cystitis should be treated for a minimum of 7 days with a fluoroquinolone.
- c. Therapeutic drug monitoring is recommended with prolonged fluoroquinolone therapy, to avoid ototoxicity.
- d. In the case of treatment failure, another fluoroquinolone should be tried before switching to a different antibiotic class.
- e. All fluoroquinolones have equal efficacy when used to treat patients with community-acquired pneumonia.

55 Prednisone may produce all of the following effects, **EXCEPT**:

- a. skeletal muscle weakness.
- b. hypoglycemia.
- c. sodium retention.
- d. peptic ulceration.
- e. lowered resistance to infection.

QUESTIONS 56 TO 57 INCLUSIVE REFER TO THE FOLLOWING:

SM is a 34 year old female who, while vacationing in Mexico, began prophylactic treatment for travellers' diarrhea. Shortly thereafter she complained of a feeling of fullness in her ears, black stools and a black tongue. SM's previous history includes an allergy to sulfonamides.

56 Which of the following drugs could be the cause of SM's complaints?

- a. Bismuth subsalicylate
- b. Cotrimoxazole
- c. Doxycycline
- d. Amoxicillin
- e. Loperamide

57 An organism commonly implicated in the cause of travellers' diarrhea is:

- a. Bacteroides fragilis.
- b. Escherichia coli.
- c. Clostridium difficile.
- d. Listeria monocytogenes.

e. *Pseudomonas aeruginosa*.

58 Which of the following medications requires monitoring for the adverse effect of dyslipidemia?

- a. Ciprofloxacin
- b. Allopurinol
- c. Isotretinoin
- d. Ramipril
- e. Raloxifene

59 The mother of a 6 year old child presents to the pharmacist with a written prescription for amoxicillin that was ordered by the physician 3 days earlier. She states that her child was diagnosed with otitis media and the symptoms have remained the same over the past 3 days. Which of the following is the most appropriate pharmacist response?

- a. Fill the prescription as written.
- b. Refuse to fill the prescription as the antibiotic order is no longer current.
- c. Indicate a need to contact the prescriber before filling the prescription at this time.
- d. Fill the prescription for a quantity that is the ordered amount less three days' supply.
- e. Explain that, at this late date, antibiotic therapy will likely be ineffective for the child.

60 RF is an 80 year old female who developed CDAD (*Clostridium difficile*-associated diarrhea) after recent treatment of a urinary tract infection with ciprofloxacin. She is admitted to hospital with profound diarrhea (8 watery bowel movements per day) and fever (39.5° C). Based on her symptoms, which of the following is the most appropriate therapy choice for her?

- a. Oral metronidazole
- b. Intravenous metronidazole
- c. Oral cholestyramine
- d. Oral vancomycin
- e. Intravenous vancomycin

61 CC, a 72 year old female, complains to the pharmacist that her stomach has been bothering her recently. Current medications include: levothyroxine 100 mcg po daily (x 30 years), acetaminophen 500 mg po qid (x 5 months), atorvastatin 40 mg po at bedtime (x 4 years), ibuprofen 400 mg po tid prn joint pain (x 2 months), and zopiclone 3.75 mg po at bedtime prn (x 3 months).

Based on CC's current symptoms, which of the following drug therapy problems best describes CC's current situation?

- a. Too high a dosage of atorvastatin
- b. Too high a dosage of zopiclone
- c. Need for cytoprotection with ibuprofen
- d. Drug interaction between atorvastatin and zopiclone
- e. Too low a dosage of levothyroxine

62 A 27 year old patient presents to a community pharmacy for the first time and tells the pharmacist that he experienced an allergy to a penicillin product as a child. His symptoms included hives, wheezing and facial swelling, which resulted in hospitalized care. Which of the following is the most important reason for a community pharmacist to document this type of information in a patient's medication profile record?

- a. To provide drug allergy information to the patient's insurance provider.
- b. To encourage the patient to fill future prescriptions at this pharmacy.
- c. To advertise relevant pharmacy products or services to appropriate patients.
- d. To enhance continuity of patient care regardless of the prescriber.
- e. To provide a record of cognitive services for insurance reimbursement.

QUESTIONS 63 TO 64 INCLUSIVE REFER TO THE FOLLOWING:

TK is a 63 year old male with chronic kidney disease ($\text{CrCl} = 29 \text{ mL/min/1.73m}^2$) and gout. He experienced his last gout attack about 2 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 5 days. TK's other current medication is pravastatin 20 mg po at bedtime.

63 What drug therapy problem should the pharmacist identify for TK?

- a. Naproxen is inferior to indomethacin for the treatment of acute gout.
- b. The duration of naproxen treatment is too short.
- c. Naproxen should be avoided in patients taking pravastatin.
- d. Naproxen should be avoided in patients with renal dysfunction.
- e. The frequency of naproxen dosing is too low.

64 Following successful resolution of the acute episode, TK's physician decides that he should initiate allopurinol. TK should be advised to:

- a. limit fluid intake.
- b. take medication on an empty stomach.
- c. use precautions to avoid photosensitivity.
- d. report any skin rash or itching to the physician.
- e. avoid dairy products or multivitamins within 2 hours of dose.

65 All of the following have been implicated in causing toxic nephropathy, **EXCEPT**:

- a. cyclosporine.
- b. sulfonamides.
- c. cisplatin.
- d. penicillamine.
- e. erythromycin.

66 In the treatment of a patient who has a solid tumour, which of the following side effects typically occurs 1 to 2 weeks after chemotherapy?

- a. Neuropathy
- b. Cardiotoxicity
- c. Neutropenia
- d. Emesis
- e. Nephrotoxicity

67 Lactose intolerance is classified as a(n):

- a. allergy.
- b. enzyme deficiency.
- c. mineral deficiency.
- d. transporter abnormality.
- e. vitamin deficiency.

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:

Acclidinium 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?

- a. Taking too high a dosage of acclidinium
- b. Taking too high a dosage of metformin
- c. Inappropriate dosing time for venlafaxine
- d. Drug interaction between sitagliptin and metformin
- e. Duplication of therapy with salbutamol and formoterol

69 All of the following statements are true regarding chronic inflammation, **EXCEPT**:

- a. it may develop as a granulomatous inflammation.
- b. it may be caused by persistent infections such as tuberculosis.
- c. it may occur with autoimmune diseases such as rheumatoid arthritis.
- d. large numbers of macrophages are found in the infiltrate.
- e. lymphocytes and eosinophils are rarely involved in its development.

70 Which of the following is characterized as an autoimmune disorder?

- a. Alzheimer's disease
- b. Systemic lupus erythematosus
- c. Osteoarthritis
- d. Parkinson's disease
- e. Paget's disease

71 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

72 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**:

- a. strategies to minimize cardiac risk factors.
- b. facts on diabetes and its complications.
- c. use of the various glucometers.
- d. appropriate dietary recommendations.
- e. technique for the mixing of insulins.

PHARMACY PRACTICE – Professional Practice Skills

73 Which of the following is **NOT** a benefit of performing medication reconciliation activities in a hospital setting?

- a. Reduction of medication errors
- b. Reduction of inventory pilferage
- c. Reduction of preventable adverse effects
- d. Assessment of patient adherence to therapy
- e. Enhanced accuracy of patient allergy information

74 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

75 In dispensing, the Latin abbreviation for "before meals" is:

- a. ac.
- b. aa.
- c. pc.
- d. ic.
- e. cc.

76 In dispensing, the English meaning for the Latin phrase “ex aqua” is:

- a. with or in water.
- b. extracellular fluids.
- c. exact amount.
- d. soluble in water.
- e. out of water.

77 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.

78 Appropriate quality control procedures to ensure product and patient safety in the pharmacy do **NOT** include which of the following?

- a. Adhering to guidelines for cold chain management.
- b. Maintaining a regular cleaning schedule for dispensary surfaces.
- c. Cleaning counting trays and automated counting machines regularly.
- d. Using TALLman lettering on all prescription labels.
- e. Regulating the pharmacy’s indoor climate where medications are stored.

79 Which of the following statements is true regarding the MedlinePlus web site for drug information? The service:

- a. provides a compilation of clinical practice guidelines for health care professionals.
- b. provides systematic reviews that are based solely on evidence from primary studies.
- c. has an emphasis on providing patient/consumer information on a wide variety of health topics.
- d. is limited by its availability only through paid subscription by health care professionals.
- e. is limited by a lag to publication and updating of patient therapy-related information.

80 The pharmacist fills a prescription for sumatriptan 100 mg tablets for a migraine patient. Appropriate information to provide to the patient includes which of the following?

- a. If the sumatriptan does not relieve the headache within four hours, ergotamine may be used.
- b. If no relief is achieved in two hours, sumatriptan may be repeated.
- c. If the headache is relieved but another headache occurs eight hours later, sumatriptan may be used for the second headache.
- d. The maximum dosage in any 24-hour period is six tablets.
- e. If relief is not achieved, no other medication can be used for 24 hours.

81 Which of the following medications requires an auxiliary label regarding avoiding the consumption of grapefruit or grapefruit juice?

- a. Nifedipine.
- b. Amlodipine
- c. Topiramate
- d. Phenytoin
- e. Gabapentin

82 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.

- a. 12.5 mL

- b. 15 mL
- c. 25 mL
- d. 37.5 mL
- e. 50 mL

83 A pharmacist is making a presentation on medication adherence to a group of clients. Which of the following would be the most appropriate indicator of the effectiveness of the presentation for these clients?

- a. Increase in fill quantity for each prescription refill
- b. Reduced number of prescriptions filled per month
- c. Increase in number of nonprescription medications used
- d. Reduced number of prescription refill dates per month
- e. Prescription refill dates closer to expected fill intervals

84 R_x Timolol 0.25 % drops

Mitte : 15 mL

Sig: gtt. i o.d. bid

On the prescription label the instructions to the patient should read:

- a. apply one drop into both eyes twice daily.
- b. instil one drop into the left eye twice daily.
- c. instil one drop into the right eye twice daily.
- d. shake well and instil one drop into the left eye twice daily.
- e. shake well and instil one drop into the right ear twice daily.

85 According to ISMP guidelines, which of the following medication orders contains a dangerous abbreviation or dosing designation?

- a. Insulin NPH 10 units subcut at bedtime
- b. Oxycodone CR 40 mg po q12h
- c. Gliclazide 80 mg po bid
- d. MTX 7.5 mg po weekly
- e. Levothyroxine 88 mcg po daily

86 Which of the following statements is true regarding Tylenol Elixir With Codeine[®] (each 5 ml contains acetaminophen 160 mg and codeine 8 mg)?

- a. It requires a written order from an authorized prescriber.
- b. It is an example of a legally exempted codeine product.
- c. Sale for self-medication use must involve a pharmacist.
- d. It is regulated under the Benzodiazepines and Other Targeted Substances Act.
- e. Authorized prescribers include chiropractors.

87 A physician wants to switch a terminally-ill patient from slow release morphine sulfate tablets, 15 mg twice daily, to a liquid morphine sulfate dosage form because the patient has difficulty in swallowing 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?

- a. 20 mL
- b. 60 mL
- c. 80 mL
- d. 100 mL
- e. 120 mL

88 A biological safety cabinet is preferred to a laminar flow hood when preparing a parenteral formulation of:

- a. tenecteplase.
- b. doxorubicin.
- c. magnesium sulfate.
- d. nitroglycerin.
- e. penicillin.

89 Which of the following drug orders is incomplete and requires follow-up with the prescriber?

- a. Zithromax Z-Pak[®] (azithromycin 250 mg), 2 tabs po on day 1 and 1 tab po on days 2-5.
- b. Flonase[®] (fluticasone) 100 mcg spray, 1 or 2 sprays in each nostril bid x 1 bottle
- c. Actonel[®] (risedronate), 35 mg po once weekly x 12 tabs
- d. Cozaar[®] (losartan), 50 mg po bid x 1 month
- e. Zocor[®] (simvastatin), 1 tab po hs for 3 months

90 In establishing a professional relationship with a patient, which of the following principles is the **LEAST** compatible with the philosophy of pharmaceutical care?

- a. Autonomy
- b. Nonmaleficence
- c. Confidentiality
- d. Paternalism
- e. Veracity

91 JN, a 17 year old male with a highly resistant form of testicular cancer, is in hospital for treatment. He is an intelligent, articulate young man. His parents are insisting that the physician treat him with the latest experimental therapy, but JN does not want to undergo the treatment. If the physician goes ahead and gives the experimental therapy what ethical principle will have been violated the most?

- a. Confidentiality
- b. Nonmaleficence
- c. Justice
- d. Veracity
- e. Autonomy

92 Which of the following statements is correct regarding hypothesis testing?

- a. A type I error frequently occurs when sample sizes are small.
- b. A type II error is more serious than a type I error.
- c. Small p-values suggest that the null hypothesis is likely to be true.
- d. The larger the p-value, the more likely the null hypothesis is false.
- e. P-value is the probability of wrongly rejecting the null hypothesis if it is in fact true.

93 An adequately powered, randomized controlled trial conducted over 2 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:

- a. 10%.
- b. 15%.
- c. 25%.
- d. 40%.
- e. 50%.

94 In an adequately powered, randomized controlled trial conducted over 3 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 3 years to statistically demonstrate the prevention of one episode of this side effect in at least one patient is:

- a. 15.
- b. 20.
- c. 150.
- d. 200.
- e. 2000.

95 In a study comparing 2 drug treatment regimens, a type II error occurs when:

- a. the statistical conclusion is that there is a difference between the 2 treatment regimens when a

- difference does not actually exist.
- b. the statistical conclusion is that there is no difference between the 2 treatment regimens when a difference actually does exist.
- c. the p level is > 0.05 .
- d. the drug treatments studied are not appropriate comparators for the disease.
- e. the exclusion criteria are too restrictive.

96 A pharmacist has received information regarding a new drug to treat hypertension. The information is based on a 2 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?

- a. The study size was too small to assess efficacy.
- b. The patients did not achieve guideline targets for hypertension.
- c. Blood pressure is a surrogate outcome.
- d. Long term safety and efficacy were not assessed.
- e. Placebo is not an appropriate comparator.

BEHAVIOURAL, SOCIAL AND ADMINISTRATIVE PHARMACY SCIENCES

97 In deciding what drugs are appropriate for its formulary, the hospital must consider a drug's efficacy, associated workload, and acquisition cost. Several new antifungal IV drugs (drug A, drug B, drug C, and drug D), all with equal efficacy, have recently become available. Currently the hospital stocks drug E, which has been available for several years. Data for the medications is as follows:

Drug	Cost/Day	Dosing Frequency	Treatment Duration (days)
A	\$2.50	qid	14
B	\$2.25	once daily	14
C	\$5.00	bid	7
D	\$2.25	bid	7
E	\$2.25	qid	7

The most appropriate choice for the hospital is:

- a. Drug A.
- b. Drug B.
- c. Drug C.
- d. Drug D.
- e. Drug E.

98 Which financial statement could be used to determine the total value of prescription drug sales for a pharmacy during the course of a year?

- a. Balance sheet
- b. Statement of investments
- c. Statement of changes in financial position
- d. Income statement
- e. Statement of equity

99 The standard of universal access to government insured health care in Canada is mandated by:

- a. the Canada Health Act.
- b. individual provinces and territories.
- c. Health Canada's Health Environment and Consumer Safety directorate.
- d. Canadian Agency for Drugs and Technologies in Health
- e. Public Health Agency of Canada.

100 The Canada Health Act (1984) embodies all of the following principles, **EXCEPT**:

- a. affordability.
- b. accessibility.
- c. comprehensiveness.
- d. portability.
- e. universality.

101 Which of the following responsibilities can be appropriately delegated to a non-pharmacist manager of a community pharmacy?

- a. Purchasing narcotic drugs
- b. Selecting clinical decision software for the dispensary computer
- c. Coordinating staff scheduling
- d. Supervising pharmacy technicians
- e. Determining workflow for the pharmacy's professional services

102 Academic detailing by pharmacists provides a service to physicians by:

- a. educating on improved prescription legibility.
- b. advising on optimal patient interviewing techniques.
- c. recommending strategies to avoid medication wastage.
- d. providing current information on best prescribing practices.
- e. promoting the use of physician samples given to patients.

103 A role of The National Association of Pharmacy Regulatory Authorities is to:

- a. audit the financial performance of provincial pharmacy licensing bodies.
- b. promote harmonization of pharmacy practice standards across Canada.
- c. establish a unified lobby voice for pharmacists from all types of practice settings.
- d. provide mechanisms for the public to file complaints about pharmacy care providers.
- e. accredit the pharmacy programs at Canadian universities

104 The term 'perspective' in the context of a pharmacoeconomic study refers to the:

- a. source of funding for conducting the pharmacoeconomic analysis.
- b. approach the researcher takes to analyze the research problem.
- c. approach the researcher uses to limit confounding factors.
- d. stakeholder whose interest is most represented in the study's conclusions.
- e. method used to facilitate communication of the study results in a journal publication.

105 Which of the following would be the most effective method to prevent "inventory shrinkage" due to internal theft within a pharmacy?

- a. Assigning the responsibility of ordering and receiving of inventory to one employee.
- b. Implementing an employee bag check program at the end of shifts.
- c. Hiring a uniformed security guard to monitor the pharmacy exits.
- d. Offering incentives such as employee discounts on merchandise.
- e. Installing mirrors and security cameras strategically throughout the pharmacy.

Answers to Sample Questions

1. (d)	26. (b)	51. (b)	76. (a)	101. (c)
2. (b)	27. (c)	52. (a)	77. (b)	102. (d)
3. (a)	28. (c)	53. (c)	78. (d)	103. (b)
4. (a)	29. (d)	54. (a)	79. (c)	104. (d)

5. (e)	30. (b)	55. (b)	80. (c)	105. (b)
6. (b)	31. (b)	56. (a)	81. (a)	
7. (a)	32. (c)	57. (b)	82. (a)	
8. (d)	33. (a)	58. (c)	83. (e)	
9. (a)	34. (c)	59. (a)	84. (c)	
10. (a)	35. (a)	60. (d)	85. (d)	
11. (c)	36. (d)	61. (c)	86. (a)	
12. (a)	37. (e)	62. (d)	87. (e)	
13. (c)	38. (c)	63. (d)	88. (b)	
14. (d)	39. (a)	64. (d)	89. (e)	
15. (d)	40. (a)	65. (e)	90. (d)	
16. (a)	41. (b)	66. (c)	91. (e)	
17. (a)	42. (d)	67. (b)	92. (e)	
18. (a)	43. (d)	68. (e)	93. (d)	
19. (b)	44. (a)	69. (e)	94. (e)	
20. (b)	45. (c)	70. (b)	95. (b)	
21. (a)	46. (c)	71. (e)	96. (d)	
22. (c)	47. (c)	72. (e)	97. (d)	
23. (d)	48. (b)	73. (b)	98. (d)	
24. (e)	49. (b)	74. (b)	99. (a)	
25. (d)	50. (c)	75. (a)	100.(a)	

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