To familiarize you with the short answer/essay portion of the pharmacist licensure exam, the Board of Pharmacy is providing below excerpts of sections and actual test questions from prior examinations.

The short answer/essay portion of the examination typically consists of 100 points. Answers to the questions are provided at the end of this document.

SECTION 1 – NEW DRUGS
QUESTIONS 1 through 5 (1 point each)

In the following table you are provided with the generic and brand names of drugs which have been introduced to the market within the past 5 years. **FILL IN THE CHART BELOW TO SHOW ONE FDA-APPROVED INDICATION FOR USE. NOTE: NO CREDIT WILL BE GIVEN FOR PROVIDING THE PHARMACOLOGICAL CLASS (E.G., H_2 ANTAGONIST).**

EXAMPLE:

Generic Name	Brand Name	FDA-Approved Indication
Cimetidine	Tagamet	*Peptic ulcer disease*

Generic Name	Brand Name	FDA-Approved Indication
1. galantamine	Reminyl	
2. docosanol	Abreva	
3. eflornithine	Vaniqa	
4. leflunomide	Arava	
5. entacapone	Comtan	

SECTION 2 – IDENTIFY ADVERSE EFFECTS OF DRUGS
QUESTIONS 6 through 7 (2 points each)

A 36-year-old man with HIV infection and a CD4 count of 50/mm^3 has been taking the following medications for the past 6 weeks:

Dapsone 50 mg b.i.d.
Didanosine 200 mg b.i.d.
Abacavir 300 mg b.i.d.
Ritonavir 400 mg b.i.d.
Saquinavir 400 mg b.i.d.

Assume the patient is compliant with the medication regimen. Assess whether or not each complaint listed below could be drug-related. If drug-related, list the drug and mechanism (if known) for the side effect you are observing.

For each complaint, list only ONE drug. If you list more than one drug, only the first one you list will be graded.

If the complaint is not drug-related, indicate by stating, "not a drug-related problem."

Complaints:

6. "I have a rash, fever, sore throat, and cough."

   a. Drug: _____

   b. Mechanism: _____

7. "I have gained 10 pounds since I started taking these drugs."

   a. Drug: _____

   b. Mechanism: _____

SECTION 3 – DRUG INTERACTIONS
QUESTIONS 8 through 10 (2 points each)

The medical and drug histories of several patients are described below. For each situation, determine whether or not there is a potential for an adverse drug interaction involving the NEW DRUG added to the regimen. If a potential adverse interaction exists, list the interacting drugs and the potential consequences in the space provided. If no potential interaction exists, state, "NO INTERACTION," and "NO CONSEQUENCES."

8. A 65-year-old male is hospitalized for "irregular heart beat." Patient is on the following medications for congestive heart failure:

   Digoxin 0.25 mg i q.d.
   Furosemide 40 mg i q.d.
   Potassium 10 mEq i q.d.
   Lisinopril 20 mg i q.d.

   The patient is started on amiodarone 200 mg iii b.i.d.

   a. Interacting drugs: _____

   b. Consequences of interaction: _____

_____

9. A 35-year-old female with a history of asthma and chronic obstructive pulmonary disease is on the following medications:

   Fluticasone 110 mcg inhaler ii puffs b.i.d.
   Albuterol inhaler i-ii puffs q4-6h p.r.n. s.o.b.
   Theophylline 300 mg i b.i.d.
   Singulair 10 mg i q.d.

   The patient is started on Terbinafine 250 mg i q.d. x6 weeks for a fungal infection.

   a. Interacting drugs: _____

   b. Consequences of interaction: _____

_____

10. A 65-year-old man with a history of mild congestive heart failure is taking the following medications:

furosemide 40 mg q.d.
lisinopril 20 mg q.d.
warfarin 2.5 mg q.d.
simvastatin 40 mg q.d.

The patient is given a prescription for spironolactone 50 mg q.d.

a. Interacting drugs: _____

b. Consequences of interaction: _____

_____

SECTION 4 – TRANSLATE SIGS/DRUG ORDERS, COMMUNITY & INSTITUTIONAL
QUESTIONS 11 through 16 (1 point each)

The following questions test your ability to interpret drug orders and to translate abbreviations or symbols commonly used in such orders.

Fully translate and interpret each of the orders **as you would type them on a label.**

Example: 3 ml p.o. t.i.d.
Take 3 ml by mouth 3 times daily.

11. i gtt. o.s. b.i.d.

_____

_____

12. 1 cap. p.o. 30 min a.c.

_____

_____

13. i-ii tab p.o. q4-6h p.r.n. NTE 8/d

_____

_____

_____

14. i app p.v. h.s. x 5

15. gtt ii o.s. q.i.d. & am of surg. Start 2 days pre-op

16. ap ung liberally h.s. cover $\overline{c}$ occ dress

SECTION 5 – DRUG INFORMATION TO HEALTH PROFESSIONALS
QUESTIONS 17 through 19 (2 points each)

For the next questions, you may assume that a health care professional calls asking for drug information. Provide the information requested and a brief rationale for your answer.

17. A patient with type 2 diabetes is having problems with management of hyperglycemia. Her FBS is 100 mg/dl but her glucose is 240 mg/dl after meals. Circle the most appropriate agent to manage her hyperglycemia and provide a brief explanation of your rationale.

    a. Circle One: repaglinide OR glyburide

    b. REASON: _____

_____

_____

_____

18. A nurse who is hepatitis B antibody negative sustains a high risk needle stick. Circle the most appropriate agent to protect against transmission of hepatitis B now, and provide a brief explanation of your rationale.

    a. Circle One: Recombivax OR Hepatitis B immune globulin

    b. REASON: _____

_____

_____

_____

19. A physician wants to give a once-a-day beta blocker to a patient. He wants to know if atenolol and metoprolol can both be given once daily.

    a. Circle One: YES NO

    b. Rationale: _____

_____

_____

SECTION 6 – LAW AND REGULATION
QUESTIONS 20 through 21 (2 points, all or none)

For the following questions, assume that you are a pharmacist practicing in a pharmacy. If the action described below is legal, circle the word "LEGAL." If this action is not legal, circle the words "NOT LEGAL," AND EXPLAIN WHY THIS ACTION IS NOT LEGAL.

20. A pharmacist substitutes hydroxyzine HCl 25 mg for Vistaril 25 mg, based on the patient's request for a generic product. The label states that the drug ingredient dispensed is hydroxyzine HCl 25 mg.

    LEGAL

    NOT LEGAL (EXPLAIN WHY)

    EXPLANATION: _____

_____

_____

_____

21. It is a very busy day at your pharmacy. You notice that the trash basket under the counter is overflowing with used prescription vials and labels. You ask your technician to empty it in the dumpster behind the pharmacy.

    LEGAL

    NOT LEGAL (EXPLAIN WHY)

    EXPLANATION: _____

_____

_____

_____

SECTION 7 – PRESCRIPTION ERRORS
QUESTIONS 22 through 26 (1 point each)

Indicate whether the following prescriptions may be filled as written or if they are incorrect in some respect without discussing with the physician. If a prescription is written improperly, you must explain specifically what is wrong with it.

NOTE: We have provided you with a drug name (and if appropriate, a strength) and a Sig. You may assume all legally required information is present and is correct. In other words, do not indicate that you would not fill the prescription because the quantity of the drug, the patient's name, etc. are missing. It is not necessary to write the interpretation of the Sig., but as indicated above, you should explain any error or ambiguity. The following two examples are provided to give you some guidance in this regard.

Example 1: chlorpheniramine maleate 4 mg
Sig: i q.i.d.
(For an adult)

Your Answer: *Fill as written.*

Example 2: Bactrim DS
Sig: i q.i.d. for UTI
(For an adult)

Your Answer: *Do not fill; the usual dose of Bactrim DS is twice a day.*

22. Vasotec 1.25 mg
    Sig: 1.25 mg IVP q6h

23. Vanceril Inhaler
    Sig: 1 spray each nostril q.d.

24. Megace 40 mg/ml suspension
    Sig: 10 ml p.o. q.d.

25. Gabapentin 800 mg tablets
    Sig: i t.i.d.

26. Celebrex 50 mg PE/mL
    Sig: 600 mg IV infusion over 4 min stat for seizure

SECTION 8 – CLINICAL PRACTICE
QUESTIONS 27 through 31 (2 points each)

The following questions involve a pharmacist who provides consultation to a patient, physician, or health care provider. For each incident, you are to indicate if you agree or disagree with the actions of the pharmacist or the information he/she has provided. INDICATE THE REASON IF YOU DISAGREE. DO NOT PROVIDE A REASON IF YOU AGREE. Do not recommend an alternative product.

27. A 45-year-old man with an ileostomy requests an aspirin product to be taken daily to "protect his heart." The pharmacist recommends Ecotrin.

    Circle One: AGREE DISAGREE

    REASON: _____

    _____

    _____

28. A 50-year-old patient on Antabuse requests an over-the-counter cough preparation for a dry, hacking cough. The pharmacist recommends Delsym.

    Circle One: AGREE DISAGREE

    REASON: _____

    _____

    _____

29. The mother of a 4-year-old pre-school child requests an over-the-counter product for her child who has been suffering from intense itching in the anal area which has been keeping him up at night. The mother also observed what appeared to be mucus strands in the child's stool. The pharmacist recommends Pin-X.

    Circle One: AGREE DISAGREE

    REASON: _____

    _____

    _____

30. A physician calls and asks the pharmacist to recommend an oral antibiotic for endocarditis prophylaxis for a patient who is allergic to penicillin. The pharmacist recommends vancomycin capsules.

Circle One: AGREE DISAGREE

REASON: _____

_____

_____

31. A woman comes into the pharmacy with a prescription for clotrimazole 1% vaginal cream. She tells the pharmacist that she is currently menstruating and asks if it is okay to use the product. The pharmacist tells the patient to wait until her period is finished before using the cream.

Circle One: AGREE DISAGREE

REASON: _____

_____

_____

SECTION 9 - MATH
QUESTIONS 32 through 34 (2 points each)

32. Calculate the daily dose of cisplatin to be received by a patient weighing 172 lb and 6'0'' in height, based upon a 20 mg/m^2/day regimen. NOTE: Body Surface Area (BSA) = square root of [height (cm) x weight (kg)/3600]

_____

_____

33. What would be the initial loading dose (units) of heparin for a 220 lb patient treated for thromboembolism based upon a 100 units/kg regimen?

_____

_____

34. How many 50 mg Sandimmune capsules are required per day to convert a 220 lb patient from intravenous cyclosporine to oral therapy based upon a 2 mg/kg/day parenteral maintenance regimen and a 1:2 IV:PO conversion ratio?

_____

_____

SECTION 10 – MISCELLANEOUS
QUESTIONS 35 through 38

The following questions involve a pharmacist who provides consultation to a patient, physician, or health care provider. For each incident, you are to indicate if you agree or disagree with the actions of the pharmacist or the information he/she has provided. INDICATE THE REASON IF YOU DISAGREE. DO NOT PROVIDE A REASON IF YOU AGREE. Do not recommend an alternative product.

35. A 58-year-old female is currently on clonidine 300 mcg 1 p.o. b.i.d., diltiazem CD 180 mg 1 p.o. q.d. for her blood pressure, and metformin 850 mg 1 p.o. b.i.d. for her diabetes. She presents with tingling sensation and chronic pain of both extremities. The physician makes a diagnosis of peripheral neuropathy and prescribes amitriptyline 25 mg 1 p.o. h.s. x2, then 2 p.o. h.s. x2, then 3 p.o. h.s. thereafter. The pharmacist fills the prescription as written.

Circle One: AGREE DISAGREE

REASON: _____

_____

_____

36. A 24-year-old female in her first trimester of pregnancy requires prophylactic therapy for several dental procedures. She is allergic to penicillin. Her physician prescribes clindamycin 150 mg 4 capsules 1 hour prior to dental procedure. The pharmacist fills the prescription as written.

Circle One: AGREE DISAGREE

REASON: _____

_____

_____

37. A patient is receiving antineoplastic chemotherapy. List two clinical signs or symptoms that you will advise the patient to monitor at home for thrombocytopenia. **(2 points)**

a. _____

_____

b. _____

_____

38. You are conducting a drug regimen review of a patient in the intensive care unit. You note that the patient was admitted for an acute myocardial infarction and has developed cardiogenic pulmonary edema. The physician is using morphine sulfate to assist in treating this condition. Do you agree or disagree and why? **(2 points)**

Circle One: AGREE DISAGREE

REASON: _____

_____

_____

SECTION 11 – SELECTING THE MOST APPROPRIATE DRUG FOR A PATIENT FROM A SPECIFIC ARRAY OF DRUGS
QUESTIONS 39 through 40 (2 points each)

In each of the following questions, a patient with a disease state is described. Two drugs are suggested as alternative choices for treatment of the patient's disease. For your answer, circle the drug which would be better and give a brief justification for your choice. **CHOOSE ONLY ONE OF THE TWO DRUGS LISTED.**

39. A 75-year-old woman develops urinary retention 2 days after surgery. She has a history of CHF and osteoarthritis.

    a. bethanechol OR oxybutynin

    b. REASON: _____

_____

_____

_____

40. A 37-year-old woman with a history of obsessive-compulsive disorder is currently diagnosed with depression. Which of the following drugs is the best choice?

    a. paroxetine OR bupropion

    b. REASON: _____

_____

_____

_____

SECTION 12
QUESTIONS 41 through 42 (2 points each)

For each of the medications listed below, provide (in layman's terms) two pieces of information or advice you would orally provide when dispensing each medication. We will assume you have already discussed the name of the drug, what it is used for, the Sig., the need for compliance, and storage requirements with the patient. DO NOT LIST MORE THAN TWO ANSWERS FOR EACH DRUG. IF YOU DO, ONLY THE FIRST TWO ANSWERS WILL BE GRADED.

41. Azo-Standard (phenazopyridine): treating urinary tract pain

    a. List one side effect.

_____

_____

    b. List one aspect of administration.

_____

_____

_____

42. Fleets Phospho-Soda: bowel prep for examination

    a. List one side effect.

_____

_____

    b. List one aspect of administration.

_____

_____

_____

SECTION 13 – INFORMATION, ANALYSIS AND APPLICATIONS
QUESTIONS 43 through 47 (1 point each)

Use the information provided in the article at the end of this examination to answer these questions. Base your answers only on the data given.

43. What strategy is recommended by the article for minimizing antibiotic resistance in common pathogens?

---

44. According to the article, what is the most likely etiology of infection in a 49-year-old, otherwise healthy female patient who goes to see her physician with complaints of cough, muscle aches, and fatigue?

---

45. What is the most important factor in the carriage and infection of antibiotic resistant *Streptococcus pneumoniae*?

---

46. In addition to educating physicians on the use of treatment guidelines, what other strategy is stated in the article as being a fundamental step in reducing unnecessary prescriptions?

---

47. In addition to causing community acquired pneumonia, list two other infections that the article states can be caused by *Streptococcus pneumoniae*.

The article used is Principles of Appropriate Antibiotic Use for Treatment of Nonspecific Upper Respiratory Tract Infections in Adults by Vincenza Snow, MD; Christel Mottur-Pilson, PhD; and Ralph Gonzales, MD, MSPH, for the American College of Physicians-American Society of Internal Medicine.

To view the article please visit the following website:
http://www.annals.org/issues/v134n6/pdf/200103200-00014.pdf

Sample California Pharmacist Licensure Examination Key

1. *Alzheimer's disease*

2. *Cold sore*

3. *Reduction of unwanted facial hair*

4. *Rheumatoid arthritis*

5. *Parkinson's disease*

6. a. *Abacavir*
   b. *Abacavir hypersensitivity reaction*

7. a. *not a drug-related problem*
   b.

8. a. *Digoxin and Amiodarone*
   b. *Increased serum digoxin levels or digoxin toxicity*

9. a. *No interaction*
   b. *No consequences*

10. a. *spironolactone and lisinopril*
    b. *hyperkalemia*

11. *Instill (place, put) 1 drop into left eye 2 times each day (twice daily).*

12. *Take 1 capsule by mouth 30 minutes (or ½ hour) before meals.*

13. *Take one to two tablets orally every four to six hours as needed. Not to exceed eight per day.*

14. *Insert one applicatorful vaginally at bedtime for 5 days/nights.*
    Do not accept: per vagina

15. *Instill two drops in the left eye four times daily and on the morning of surgery.*
    Start two days before surgery/operation/procedure.

16. *Apply ointment liberally at bedtime. Cover with occlusive dressing.*

17. a. *repaglinide*
    b. *Need a short acting agent to manage postprandial hyperglycemia*

18. a. Hepatitis B immune globulin
    b. *Hepatitis B immune globulin provides passive immunization against Hepatitis B; recombivax vaccine requires 6 months before it is effective (active immunization).*

19. a. *NO*
    b. *Atenolol (Tenormin) is long-acting because of a truly long metabolic half-life, while the metoprolol (Lopressor) is an intermediate half-life drug that requires b.i.d. dosing.*

20. *NOT LEGAL (EXPLAIN WHY)*

    EXPLANATION: *It is illegal to substitute because the products are not equivalent (different salts HCl vs. pamoate).*

21. *NOT LEGAL (EXPLAIN WHY)*

    EXPLANATION: *Unauthorized access to patient's confidential medical information must be prevented.*

    OR

    All paper documents should be destroyed and information should be blacked out.

22. *Fill as written.*

23. *Do not fill. Wrong product.*

24. *Fill as written.*

25. *Fill as written.*

26. *Do not fill; wrong drug, should be Cerebyx (fosphenytoin).*

27. DISAGREE

REASON: *Ecotrin is enteric coated. The tablet will not be absorbed, and will be excreted whole.*

28. *AGREE*

REASON: *blank; no reason necessary*

29. *AGREE*

REASON: *blank; no reason necessary*

30. *DISAGREE*

REASON: *Oral vancomycin is not systemically absorbed and is therefore ineffective.*

31. *DISAGREE*

REASON: *The patient has a fungal infection and should therefore be instructed to use the vaginal cream continuously, even during her menstrual period.*

32. *40 mg*

33. *10,000 units*

34. *8 capsules*

35. *DISAGREE*

REASON: *Tricyclic antidepressants may block antihypertensive effects of clonidine and possibly life-threatening elevations in blood pressure may occur.*

36. *AGREE*

REASON: blank; *no reason necessary*

37. a. and b.

Accept any two:
Easy bruising
Petechiae – small, dot-sized bleeding into the skin
Ecchymosis – purple discoloration of the skin due to bleeding
Gum bleeding
Blood in the urine

Nose bleed
Blood in stool

38. *AGREE*

REASON: *Morphine increases venous capacitance and reduces systemic vascular resistance. These factors combine to relieve pulmonary congestion. Improves LV function.*

39. *bethanechol*

REASON: *Bethanechol is indicated for urinary retention. Oxybutynin has anticholinergic properties that will cause urinary retention.*

40. *paroxetine*

REASON: *paroxetine is indicated for obsessive-compulsive disorder or bupropion is not effective.*

41. *a. Stomach upset, headache, rash, itching, staining of contact lenses, discoloration of urine.*

    b. Take with food. Take with plenty of water (fluids).

42. *a. GI (nausea, vomiting, stomach pain, bloating, cramping) nervous system (weakness, dizziness, fainting) or irritation of rectal area, electrolyte imbalance – potassium)*

    b. Take a full glass of water or juice. Do not eat after taking this medication (i.e. prior to exam).

43. decreasing antibiotic prescriptions in the community

44. *influenza and/or parainfluenza virus*
viral infection or viral etiology

45. *previous antibiotic usage*

46. *patient education*

47. *Accept any two of the following:*
bacterial meningitis
bacterial sinusitis
otitis media