KENYATTA UNIVERSITY

EXAMINATION FOR THE DEGREE OF BACHELOR OF PHARMACY

(BPHARM Level III)

PPB 330: PHARMACOLOGY III

3RD SEMESTER 2020/2021 TIME: 3Hours

INSTRUCTIONS

- **The paper consists of THREE sections; SECTIONS: A, B and C**
- **Answer each section on separate booklets. Label each booklet CLEARLY**
- **Answer ALL questions**

SECTION A

PPB 331 RENAL SYSTEM AND ELETROLYTES REGULATION

1. Concerning drugs acting on the kidney, which statement is **FALSE**?
   A. Osmotic diuretics are contraindicated in congestive heart failure
   B. Osmotic diuretics include urea and isosorbide
   C. Adenosine receptor antagonist act in the distal convoluted tubules
   D. Carbonic anhydrase inhibitors increase incidences of renal stone
   E. Mannitol abolishes the corticomedullary osmotic gradient
2. The following drugs enhance anti-diuretic action of vasopressin **EXCEPT……**
   A. demeclocycline
   B. carbamazepine
   C. carbamazepine
   D. chloropropamide
   E. indomethacin
3. Which one of the following is **NOT** a pharmacological action of desmopressin in the kidney?
   A. Increased in insertion of water channel–containing vesicles
   B. Upregulation of urea transporters
   C. Activation of Na^+-K^+-$2C1^-$ symporter via phosphorylation and translocation into luminal membrane

D. Increased expression of subunits of the epithelial sodium channels

E. Upregulation of carbonic anhydrase enzyme

4. A 58-year-old woman with lung cancer has abnormally low serum osmolality and hyponatremia. An appropriate drug to treat her would be

   A. amiloride

   B. lixivaptan

   C. terlipressin

   D. bumetanide

   E. chlorthalidone

5. Regarding osmotic diuretics, which statement is **FALSE?**

   A. They act both in the proximal tubule and the loop of Henle

   B. The main route of glycerol elimination is hepatic

   C. The oral bioavailability of Mannitol is 70%

   D. They are inert pharmacologically

   E. They inhibit renin release

6. The most useful diuretic agent in the treatment of recurrent calcium stones due to a defect in proximal tubular calcium reabsorption is

   A. chlorthalidone

   B. diazoxide

   C. ethacrynic acid

   D. mannitol

   E. spironolactone

7. The following drugs induce syndrome of inappropriate secretion of vasopressin **EXCEPT.....**

   A. amitriptyline

   B. fluoxetine

   C. vincristine

   D. methydopa

   E. lithium

8. Which of the following drugs would be contraindicated in a patient with elevated potassium?

   A. Canrenone and acetazolamide

   B. Eplerenone and triamterene

   C. Chlorothiazide and hydrochlorothiazide

D. Ethacrynic acid and amiloride

E. Chlorthalidoneand spironolactone

9. A drug has following pharmacological properties: downregulate Na^+K^+ ATPase, long term use cause gynaecomastia, possesses antiantiarrhythmic effects in heart failure. The drug is most likely to be

   A. canrenone

   B. dichlorphenamide

   C. tripamide

   D. mannitol

   E. metolazone

10. The following pharmacological actions ensue after administration of terlipressin**EXCEPT……**

   A. vasoconstriction

   B. ACTH release

   C. synthesis of Willebrand factor

   D. relaxation of uterus smooth muscle

   E. increase of large bowels movements

11. Which of the following statement is**FALSE** regarding thiazide diuretics?

   A. Contraindicated in patients hypersensitive to sulphonamides

   B. Abolish corticomedullary osmotic gradient

   C. Indicated in nephrogenic diabetic insipidus

   D. Increase harmful lipids in plasma

   E. They exbibit carbonic anhydrase ambition activity

12. Which one of the following is **NOT** a factor in the release of anti-diuretic hormone?

   A. metabolic alkalosis

   B. dopamine

   C. sodium concentration

   D. morphine administration

   E. administration of bumetanide

13. A pharmacy student plans to climb Mt. Kenya. Which one of the following drugs can he use to prevent high-altitude sickness?

   A. Conivaptan

   B. Dichlorphenamide

   C. Amiloride

   D. Isosorbide

E. Desmopressin

F. Ethacrynic acid

14. Regarding thiazide class of diuretic, which statement is**TRUE**?

A. They increase uric acid secretion

B. The site of action is thin descending loop of Henle

C. Metolazone is efficacious in low GFR

D. They are administered either orally or intravenously

E. They are metabolized in the liver

15. Regarding diabetes insipidus, select the **FALSE** statement.

A. Patients excrete large volumes of dilute urine

B. Etiologies include genetic mutation and head injuries

C. Hydrochlorothiazide can induce the nephrogenic type

D. Amiloride and desmopressin are used in treatment

E. Adequate water intake is a mainstay of treatment

16. The following vasopressin receptor antagonists are administered orally **EXCEPT…..**

A. tolvaptan

B. lixivaptan

C. satavaptan

D. conivaptan

E. mozavaptan

17. Which one of the following drugs should be used cautiously in a patient with diabetes mellitus?

A. Glycerol

B. Conivaptan

C. Hydrochlorothiazide

D. Mannitol

E. Spironolactone

For question 18 - 20, select the most appropriate pharmacological property in the table

Drug	Pharmacological Property
18. Desmopressin	**A.** Binds to mineralocorticoid receptors
19. Canrenone	**B.** Administered intranasally
20. Dorzolamide	**C.** Inhibits Na^+-Cl^- symporter
	D. Antagonize vasopressin receptor
	E. Site of action is proximal tubule

21. Explain the pharmacological basis of the following;

i) Empagliflozin is used in management of type II diabetes mellitus despite its action in the kidney. (3 marks)

ii) A patient taking oral acetazolamide presenting with hyperchloremic metabolic acidosis. (3 Marks)

22. Regarding furosemide;

i) Outline three adverse effects unrelated to its diuretic efficacy. (3 Marks)

ii) Outline three contraindications. (3 Mark)

iii) Outline its pharmacokinetic properties. (4 Marks)

iv) Explain the nature of its interaction with the following; (4 Marks)

a) Non-steroidal anti-inflammatory drugs.

b) Thiazide diuretics.

SECTION B

PPB 332 GASTROINTESTINAL SYSTEM

1. The following are true about sucralfate **EXCEPT** it.....

A. contains aluminium hydroxide

B. undergoes crosslinking atlow pH

C. is taken on an empty stomach

D. is an antacid

E. has an affinity to exposed proteins

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2. Which of the following is TRUE regarding aprepitant?

A. Cholinergic antagonist

B. Dopaminergic agonist

C. Histamine H1-receptor antagonist

D. Serotonin 5-HT3 antagonist

E. Substance P antagonist

3. Which of the following would be the appropriate choice for management of dyspepsia in a hypertensive patient.

A. Sodium bicarbonate because it is good for long-term use

B. Calcium carbonate because it is good for long-term use and she could use the calcium

C. Magnesium hydroxide for short-term use only because of her hypertension

D. A combined agent to balance the constipation associated with magnesium hydroxide
and the diarrhea associated with aluminum hydroxide

E. A combined agent to balance the diarrhea associated with magnesium hydroxide and
the constipation associated with aluminum hydroxide

4. Alosetron acts as……

A. 5-HT3 receptor antagonist

B. 5-HT4 receptor agonist

C. D2 receptor antagonist

D. NK1 receptor antagonist

E. Muscarinic receptor antagonist

5. Which drug is chemically related to meperidine?

A. Aluminum hydroxide

B. Diphenoxylate

C. Loperamide

D. Magnesium hydroxide

E. Metoclopramide

6. Which one of the following medications is most effective to counteract emesis without exacerbating cardiac failure?

A. Droperidol
B. Dolasetron
C. Promethazine
D. Dronabinol
E. Palonosetron

7. D.G is a 27 year-old woman who is 34 weeks pregnant. Which of the following medications is recommended if D.G is experiencing mild constipation.

A. Castor oil
B. Docusate
C. Mineral oil
D. Loperamide
D. Misoprostol

8. Which of the following drugs causes discoloration of the tongue?

A. Famotidine
B. Omeprazole
C. Sulfasalazine
D. Bismuth
E. Lubiprostone

9. Extrapyramidal symptoms are associated with which one of the following drugs?

A. Metoclopramide
B. Diphenoxylate
C. Alprazolam
D. Aprepitant
E. Loperamide

10. Which of the following drugs is effective drug for managing steatorrhea?

A. Nizatidine
B. Famotidine
C. Bile salts
D. Metoclopramide
E. Pancrelipase

11. A patient with multiple medical problems is taking theophylline, warfarin, quinidine, and phenytoin. The dosages of each drug are adjusted carefully so their serum concentrations and effects are acceptable. However, the patient suffers some dyspepsia and GI distress. He starts taking a drug provided by a "well intentioned" family member. He with excessive or toxic effects from ALLhis other medications, loss of libido and gynecomastia. A drug-drug interaction is suspected.

i) Which drug did the patient most likely self-medicate with? (1 mark)

ii) Explain the mechanism that resulted to the drug-drug interaction. (4 marks)

iii) Outline the most probable drug related cause of the patient's loss of libido and gynecomastia. (3 marks)

12. We have two patients. One requires suppression of emesis caused by an anticancer drug that causes a high incidence and severity of vomiting. Another patient has severe diabetic gastroparesis and gastroesophageal reflux.

i) Which drug would be most suitable for both indications (assuming no specific contraindications)? (1 mark)

ii) Explain the pharmacodynamic basis of your drug selection in (i). (3 marks)

13. Outline TWO regimens used to eradicate *Helicobacter pylori*. (4 marks)

15. Regarding sulfasalazine:

i) Describe the pharmacokinetics. (6 marks)

ii) Classify and list the adverse reactions (4 marks)

iii) Explain effects of genetic variation on pharmacology. (4 marks)

SECTION C

PPB 333 ENDOCRINE SYSTEM

1. Which one of the following promotes spermatogenesis?

A. Cabergoline.

B. Urofollitropin.

C. Methimazole.

D. Abarelix

D. Vasopressin.

2. All of the following agents are correctly paired with an appropriate clinical use of the drug **EXCEPT**.....

A. Desmopressin—treatment of diabetes insipidus.

B. Bromocriptine—hyperprolactinaemia.

C. Octreotide—treatment of bleeding esophageal varices.

D. Oxytocin—induction of labour.

E. Goserelin—growth hormone deficiency.

3. Which of the following classes of oral diabetes drugs is paired appropriately with its primary mechanism of action?

A. DPP-4 inhibitor—inhibits breakdown of complex carbohydrates.

B. Glinide—increases insulin sensitivity.

C. Sulfonylurea—increases insulin secretion.

D. Thiazolidinedione—decreases hepatic gluconeogenesis.

E. Pramlintide- increases gastric transit time.

4. Which one of the following blocks glucocorticoid and progesterone receptors?

A. Aminoglutethimide

B. Beclomethasone

C. Ketoconazole

D. Mifepristone

E. Spironolactone

5. Which one of the following adverse reactions is associated with thioamides?

A. Agranulocytosis

B. Lupus erythematosus-like syndrome

C. Myopathy

D. Torsades de pointes arrhythmia

E. Thrombotic thrombocytic purpura

6. Which of the following best describes a glucocorticoid response element (GRE)?

A. Protein regulator that controls the interaction between an activated steroid receptor and DNA

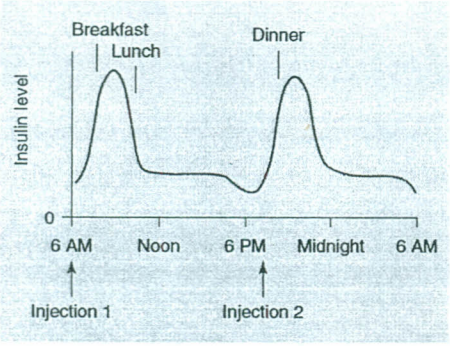
B. Short DNA sequence that binds tightly to RNA polymerase

C. Small protein that binds to an unoccupied steroid receptor protein and prevents it from becoming denatured

D. Specific nucleotide sequence that is recognized by a steroid hormone receptor-hormone complex

E. Portion of the steroid receptor that binds to DNA

7. The graph below shows the serum insulin level that resultsfrom a 2-injection regimen given to a child with type 1diabetes mellitus. Assume that both injections contain the same medication(s). Which drug or drug combination is most likely to generate the levels of insulin depicted in the figure?



A. 100% Regular insulin

B. 70% Lispro insulin plus 30% insulin detemir

C. 70% NPH insulin plus 30% regular insulin

D. 70% NPH insulin plus 30% insulin glargine

E. 100% Insulin glargine

8. The following are true about calcitonin **EXCEPT....**

A. It is secreted during imminent hypercalcemia.

B. It lowers plasma ca^{2+} levels.

C. It inhibits osteoclast activity.

D. It is indicated in hypercalcemia and osteoporosis.

E. Injection produces analgesia restricted to bone pain.

9. High doses of a bisphosphonate result in which endocrine-metabolic disorder?

A. Cushing's disease

B. Diabetes insipidus

C. Diabetes mellitus

D. Hyperparathyroidism

E. Hyperthyroidism

10. The following is **FALSE** about thyroid stimulating hormone (TSH).

A. It is a 211- amino acid glycoprotein

B. It comprises of three subunits

C. Its actions are mediated by cAMP

D. Recombinant TSH is used to diagnose thyroid deficiency

E. It is secreted from the anterior pituitary gland

11. Match each drug with most appropriate statement numbered below: (3 marks)

a. Radioactive iodine

b. Amiodarone

c. Propranolol

d. Propylthiouracil

e. Methimazole

f. Thiocyanate

i) Inhibits peripheral deiodination of triiodothyronine to thyroxine

ii) Blocks uptake of iodide by the gland through competitive inhibition of the iodide transport mechanism.

iii) Inhibits peripheral conversion of thyroxine to triiodothyronine

iv) Produces a permanent reduction in thyroid activity

v) Increases risk of severe and fatal hepatitis

vi) Improves hyperthyroidism clinical symptoms

12. A male patient is diagnosed with a large, benign prostatic mass, and he has the urge to urinatefrequently. He is begun on leuprolide acetate therapy. He returns to your office 3 days later complaining that his urge to urinate has increased (paradoxical increase). Account for this action? (2 marks)

13. A 50-year-old woman is recently diagnosed with Type 2 diabetes mellitus. Exercise and diet do not provide adequate glycemic control, so drug therapy is needed. The physician contemplates prescribing metformin. Regarding metformin:

i) Outline the drug's pharmacodymanic effect on THREE tissues. (6 marks)

ii) Describe the distribution, metabolism and elimination (6 marks)

iii) List THREE adverse effects. (3 marks)

14. Regarding glucocorticoids,

i) Giving TWO examples, explain their permissive action. (2 marks)

ii) Outlinetheir effects on; (8 marks)

a. Carbohydrate metabolism

b. Protein metabolism

c. Bone

d. Immune system