



MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

UNIVERSITY EXAMINATIONS 2021/2022 ACADEMIC YEAR

THIRD YEAR MAIN EXAMINATION

FOR THE DEGREE OF

BACHELOR OF SCIENCE (CHEMISTRY)

COURSE CODE: SCH 334E

COURSE TITLE: MEDICINAL CHEMISTRY

DATE: FRIDAY, 26TH APRIL 2022

TIME: 8.00AM - 10.00AM

INSTRUCTIONS

- *Answer ALL Questions*

MMUST observes ZERO tolerance to examination cheating

This paper consists of 5 printed pages. Please turn over.



Q1.

[19 marks]

(a) Using two (2) relevant examples, what do you understand by the term 'drug' precisely?

[4]

(b) Why is there need for new drugs from time to time?

[5]

(c) With relevant examples outline five (5) sources of Drugs and Lead Compounds:

[5]

(d) Explain five (5) types (Forms) of medicines found in the market today? Illustrate your answer with relevant example(s) for each form. [5]

Q2.

[17 marks]

Using Quinine (anti-malarial) as an example of a drug, discuss its ADMET exhaustively.

Q3.

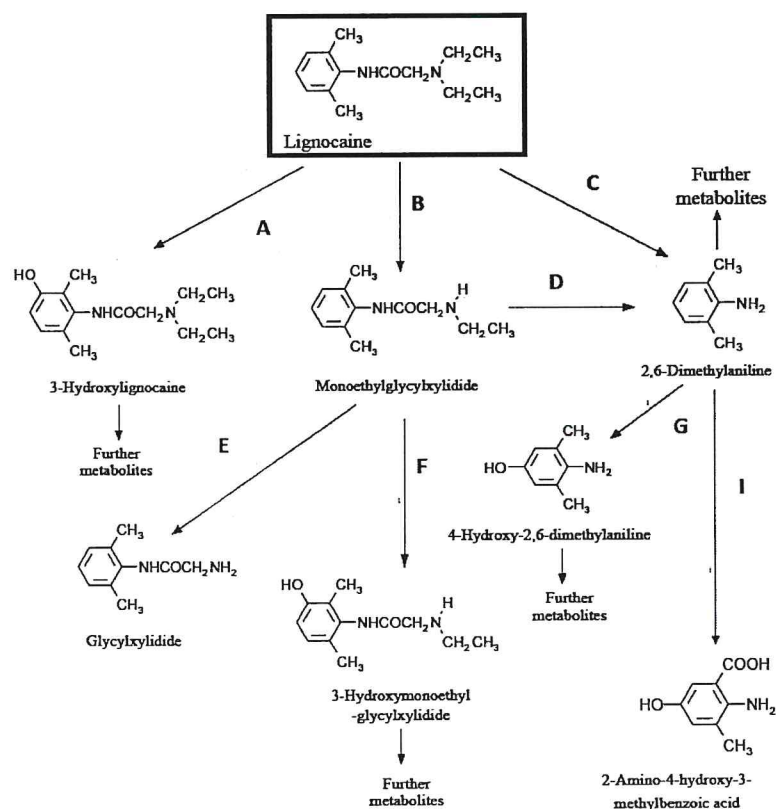
[18 marks]

(a) Given an analgesic e.g. Diclofenac, explain its possible sites of action in the body.

[6]

(b) Clearly explain the difference between an Agonist and an Antagonist. [4]

(c) Drug metabolism is the biotransformation of a drug along its ADME process into other compounds (metabolites) that are usually more water soluble than their parent drug and are excreted in the urine. Given below is an outline of the known metabolic pathways of the local anaesthetic lignocaine. Study the outline carefully and answer the following question. Identify the classes of chemical reactions marked A – I. (For example, substitution, reduction, [7]



Q4.

[16 marks]

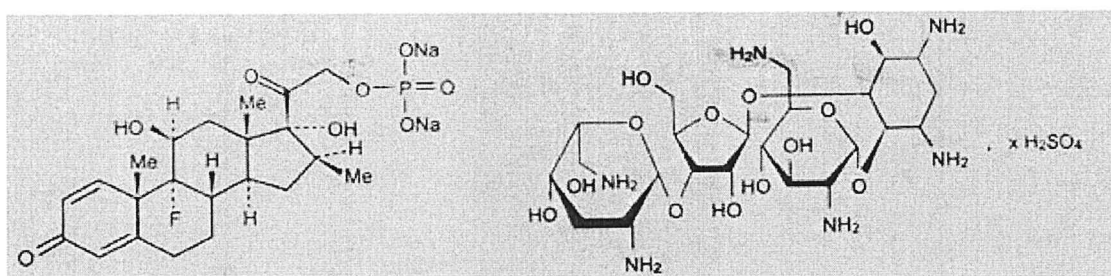
The passage below contains information on a medicine marked X. Read and understand the information provided and use it to answer the following questions.

Drug X information

X drops contains Betamethasone Sodium Phosphate BP 0.1% W/V and Neomycin Sulphate BP 0.5% w/v in a clear colourless to yellowish aqueous solution. Sterile until opened.

Betamethasone Sodium Phosphate

Neomycin Sulphate



X is used for non-infected steroid responsive inflammatory conditions e.g uveitis, marginal keratitis, allergic conjunctivitis, Blepharitis, Episcleritis, where prophylaxis against secondary bacterial infection is desired. Also, it is used for otitis external and other steroid responsive inflammatory conditions where infection is present or suspected.

X is should not be used for Bacterial, viral, fungal, tuberculosis or purulent conditions. Use in the eye is contraindicated if glaucoma is present or where herpetic keratitis (e.g dendritic ulcer) is considered a possibility. Inadvertent use of topical steroids in the latter conditions can lead to extension of the ulcer and marked visual deterioration. Because of the risk of ototoxicity, preparation containing Neomycin Sulphate should not be used until an intact tympanic membrane has been visualized.

Steroids should not be administered to 'red eyes' until a definitive diagnosis is made. Treatment with steroid preparations should not be repeated or prolonged without regular review to exclude raised intra-ocular pressure or unsuspected infections. The unnecessary topical use of Neomycin Sulphate containing products should be avoided in order to minimize occurrence of neomycin resistant organisms (and organisms cross-resistant to other aminoglycosides).

X is for external use only. Eye: 1 or 2 drops instilled into the eye every one or two hours until signs of improvement are apparent, when the frequency may be reduced. Ear: 2 or 3 drops instilled into the ear every two or three hours until signs of improvement are seen three times daily. Nose: 2 or 3 drops instilled into each nostril two or three times daily.

Topical administrations of corticosteroids to pregnant animals can cause abnormalities of foetal development. The relevance of this finding to human beings has not been established; however, topical steroids should not be used extensively in pregnancy i.e. in large amounts or for prolonged periods.

Eye drops containing corticosteroids cause a serious rise in intra-ocular pressure in a small percentage of the population, including most of those with a family history of glaucoma. A milder rise may be experienced by a larger proportion of subjects if treatment is continued for longer than a few weeks. Thinning of the cornea leading to perforation has occurred with use of topical corticosteroids. Acute sensitization to Neomycin Sulphate is a rare event. Cataract is reported to have occurred after unduly prolonged treatment of eye conditions with topical corticosteroids. Excessive and prolonged intranasal usage above the recommended dose may induce systemic side effects.

Probeta-N contents should not be used for more than four weeks after first opening the bottle drop.

It is instructed do not store above 30°C. Protect from light & heat. Keep out of the reach of children. Bottle must be stored upright. The solution turns yellow on storage. This does not affect efficacy of the product.

X drops is available in 7.5ml in plastic dropper bottle.

Identify and / or explain all aspects marked (a-p) below on drug **X**.

- | | | |
|-----|--|--------|
| (a) | Trade Name(s) of X . | 1 mark |
| (b) | Pharmaceutical Form/Presentation of X | 1 mark |
| (c) | Special instructions for use/handling of drug X | 1 mark |
| (d) | Active ingredient (s) in X | 1 mark |
| (e) | Chemical structure of the active ingredient in X . | 1 mark |
| (f) | Class of the compound of the active ingredient (s) of X . | 1 mark |
| (g) | Class of the drug X ? | 1 mark |
| (h) | Excipients in the formulation of drug X | 1 mark |
| (i) | Indication(s) of the drug X | 1 mark |
| (j) | Dosage and administration of X | 1 mark |
| (k) | Contraindication(s) of X | 1 mark |

- | | | |
|-----|--|--------|
| (l) | Warnings and precautions cited for Drug X | 1 mark |
| (m) | Known adverse reaction(s) of X | 1 mark |
| (n) | Brief statement on the Pharmacodynamics of drug X | 1 mark |
| (o) | Brief statement on the Pharmacokinetics of drug X | 1 mark |
| (p) | Is drug X an original medicine or is it generic? | 1 mark |