

**NATIONAL UNIVERSITY OF LESOTHO**

**FACULTY OF HEALTH SCIENCES**

**DEPARTMENT OF PHARMACY**

**COURSE: PHA 4303 – CHEMOTHERAPY**

**FINAL EXAMINATION**

**JANUARY 2024**

**MARKS: 100**

**TIME: 3 HOURS**

---

**INSTRUCTIONS:**

The paper has FIVE (5) sections, section A to E.

- Answer ALL questions

**SECTION A – ANTIBACTERIAL AGENTS**

**[20 MARKS]**

1. A 51-year-old alcoholic patient presents to the emergency department with fever, headache, neck stiffness and altered mental status for 12 hours. Vital signs are blood pressure 90/55 mm Hg, pulse 120/min, respirations 30/min, temperature 40 °C rectal. The patient is minimally responsive to voice and does not follow commands. Examination is significant for a right third cranial nerve palsy and nuchal rigidity. An emergency CT scan of the head is normal. Blood cultures are obtained, and a lumbar puncture reveals the following CSF values: white blood cells 5000/mm<sup>3</sup>, red blood cells 10/mm<sup>3</sup>, protein 200 mg/dL, glucose 15 mg/dL. CSF Gram stain reveals Gram-positive cocci in pairs.
  - a. What is the most likely diagnosis in this patient? (2)
  - b. Empirical therapy was recommended until sensitivity test results were available. Which drugs would be included as first-line treatment? (2)
  - c. Give the rationale behind the use of drugs recommended (in b. above) in this case. (4)
  - d. A sample was taken before commencement of empirical therapy and the organism causing the infection was found to be *Streptococcus pneumoniae*, which drugs may be used in this case? (2)
  
2. A 30-year-old woman, HIV positive presents with persistent cough, night sweats, fatigue and weight loss. Sputum microscopy and smear were positive for pulmonary tuberculosis infection.
  - a. Which anti TB drugs would be included in the first-line treatment regimen for this patient? (4)
  - b. On further clinical examination, the patient was found to have liver disease. Describe the potential hepatotoxicity of the drugs in the first-line regimen and state the treatment regimens that would be considered in this case? (6)

**SECTION B – ANTIVIRAL AGENTS**

**[20 MARKS]**

3. A 30-year-old woman, HIV positive presents with persistent cough, night sweats, fatigue and weight loss. Sputum microscopy and smear were positive for pulmonary tuberculosis infection.
  - a. The patient had been on INSTI-based ART regimen. Mention possible drug combinations in this kind of regimen. (6)
  - b. Describe the detailed mechanisms of action of the drugs included. (4)
  - c. What changes may need to be made on the ART regimen, during the period of concurrent anti TB therapy and ART. (2)
  - d. Shingles; Herpes zoster infection have been found to be one of the common opportunistic infections in HIV patients. Describe the treatment plan that includes antiviral agents in the management of this infection. (4)
  - e. Discuss in detail the mechanism of action of one antiviral agent used in the management of varicella zoster virus infection. (4)

**SECTION C – ANTIFUNGAL AGENTS**

**[20 MARKS]**

1. A 37-year old woman had recently been diagnosed with systemic candidiasis, and IV antifungal treatment was prescribed. One week later, the following lab results were obtained: serum creatinine 5.9 mg/dL (normal 0.6-12 mg/dL),  
BUN 53 mg/dL (normal 7 -18 mg/dL),  
plasma potassium 2.3 mmol/L (normal 3.5-5.0 mmol/L).
  - a. Which antifungal drug was most likely prescribed? Give the rationale based on the information provided (4)
  - b. Describe other two (2) alternative drugs that could be prescribed for a patient diagnosed with systemic candidiasis (include their mechanisms of action). (6)
2. A 30-year-old woman, HIV positive presents with round scaly itchy lesions with raised edges on the skin. A diagnosis of Tinea capitis infection was made.
  - a. Describe the approach to clinical management of this infection, including possible pharmacotherapeutic agents that may be considered. (6)
  - b. Mention two (2) systemic antifungal agents used for mucocutaneous infections and describe their mechanisms of action. (4)

**SECTION D – ANTIPROTOZOAL AGENTS [10 MARKS]**

1. The choice of a prophylactic drug against malaria for a particular individual should take into account various factors including patient-related factors such as pregnancy.
  - a. Which chemoprophylactic drug(s) would you recommend for a 34-year-old pregnant woman in the second trimester attending a conference in Kenya. In Kenya, all Plasmodium species exist. Justify your answer (2)
  - b. Which other effective prophylactic drugs are available, which however are contraindicated in the second trimester of pregnancy? Justify the contraindication. (8)

**SECTION E – CANCER CHEMOTHERAPY**

**[30 MARKS]**

1. A 46-year-old woman who had undergone mastectomy for infiltrating ductal carcinoma started adjuvant combination therapy with CMF (cyclophosphamide, methotrexate and fluorouracil) regimen.
  - a. What molecular actions most likely mediated the therapeutic effects of the drugs in this regimen? (6)
  - b. The oncologist ordered leucovorin from the pharmacy; however he was not confident on how to integrate leucovorin in the regimen. With your knowledge of molecular actions of leucovorin, when should the drug be given, relative to time of infusion of methotrexate and fluorouracil? (2)
  - c. Describe the effects of leucovorin on the therapeutic effects of methotrexate and fluorouracil. (2)
  - d. Range the emetogenic potential of the drugs in the CMF regimen. Which antiemetics may be given with this regimen? (5)
  - e. Describe cyclophosphamide most common adverse effect and how this may be clinically managed. (5)
2. A 69-year-old woman with breast cancer is considered for adjuvant therapy with doxorubicin.
  - a. What factors should be considered before administration of this drug to this patient? (5)
  - b. Assuming after all assessments were done, the patient was found eligible to be given the drug and during administration extravasation occurred. How should this be managed? (5)