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(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)
MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS
2021 / 2022 ACADEMIC YEAR
FOURTH YEAR SECOND SEMESTER EXAMINATIONS**

**FOR THE DEGREE
OF
BACHELOR OF SCIENCE IN MEDICAL LABORATORY
SCIENCES**

COURSE CODE: BML 422

COURSE TITLE: SYSTEMIC PATHOLOGY

DATE: 21/04/2022

TIME: 8.00 -10.00 AM

INSTRUCTIONS TO CANDIDATES

This paper consists of three sections:

- i. Section A – Multiple Choice Questions
- ii. Section B – Short Answer Question
- iii. Section C – Long Answer Question.

Answer all questions

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over. 

Section A: Multiple Choice Questions (20 marks)

Choose the most suitable choice, only one choice is correct.

1. Are a group of genotoxic chemotherapy treatments that work by modifying DNA bases, disrupting DNA replication and transcription? A good example of this type of drug is _____.
 - a. Intercalating agents, cisplatin
 - b. Alkylating agents, methotrexate
 - c. Intercalating agents, methotrexate
 - d. Alkylating agents, cisplatin
2. Which of the following is NOT a type of treatment for cancer?
 - a. Surgery
 - b. Chemotherapy
 - c. Hemoglobinostomy
 - d. Antibodies
3. Which of the following condition is characterized by Longitudinal tear at GE junction after forceful vomit.
 - a. Achalasia
 - b. Esophageal Hernia
 - c. Mallory Weiss Syndrome
 - d. Esophagitis
4. Ulceration, bleeding, and rupture are possible complications of
 - a. Achalasia
 - b. Esophageal Hernia
 - c. Mallory Weiss Syndrome
 - d. Esophagitis
5. Which of the following is/are benign tumor(S) of the small intestine?
 - a. Adenocarcinoma
 - b. Polyps
 - c. MALT
6. Segmental disorder of large intestine.
 - a. Chron's disease
 - b. Ulcerative colitis
 - c. Diverticulosis
7. Adenomatous colon is a result of dysfunction of which of these genes
 - a. Onchogenes
 - b. Protoonchogenes
 - c. Rb gene
 - d. P53
8. You have a paraplegic patient with renal calculi. Which factor contributes to the development of calculi?
 - a. Increased calcium loss from the bones.
 - b. Decreased kidney function.
 - c. Decreased calcium intake.
 - d. High fluid intake.
9. Which finding leads you to suspect acute glomerulonephritis in your 32 y.o. patient?
 - a. Dysuria, frequency, and urgency
 - b. Back pain, nausea, and vomiting
 - c. Hypertension, oliguria, and fatigue
 - d. Fever, chills, and right upper quadrant pain radiating to the back
10. The most common early sign of kidney disease is:

- a. Sodium retention
 - ~~b. Elevated BUN level~~
 - c. Development of metabolic acidosis
 - d. Inability to dilute or concentrate urine
11. A 32-year-old woman had a firm nodule palpable on her uterus three years ago noted on a routine physical examination. The nodule has slowly increased in size and is now about twice the size it was when first discovered. She is asymptomatic. Which of the following does this patient most likely have?
- a. Adenocarcinoma
 - b. Leiomyosarcoma
 - c. Rhabdomyosarcoma
 - d. Leiomyoma
12. All of the following are true regarding fibroadenoma EXCEPT:
- a. It is the most common benign tumor of the female breast
 - b. More common in younger women
 - c. May enlarge late in the menstrual cycle and during pregnancy
 - d. Is an important risk factor for breast carcinoma
13. Which of the following neoplasms is derived from all three germ layers?
- a. Carcinoma
 - b. Teratoma
 - c. Sarcoma
 - d. Apudoma
14. In males aged 20-35 y, which of the following is the most common tumor found?
- a. Colon cancer
 - b. Prostatic carcinoma
 - c. Testicular tumor
 - d. Lung cancer
15. True statements about prostatic hyperplasia include all but which one of the following?
- a. It predisposes to carcinoma.
 - b. It produces urinary obstruction
 - c. It predisposes to urinary tract infections.
 - d. It is the result of benign glandular and stromal proliferation
16. What bone disorder is caused by an autosomal dominant defect in the synthesis of collagen type 1?
- a. Osteogenesis imperfecta
 - b. Achondroplasia
 - c. Osteopetrosis
 - d. Osteomyelitis
17. What is the pathogenesis of osteopetrosis (marble bone disease)?
- a. Poor osteoclast function due to a carbonic anhydrase II mutation
 - b. Defective mineralization of osteoid
 - c. Reduction in trabecular bone mass
 - d. Imbalance between osteoclast and osteoblast activity with an osteoclastic phase, a mixed osteoclastic- osteoblastic phase followed by an osteoblastic phase
18. The following is NOT benign primary cardiac tumor
- a. Primary fibroelastoma
 - b. Rhabdomyoma
 - c. Mesothelioma of AV node
 - d. mesothelioma
19. Worldwide, lung cancer is the leading cause of cancer death among _____.
- a. Men

- b. Women
 - c. Both men and women
 - d. Elderly
20. The most frequently diagnosed form of non-small cell lung cancer (NSCLC) among both men and women?
- a. Adenocarcinoma
 - b. Squamous cell carcinoma
 - c. Large cell carcinoma
 - d. Adenosarcoma

Section B Short Answer Questions (40 Marks)

1. Explain the modalities used in management of neoplasms (8marks)
2. Describe the clinical features associated with urethral strictures in urological obstruction (8marks)
3. Explain the major classes of primary bone tumors
4. Explain the risk factors associated oral cancers
5. Explain the pathophysiology of ovarian tumors (8marks)

Section C Long Answer Questions (60 marks)

1. Describe pathophysiology and patterns of cardiac myxoma (20 marks)
2. Discuss features of intra axial and extra axial tumor of the Central nervous system(20 marks)
3. During yearly bench rotation, you were transferred to histology bench and given a new responsibility of taking charge of the bench. You were introduced to the pathologist in-charge of pathological samples and after the orientation the pathologist you request to make a presentation on CYSTS in the next meeting coming in three days.
Instructions: Make an outline and a presentation under the following
 - i. Definition of a cyst
 - ii. Causes of cyst
 - iii. Components of a cyst
 - iv. Types of cysts



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(MAIN CAMPUS)

**UNIVERSITY EXAMINATIONS (MAIN PAPER)
2021/2022 ACADEMIC YEAR**

FIRST YEAR SECOND SEMESTER EXAMINATIONS

**FOR THE DEGREE
OF
BACHELOR OF SCIENCE MEDICAL LABORATORY
SCIENCE/MEDICAL BIOTECHNOLOGY**

COURSE CODE: BML 121

COURSE TITLE: INORGANIC CHEMISTRY

DATE: 20/04/2022

TIME: 8.00 -10.00 AM

INSTRUCTIONS TO CANDIDATES

This paper is divided into three sections, **A B** and **C**, carrying respectively: Multiple Choice Questions (**MCQs**), Short Answer Questions (**SAQs**) and Long Answer Questions (**LAQs**). **Answer all questions. DO NOT WRITE ON THE QUESTION PAPER.**

TIME: 2 Hours

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This Paper Consists of 5 Printed Pages. Please Turn Over

SECTION A: Multiple Choice Questions (20 marks).

- The statement that is not correct for the periodic classification of elements is:
 - The properties of elements are the periodic functions of their atomic numbers.
 - Non – metallic elements are lesser in number than metallic elements
 - The first ionization energies of elements along a period do not vary in a regular manner with increase in atomic number
 - For transition elements the d – sub shells are filled with electrons monotonically with increase in atomic number
- In the long form of periodic table, elements are arranged according to:
 - Increasing atomic number
 - Decreasing atomic number
 - Increasing atomic mass
 - Decreasing atomic mass
- Which of the following statement is incorrect in relation to ionization energy?
 - Ionization energy increases for each successive electron
 - The greatest increase in ionization energy is experienced on removal of electron from core of noble gas configuration
 - End of valence electrons is marked by a big jump in ionization energy
 - Removal of electron from orbitals bearing lower n value is easier than from orbital having higher n value
- Four successive members of first row transition elements are listed below with their atomic numbers. Which one of them is expected to have the highest third ionization energy.
 - Iron (Z = 26)
 - Chromium (Z=24)
 - Manganese (Z=25)
 - Vanadium (Z=23)
- Which of the following statement is correct?
 - Generally reducing character of elements increases in period
 - Generally oxidizing character of elements increases in period
 - Generally, basic character of oxides decreases in group
 - All are correct
- The set representing the correct order of first ionization energy is:
 - $K > Na > Li$
 - $Be > Mg > Ca$
 - $N > P > As$
 - Both (b) and (c)
- Which is correct order of atomic radii?
 - $Mg < Al < Na < K$
 - $Al < Mg < Na < K$
 - $K < Na < Mg < Al$
 - None of the above
- (A), (B) and (C) are elements in the third short period. Oxide of (A) is ionic, that of (B) is amphoteric and of (C) a giant molecule. (A), (B) and (C) have atomic numbers in the order of
 - $(A) < (B) < (C)$
 - $(C) < (B) < (A)$
 - $(A) < (C) < (B)$
 - $(B) < (A) < (C)$
- Which of the following is incorrect?
 - An element which has high electronegativity always has high electron gain enthalpy
 - Electron gain enthalpy is the property of an isolated atom

- c. Electronegativity is the property of bonded atoms
 - d. Both electronegativity and electron gain enthalpy are usually directly related to nuclear charge and inversely related to atomic size
10. according to modern periodic law, variations in the properties of elements is related to their:
- a. Atomic weight
 - b. Nuclear weight
 - c. Atomic numbers
 - d. Neutron – proton ratios
11. Mass of an atom is equals to which of the following
- a. Only protons
 - b. Only neutrons
 - c. Neutrons and protons
 - d. Protons and electrons
12. Nickel has atomic number 28. The correct electronic configuration is:
- a. $1s^2 2s^2 2p^4 3s^2 3p^8 3d^{10}$
 - b. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^2$
 - c. $1s^2 2s^2 2p^4 3s^2 3p^6 4s^2$
 - d. $1s^2 2s^2 3s^2 3p^8 3d^{10}$
13. Atoms having the same mass number and different atomic number are known as:
- a. Isotopes
 - b. Isotones
 - c. Isobars
 - d. Isomers
14. The formula for a mass number of an atom is:
- a. Number of protons + number of electrons
 - b. Number of neutrons + number of electrons
 - c. Number of protons + number of neutrons
 - d. None of these
15. The correct electronic configuration of element having atomic number 20 is:
- a. 2,6,6,2
 - b. 2,8,8,2
 - c. 2,4,6,2
 - d. 2,4,6,2
16. The place of atom where maximum mass of it concentrated is:
- a. Nucleus
 - b. Neutrons
 - c. Protons
 - d. Electrons
17. Which rule will this configuration be violating, if electronic configuration for oxygen is written as $1s^2 2s^2 2p^4$.
- a. Aufbau's principle
 - b. Hund's rule
 - c. Pauli's exclusion principle
 - d. None of the above
18. The nucleus of an atom has:
- a. Protons and neutrons
 - b. Protons and electrons
 - c. Neutrons and electrons
 - d. Protons, neutrons and electrons
19. How many electrons can fit into the orbitals that comprise the 3rd energy level?
- a. 2
 - b. 8
 - c. 18
 - d. 32

20. In d orbitals the maximum number of unpaired electron that can be present is:

- a. 1
- b. 3
- c. 5
- d. 7

SECTION B: Short Answer Questions (40 marks).

1. Explain why lithium and magnesium have similar chemical properties yet they belong in different periods (8 marks)
2. The data given below are for the elements, A, B, C and D which belong to the same periodic table

Element	A	B	C	D
1 st I.E	495	580	790	1255
Melting point of oxide	2300	1610	-20°

- a. Which one of the elements A, B, C and D is a metal? Explain your answer(4 marks)
- b. State the type of bonding and structure of the oxides of elements A and D. Explain. (4 marks)
3. State what would be observed when chlorine gas is bubbled through a solution of iron (II) chloride solution hence write the equation of reaction (6 marks)
4. Explain the following observations:
 - a. When hydrochloric acid is exposed in air, it turns brown (2 marks)
 - b. A colourless solution of acidified hydrogen peroxide turns brown on addition of acidified potassium iodide (2 marks)
5. Using examples, explain how group (IV) elements reacts with:- (8 marks)
 - a. Water
 - b. Air
 - c. Acids
 - d. Alkalis
 - e. Non-metals
6. Explain why lithium carbonate is insoluble in water (4 marks)

SECTION C: Long Answer Questions (60 marks).

1. Explain the four rules and principles followed when constructing an electronic configuration of elements. Demonstrate these using the following elements and explain which elements are thermodynamically stable and why? (20 marks)
 - a. Aluminium (Z = 13)
 - b. Phosphorus (Z = 15)
 - c. Calcium (Z = 20)
 - d. Chlorine (Z = 17)
 - e. Vanadium (Z = 23)
 - f. Selenium (Z = 34)
 - g. Nickel (Z = 28)
 - h. Copper (Z = 29)
2. The table below shows the melting points of elements in period 3 of the periodic table

(20 marks)

Element	Na	Mg	Al	Si	P	S	Cl
Atomic no.	11	12	13	14	15	16	17
Melting point (°C)	98	650	660	1410	44	119	-101

- a. Plot a graph of melting point against atomic number
 - b. Explain the shape of graph
 - c. The melting points of group I metals decrease down the group. Explain
3. Using two (2) examples, demonstrate how halogens reacts with:-
- a. Water (5 marks)
 - b. Cold dilute alkalis (5 marks)
 - c. Hot concentrated alkali (5 marks)
 - d. Hydrogen (5 marks)

