



The University of Fiji

(An Entity of Arya Pratinidhi Sabha of Fiji)



Umanand Prasad School of Medicine & Health Sciences

Department of Nursing

Semester 2, 2025

FINAL EXAMINATION PAPER

BNBI104: MEDICAL BIOCHEMISTRY FOR NURSING

Important Instructions to Students:

1. Read the questions, instructions carefully and answer the questions.
2. You are allowed an **extra 10 minutes reading time** (during this time, you are not allowed to write with pen) and **180 minutes (3 Hours) to complete this paper**
3. Silent, non-programmable calculators are allowed, but not supplied.
4. Write all your answers in the answer booklet provided. If you need extra sheets, please ask from the supervisor. Write your name, course code and student identification number in the answer booklet and in the attendance sheet.
5. This paper contains four (4) sections: A, B, C, and D. All questions are compulsory to answer.
6. Write all your answers legibly. The marker has the right to award zero for answers that are not legible.
7. This is a **Closed Book Examination**. The University views plagiarism, cheating, and dishonest practice as serious offences, and if found, offenders are penalized.

Examination Paper Format:

<u>Section</u>	<u>Question</u>	<u>Content</u>	<u>Marks</u>	<u>Suggested Time</u>
A	1 - 20	Multiple Choice	20	26 minutes
B	21 - 40	True or False	20	20 minutes
C	41 - 54	Short Answer Questions	45	60 minutes
D	55 - 59	Long Answer Questions	55	74 minutes
		TOTAL	140	180 Minutes

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Registration Certificate Number (RGN0020/11)

SECTION A: MULTIPLE CHOICE QUESTIONS.

20 marks

QUESTIONS: 1 - 20

Write the letter that best suits the correct answer.

1. Which of the following best defines biochemistry?
 - A. The study of chemical reactions in non-living systems.
 - B. The analysis of genetic variations among different species.
 - C. The study of the structure and function of the human skeleton.
 - D. The branch of science that deals with the chemical processes and substances occurring in living organisms.
2. Why is the study of biochemistry important for nursing students?
 - A. It focuses solely on the structure of the human skeleton.
 - B. It helps nurses memorize all diseases and their treatments.
 - C. It is only necessary for students pursuing a career in laboratory research.
 - D. It enables nurses to understand the chemical processes and basic functions of the human body, which have practical applications in nursing.
3. Which of the following are primary functions of metabolism in the human body?
 - A. Storing fat and producing bone tissue.
 - B. Fighting infections and producing hormones.
 - C. Synthesis of molecules for cell function, and removal of waste products.
 - D. Transporting oxygen through the bloodstream and regulating body temperature.
4. Which of the following correctly describes a common type of biochemical reactions?
 - A. Only acid-base reactions are involved in metabolism.
 - B. Biochemical reactions include nucleophilic substitution.
 - C. Biochemical reactions exclude oxidation-reduction processes.
 - D. All biochemical reactions involve the breakdown of proteins only.
5. What is vasodilation, and what causes it?
 - A. The blockage of blood vessels due to fat buildup.
 - B. The bursting of blood vessels due to high pressure.
 - C. The narrowing of blood vessels due to the contraction of smooth muscle cells.
 - D. The widening of blood vessels caused by the relaxation of smooth muscle cells in the vessel walls.

6. How can shifts in chloride ion (Cl^-) levels affect the body?
- A. They result in increased oxygen transport in red blood cells.
 - B. They only affect muscle contractions and have no impact on acid-base balance.
 - C. They primarily cause neurological disorders and are not detected in blood tests.
 - D. They lead to acid-base imbalances such as hypochloremic metabolic alkalosis or hyperchloremic metabolic acidosis, which can be detected through blood tests and clinical observation.
7. What does PCO_2 measured in mm Hg represent in a clinical context?
- A. The percentage of nitrogen in inhaled air.
 - B. The concentration of glucose in the plasma.
 - C. The total amount of oxygen in the blood, with the percentage of nitrogen in inhaled air.
 - D. The partial pressure of carbon dioxide, measured in millimeters of mercury (mm Hg), indicates CO_2 levels in a gas.
8. What is the normal pH range of blood?
- A. Normal pH is 7.0–7.2
 - B. Normal pH of 6.5–7.0
 - C. Normal pH of 7.35–7.45
 - D. Normal pH of 7.45–7.65
9. Which of the following is true for the classifications of body temperature?
- A. Low-grade fever above 36.5°C to 37.5°C and high-grade fever above 39°C .
 - B. Low-grade fever: below 37.0°C , and high-grade fever above 41°C .
 - C. Low-grade fever: between 35°C – 36°C ; High-grade fever: above 38.0°C ; Hyperpyrexia: exactly 40°C .
 - D. Low-grade fever above 37.1°C to 38.2°C ; high-grade fever above 38.2°C and hyperpyrexia higher than 40°C .
10. Which of the following correctly defines bradycardia?
- A. Bradycardia is defined as a heart rate above 100 to 150 bpm.
 - B. Bradycardia is low blood pressure above 60 systolic and 40 diastolic.
 - C. Bradycardia is when your patient's heart rate is below 60 beats per minute.
 - D. Bradycardia is when your patient has a normal heart rhythm with no complications.

11. What is the normal respiratory rate for a healthy adult?
- A. 8–12 breaths per minute.
 - B. 14–20 breaths per minute.
 - C. 21–28 breaths per minute.
 - D. 30–36 breaths per minute.
12. Which of the following is true regarding the clinical manifestations of hypertension?
- A. Blurred vision may result from constricted blood vessels.
 - B. Dizziness is rarely associated with oxygen levels in the brain.
 - C. Hypertension always presents with obvious symptoms in the early stages.
 - D. Headaches in hypertension are caused by increased oxygen flow to the brain.
13. Which of the following statements about the composition and function of bile is correct?
- A. Bilirubin aids in the emulsification of fats.
 - B. Bile has no role in digestion, only in waste excretion.
 - C. Bile salts are synthesized in the pancreas and help in protein digestion.
 - D. Bile salts are derived from cholesterol and help break down fat globules for better absorption.
14. Which of the following is not a function of steroid hormones?
- A. Facilitating blood clotting and wound healing.
 - B. Regulating immune function and salt-water balance.
 - C. Controlling food metabolism and supporting growth.
 - D. Initiating and maintaining sexual development and reproduction.
15. Why do small children commonly get colds more easily than adults?
- A. Their immune system is still developing.
 - B. They are exposed to fewer viruses than adults.
 - C. They have a fully developed and strong immune system.
 - D. They take more medications that weaken their immunity.

16. Which of the following statements about influenza (the flu) is true?
- A. Influenza is a viral infection.
 - B. Influenza does not spread from person to person.
 - C. Influenza is a bacterial infection treated with antibiotics.
 - D. Influenza only causes mild symptoms and is never serious.
17. How is COVID-19 transmitted?
- A. Spread through direct contact with animals.
 - B. Spread by stepping on animal urine and waste.
 - C. Transmitted by touching your face after touching a contaminated surface.
 - D. Spreads through respiratory droplets, contaminated surfaces, and close contact.
18. Which of the following groups are at higher risk for severe illness from COVID-19?
- A. Healthy adults living in rural and urban areas.
 - B. People aged 65 and older, and with chronic illnesses.
 - C. Teenagers and young adults with no underlying health conditions.
 - D. Only people who have recently traveled abroad with their family and friends.
19. Which of the following are possible psychosocial consequences of the coronavirus (COVID-19) pandemic?
- A. Decrease in mental health awareness.
 - B. Stigma, discrimination, and depression.
 - C. Improved social unity and reduced stress.
 - D. Increased physical strength and immunity in all individuals.
20. Which of the following describes a difference between bacteria and viruses?
- A. Both bacteria and viruses respond equally well to antibiotic treatment.
 - B. Bacteria are not made up of cells, while viruses are single-celled organisms.
 - C. Viruses can reproduce on their own without infecting a host, but bacteria cannot.
 - D. Bacteria can reproduce independently and are treated with antibiotics, whereas viruses require a host to reproduce and are often not treatable with antibiotics.

SECTION B: TRUE OR FALSE**20 marks****QUESTIONS: 21- 40**

Write 'T' for statements that are true and 'F' for statements that are false in your answer sheet.

21. Bacterial infections include food poisoning (gastroenteritis), sexually transmitted infections (STIs), and pneumonia.
22. Contagious bacterial infections such as pertussis, tuberculosis, strep throat, meningococcal disease, and bacterial STIs cannot spread from person to person.
23. Practicing safe food habits is not necessary if the food looks and smells fine; there is no need to store food properly, cook meat thoroughly, or wash fruits and vegetables before eating.
24. TB is an infectious disease primarily affecting the lungs' parenchyma, often caused by *Mycobacterium tuberculosis*.
25. The risk factors of tuberculosis (TB) do not include close contact with someone who has active TB, immunocompromised status, substance abuse, or lack of access to adequate healthcare.
26. Common tests used to diagnose tuberculosis (TB) include biopsy of the affected tissue (rare), bronchoscopy, chest X-ray or CT scan, and tuberculin skin test (PPD test).
27. The Krebs cycle is a multistep biochemical process that occurs during anaerobic metabolism and does not contribute to energy production in living organisms.
28. Aerobic metabolism is a cellular process that uses oxygen to convert nutrients into energy, Adenosine Triphosphate.
29. Water constitutes 50-95% of cell content by weight.
30. Hydrolysis reaction is the cleavage of a covalent bond by water.
31. Enzymes are proteins that slow chemical reactions in the body.
32. Homeostasis is the ability of the body to maintain a stable internal environment, despite changes in the external environment.
33. The mechanism of hemostasis can be divided into only two stages, which include constriction of the blood vessel and formation of a temporary "platelet plug.
34. Key factors that affect biochemical reactions include temperature, pH, enzyme concentration, substrate concentration, and the presence of inhibitors or activators.
35. Hypertension is defined as a systolic blood pressure greater than 160 mmHg and a diastolic pressure of more than 110 mmHg.

36. Common clinical manifestations of hypertension include headache, chest pain, blurred vision, and dizziness.
37. An electrocardiogram (ECG) may show signs of an enlarged heart, strain patterns, and conduction disturbances in hypertensive heart disease. A broad, notched P wave can be one of the earliest indicators.
38. The three common infectious diseases are cold, influenza (flu), COVID-19, and conjunctivitis, which are spread through viruses & bacteria.
39. A patient is most infectious during periods of high fever, and this contagious phase can continue for up to 24 hours after the fever resolves.
40. COVID-19 can be spread through contact with certain body fluids, such as droplets and cough.

SECTION C: SHORT ANSWER QUESTIONS

45 Marks

QUESTIONS: 41 - 54

Answer the following questions.

41. What is HIV, and how does it affect the immune system? (2 marks)
42. List four (4) common modes of HIV transmission. (4 marks)
43. What are two early symptoms of HIV infection that nurses should observe? (2 marks)
44. Identify four (4) important nursing interventions for a patient living with HIV. (4 marks)
45. State three (3) primary functions of metabolism in living organisms. (3 marks)
46. A cell's content is typically made up of water and ions, and name three important ions found in cells? (3 marks)
47. List four (4) common types of biochemical reactions? (4 marks)
48. What are two (2) possible effects of chloride ion imbalances on the body's acid-base balance? (2 marks)
49. List any four (4) clinical signs or symptoms that may indicate a biochemical reaction or imbalance in the body? (4 marks)
50. Patient's information can be obtained from a Complete Blood Count (CBC). List three (3) components of a complete blood count? (3 marks)
51. What is the role of bile salts in the digestion and absorption of fats? (2 marks)
52. List and explain the composition of bile and its two main components. (4 marks)
53. List four (4) key functions of bile salts in the human body. (4 marks)
54. Define bilirubin, and explain its functions in the human body? (4 marks)

SECTION D: LONG ANSWERS

55 marks

QUESTIONS: 55 – 59

Read and answer the following questions.

Mr. Khan, a 51-year-old Indian male, admitted to the TB Ward, presents with night sweats, weight loss, anorexia, and a productive cough. He is diagnosed with pulmonary TB and started on a full anti-TB regimen.

- 55.** As a student nurse caring for Mr. Khan, how would you implement the nursing care plan for "Ineffective Breathing Pattern"? Include at least five (5) interventions and justify each based on the patient's condition. (15 marks)
- 56.** Analyze the risk factors present in Mr. Khan's case that may have contributed to his TB infection. Relate your analysis to at least five (5) listed risk factors. (10 marks)
- 57.** Mr. Khan undergoes several diagnostic tests. Choose any three (3) TB-related tests and explain what each test detects and how it helps in TB diagnosis. (9 marks)
- 58.** Evaluate the importance of patient education in ensuring Mr. Khan completes the full 6–12-month anti-TB drug regimen. Discuss three (3) consequences of non-compliance. (6 marks)
- 59.** Analyze five (5) nursing interventions you would prioritize for Mr. Khan's admission to prevent transmission, support recovery, and ensure treatment compliance. Justify each choice based on its clinical significance. (15 marks)

The End.

