



**SIR ARTHUR LEWIS COMMUNITY COLLEGE  
ACADEMIC YEAR (2024/2025) – SEMESTER TWO  
END OF SEMESTER FINAL EXAMINATION**

***COURSE CODE*** : BIO003

***COURSE TITLE*** : Fundamentals of Biology

***LECTURER(S)*** : Marie-Louise Felix

***DATE*** : May 5, 2025

***TIME*** : 9 a.m.

***DURATION*** : 2 HOURS

***STUDENT ID #*** : \_\_\_\_\_

---

**GENERAL INFORMATION AND INSTRUCTIONS**

- Students must sign **IN** and **OUT** on the examination class list.
- Write your ID number on the question paper.
- This paper has two parts. Part A has fifty (50) Multiple choice question and Part B has seven (7) question.
- Answer all questions from both parts.

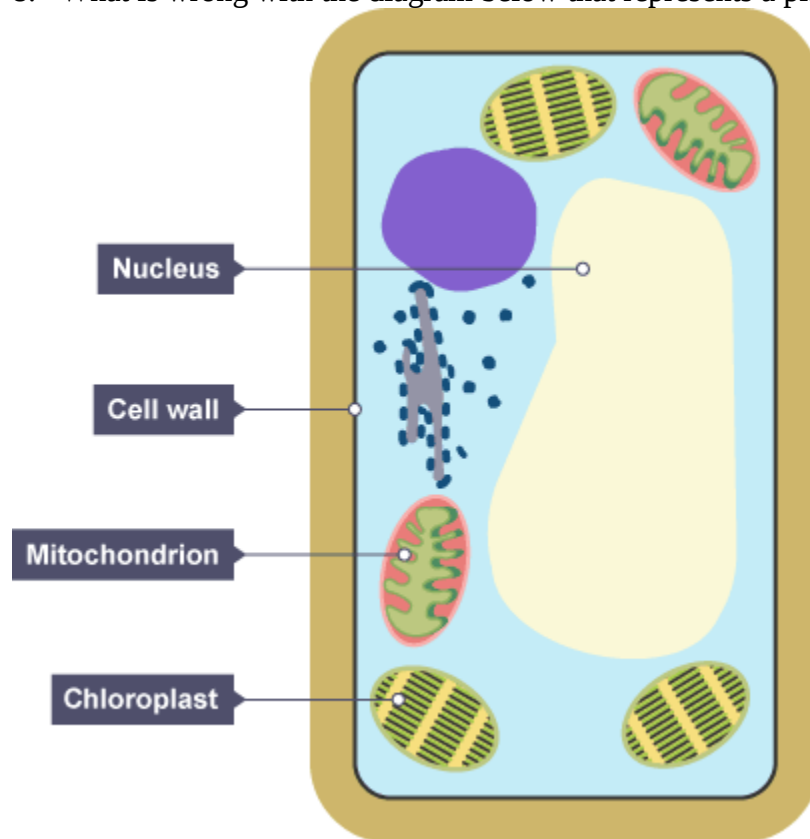
**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO**

## Part A

**Instruction: Circle the letter of the correct answer on the answer sheet provided.**

1. Which of these is the example of a decomposer?
  - A. Bacteria
  - B. Plants
  - C. Fish
  - D. Snake
2. Which of the following statements about taxonomic levels is correct?
  - A. Species is the most general
  - B. Kingdom is the most specific
  - C. Class is less specific than phylum
  - D. Family is more specific than order
3. Which domain contains both the plant and animal kingdoms?
  - A. Protista
  - B. Bacteria
  - C. Archaea
  - D. Eukarya
4. Which of the following groups would contain the largest number of organisms?
  - A. Class
  - B. Order
  - C. Phylum
  - D. family
5. A scientific name contains information about its:
  - A. family and species
  - B. genus and species
  - C. phylum and order
  - D. class and family
6. Which structures are found in all types of living cells?
  - A. Cell membranes and cell walls
  - B. Cell walls and ribosomes
  - C. Ribosomes and cell membranes
  - D. All of the above
7. Which organelle is only found in plant cells?
  - A. Chloroplasts
  - B. Mitochondria
  - C. Nuclei
  - D. None of the above

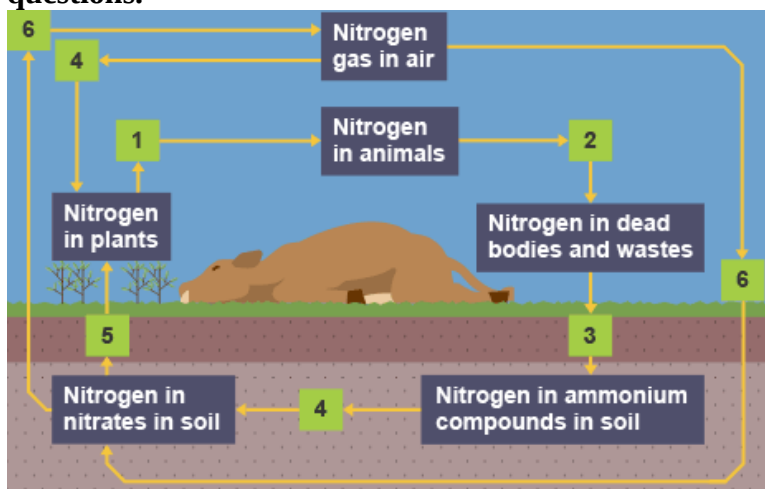
8. What is wrong with the diagram below that represents a plant cell?



- A. Plant cells do not contain mitochondria
  - B. The nucleus and the chloroplast have been labelled the wrong way round
  - C. The cell wall and the nucleus have been incorrectly labelled
  - D. All of the above
9. Which of the following is a function of the cell membrane?
- A. Supporting the cell
  - B. Controlling the entry and exit of materials
  - C. Storing water
  - D. All of the above
10. What is produced by ribosomes?
- A. Carbon dioxide
  - B. Protein
  - C. Sugar
  - D. None of the above
11. An animal cell placed in a hypotonic solution will:
- A. die
  - B. take on water
  - C. lose water
  - D. divide
12. Which of the following is a type of active transport?
- A. sodium potassium pump
  - B. endocytosis
  - C. exocytosis
  - D. all of these
13. Active transport requires:
- A. a concentration gradient
  - B. osmosis
  - C. energy
  - D. a hypertonic solution

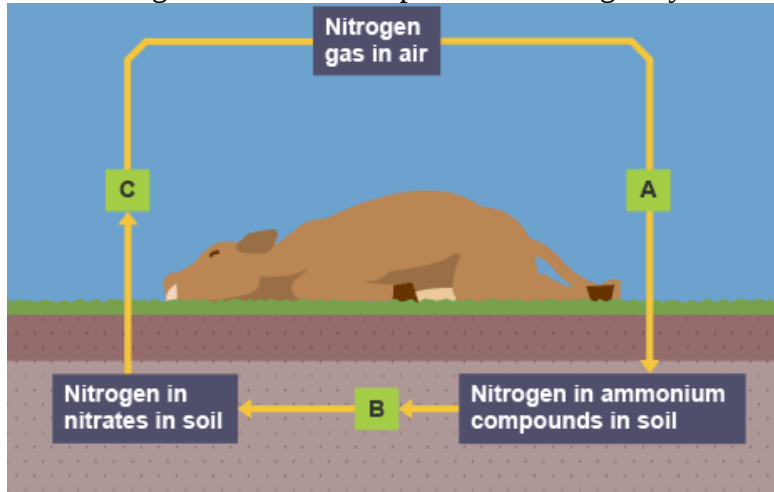
14. Which reaction shown below is carried out by denitrifying bacteria?
- ammonium→nitrate
  - nitrate→nitrogen gas
  - nitrogen gas→ammonium
  - none of the above
15. Which group of bacteria use nitrogen gas from the air to produce their own nitrate?
- Denitrifying bacteria
  - Nitrifying bacteria
  - Nitrogen-fixing bacteria
  - All of the above
16. The digestive system is responsible for all the following except:
- Mechanical breakdown of macromolecules
  - Secretion of hormones
  - Use of enzymes to breakdown proteins
  - Water absorption
17. The organ responsible for the secretion of enzymes that digest carbohydrates, fats, and proteins, as well as hormones that regulate blood sugar levels is the
- Liver
  - Pancreas
  - Gall bladder
  - Ileum

Use the following diagram which shows part of the nitrogen cycle to answer the next two questions.



18. Which of the numbered stages involve bacteria?
- 1 and 3
  - 2 and 4
  - 3 and 4
  - All of the above
19. Which stage indicates decomposition?
- 2
  - 3
  - 4
  - None of the above

20. The diagram below shows part of the nitrogen cycle.

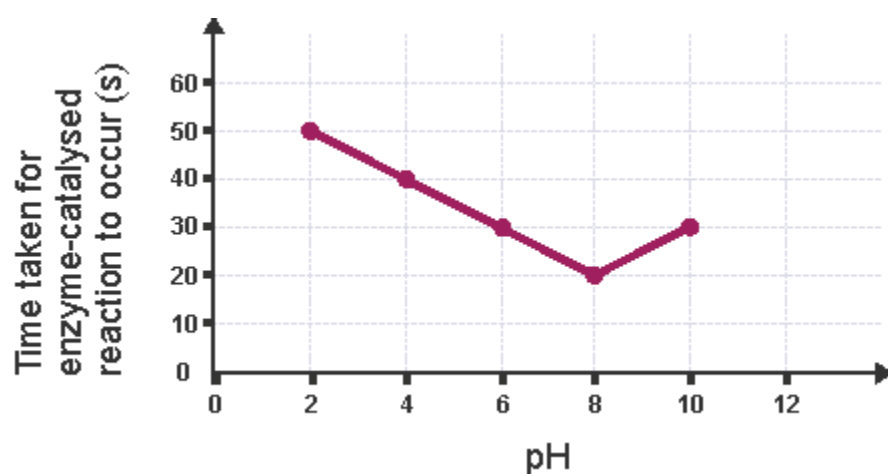


Which stage is nitrification?

- A. Stage A
  - B. Stage B
  - C. Stage C
  - D. None of the above
21. You are observing a specimen under the microscope. You use the x10 objective and your eyepiece is x10 magnification. How much larger is the image of the specimen to its actual size?
- A. One hundred times
  - B. Ten times
  - C. Twenty times
  - D. One thousand times
22. Why do decomposers break down plant and animal waste products?
- A. To keep the nitrogen cycle going
  - B. To produce ammonium
  - C. To obtain energy
  - D. All of the above
23. Amino acids are connected in a chain by what type of bond?
- A. Hydrogen
  - B. Peptide
  - C. Van der Waals
  - D. Ionic
24. There is a coating on the feathers of waterfowl such as ducks that keeps them from getting wet. What molecule would this water-repelling coating be made of?
- A. Carbohydrate
  - B. Nucleic acid
  - C. Protein
  - D. Lipid
25. Select one type of macromolecule that is commonly used as a source of energy.
- A. Nucleic acids
  - B. Proteins
  - C. Carbohydrates
  - D. Lipids
26. You are analysing a macromolecule and determine that it is made up of amino acids. What type of molecule is it?
- A. Nucleic Acid
  - B. Carbohydrate
  - C. Lipid
  - D. Protein

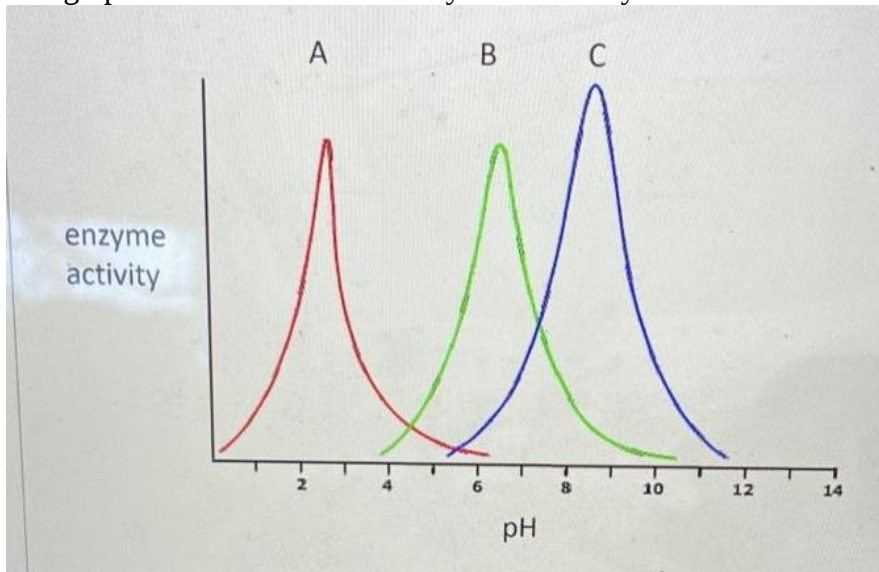
27. Which one of the following is a monosaccharide?
- A. Fructose
  - B. Sucrose
  - C. Lactose
  - D. Glycogen
28. Starch is a polymer of \_\_\_\_\_.  
A. glucose  
B. amino acids  
C. sucrose  
D. nucleic acids
29. 1 kilogram is the same as \_\_\_\_  
A. 10 grams  
B. 100 grams  
C. 1000 grams  
D. 10,000 grams
30. What kind of polysaccharide cannot be digested by human beings?  
A. Cellulose  
B. Starch  
C. Glucose  
D. Sucrose
31. Which type of substance are enzymes made of?  
A. Carbohydrate  
B. Fat  
C. Protein  
D. None of the above
32. What is the name of a substance that speeds up the rate of a chemical reaction, but is unchanged by the process?  
A. Catalyst  
B. Product  
C. Substrate  
D. None of the above
33. Small extensions in the small intestines are called:  
A. Villi  
B. Capillaries  
C. Lacteals  
D. None of the above
34. What is the name of a substance upon which an enzyme acts?  
A. Biological catalyst  
B. Product  
C. Substrate  
D. None of the above
35. What happens during an enzyme catalysed reaction?  
A. An enzyme binds to the active site of its specific substrate and the reaction occurs  
B. A specific substrate binds to the active site of an enzyme and the reaction occurs  
C. The active site of a specific substrate binds to the active site of an enzyme and the reaction occurs.  
D. All of the above
36. Calculate the mean of 20, 65, 41, 33 and 72 \_\_\_\_\_.  
A. 41  
B. 55  
C. 35  
D. 46

37. The graph below shows the effect of pH on the time taken for an enzyme-catalysed reaction to occur.



- What is the optimum pH of the enzyme?
- A. 2
  - B. 8
  - C. 10
  - D. 50
38. For health bones and teeth which supplement is advised?
- A. Vitamin A
  - B. Vitamin B
  - C. Vitamin C
  - D. Vitamin D
39. A bond between monosaccharides is called a(n) \_\_\_\_\_ bond.
- A. acid
  - B. hydrogen
  - C. glycosidic
  - D. peptide
40. What is an enzyme?
- A. A protein that speeds up chemical reactions
  - B. A protein that breaks apart molecules
  - C. A protein that is needed for cell structure
  - D. A neurological protein involved in cell signalling.
41. Which of the following affects enzyme activity?
- A. Substrate concentration
  - B. Acidity (pH)
  - C. Temperature
  - D. All options are correct.

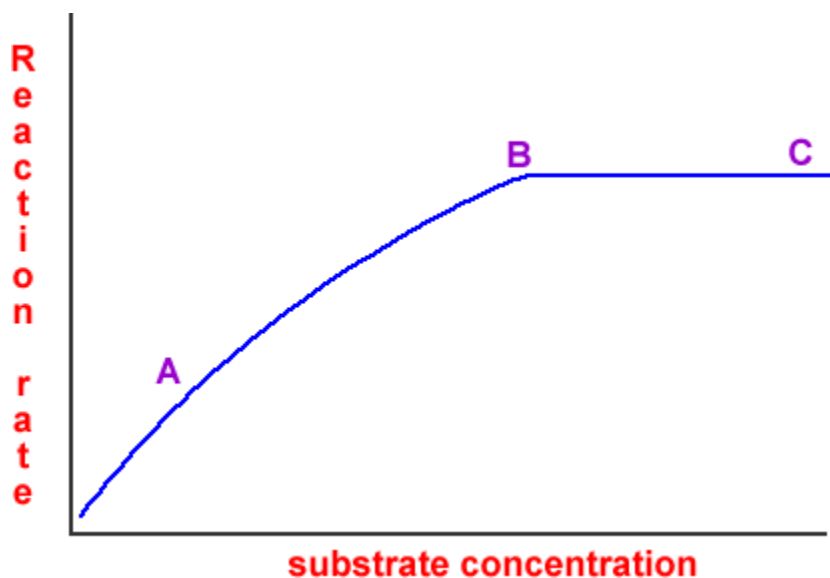
42. The graph below shows the activity of three enzymes.



Which line on the graph represents the enzyme that has an optimal pH of about 2.5?

- A. A
- B. B
- C. C
- D. None of the above

43. Based on the graph below, which of the following could be used to increase the reaction rate beyond point C?



- A. increase the amount of substrate
- B. add more water
- C. increase the temperature
- D. decrease enzyme concentration

44. The part of the enzyme where the substrate binds is called the:

- A. active site
- B. catalyst
- C. inhibitor
- D. large subunit

45. When a piece of liver is dropped into hydrogen peroxide, the peroxide bubbles vigorously as a result of what reaction?

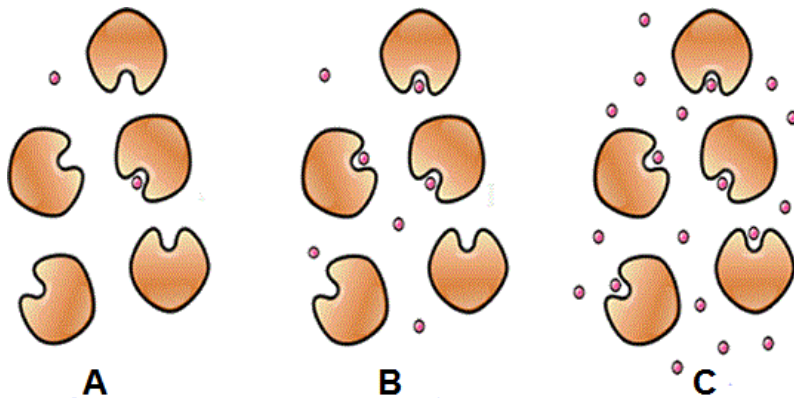
- A. peroxide being broken into water and oxygen
- B. peroxide is destroying germs in the liver
- C. more peroxide is being created by the liver
- D. liver and peroxide are joining together to make a new protein

46. The following factors affect dietary requirements of people

- I. Age and gender
- II. Physical activity level
- III. Body size and composition
- IV. Genetics

- A. I and II only
- B. II and III
- C. IV only
- D. I, II, III and IV

47. In the diagram below, how may you increase the rate of the reaction in image C?



- A. add more substrate
- B. add more enzyme
- C. remove enzymes
- D. remove substrate

48. The characteristics of living things include all except \_\_\_\_

- A. reproduction
- B. respiration
- C. photosynthesis
- D. sensitivity

49. The products of photosynthesis are

- A. water and carbon dioxide.
- B. sugar and water.
- C. sugar and oxygen.
- D. oxygen and water.

50. Why do plants appear green?

- A. They absorb green light.
- B. They excite electrons which emit green light in the visible spectrum.
- C. They reflect green light.
- D. They absorb electrons by green pigments when exposed to sunlight.

Part B

Instruction: Answer all questions on the foolscap paper provided.

- 1. Draw a large, annotated diagram representing the Carbon Cycle. Be sure to describe the key activities that drive the cycle. [6]
- 2. Complete the table below:

| Testing for Macromolecules |         |                                     |
|----------------------------|---------|-------------------------------------|
| Macromolecules             | Reagent | Change that shows a positive result |
| Starch                     |         |                                     |
| Protein                    |         |                                     |
| Reducing Sugar             |         |                                     |
| Lipids                     |         |                                     |

[8]

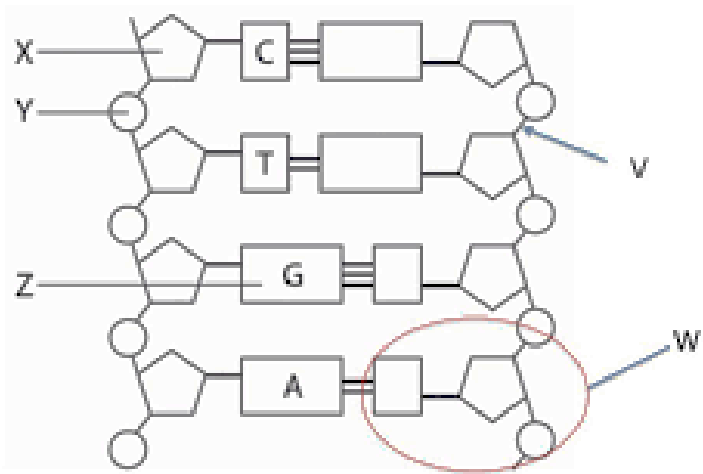
- 3. Place the following words in the blank spaces below:

organic      covalent      monomers      biological macromolecules

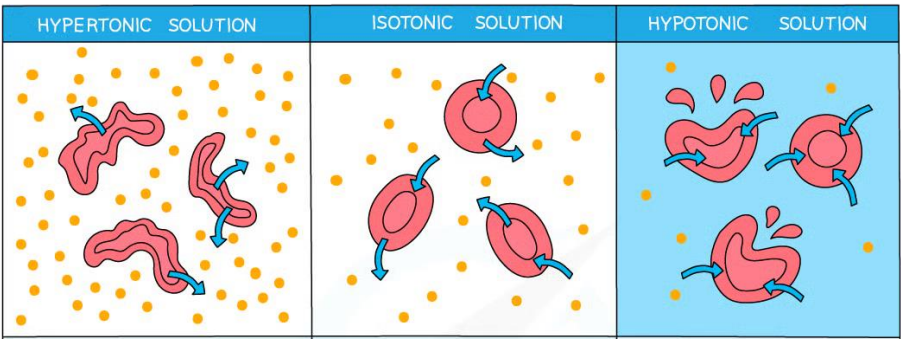
Carbohydrates, lipids, proteins, and nucleic acids are classes of \_\_\_\_\_. These molecules are \_\_\_\_\_, which means they contain carbon. Subunits of these molecules are called \_\_\_\_\_ and are connected together by strong \_\_\_\_\_ bonds. [4]

- 4. Describe briefly the following steps of digestion: a) ingestion b) mechanical digestion c) chemical digestion d) absorption e) assimilation f) egestion [6 ]
- 5. Name the structure (Fig 1) below. Using a simple table, indicate what structure each letter (C, T, G, A, W, V, X, Y, Z) represents. [10]

Fig 1

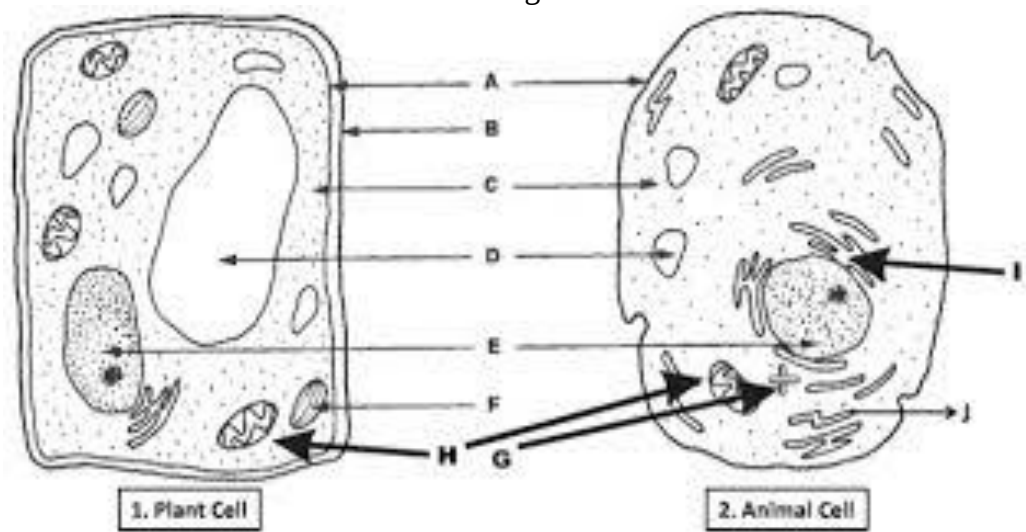


- 6. Look at the 3 sections of the diagram below. Describe and provide an explanation for what is occurring in each section. [6]



7.

Fig 2



With reference to Fig 2 above, draw a table like the one below and name the structures that each letter depicts.

| Letter | Structure Depicted |
|--------|--------------------|
| A      |                    |
| B      |                    |
| C      |                    |
| D      |                    |
| E      |                    |
| F      |                    |
| G      |                    |
| H      |                    |
| I      |                    |
| J      |                    |

[10]

**End of Examination**