



NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi – Abuja
Faculty of Sciences
Department of Pure and Applied Sciences
JANUARY, 2021 EXAMINATIONS...

COURSE CODE: BIO416

COURSE TITLE: INDUSTRIAL MICROBIOLOGY

CREDIT: 3 Units

TIME ALLOWED: 2½ Hours

INTRUCTION: Answer question ONE (1) and any other FOUR (4) questions

Q1.

- (a) Why is it important to preserve industrially important microorganisms? (4 marks)
- (b) Mentioned the units operations involved in industrial barley production in the write order (6 marks)
- (c) Discuss the preservation methods of industrially important microorganisms(12 marks)

Q2.

- (a) Describe how to screen for antibiotic production in microorganism? (3 marks)
- (b) A microorganism isolated from the natural environment can be improved upon for industrial processes through mutagenesis. Define mutagenesis. (2 marks)
- (c) Highlight two (2) methods that can be used to modify gene expression. (2 marks)
- (d) Explain two (2) methods that can be employed to naturally select microbes for industrial processes. (5 marks)

Q3.

- (a) Define a culture medium. (2 marks)
- (b) What differentiates a solid medium from a liquid medium? (3 marks)
- (c) The medium to be used for an industrial process must satisfy certain criteria. Enumerate five (5) of these criteria. (5 marks)
- (d) Mention a type of raw material each that serves as a source of carbon and nitrogen in media formulation. (2 marks)

Q4.

- (a) Fill in the table below showing the role of microorganisms in product formation during fermentation: (4 marks)

Fermentation substrate	Fermenting organism	Product of fermentation
1 _____	<i>Geotrichum candidum</i> , <i>Corynebacterium manihot</i>	_____
2. Milk	Yeast	_____
3. _____	_____	Sauerkraut
4. Soyabeans	<i>Mucor sp.</i> , <i>Actinomucor elegans</i>	_____
5. _____	<i>Erwinia dissolvens</i> , <i>Saccharomyces sp.</i>	_____

- (b) Explain how foaming can be reduced or stopped during fermentation. (2 marks)
- (c) Enumerate three (3) characteristics of an antifoam agent. (3 marks)
- (d) Differentiate between antifoam and defoamer. (3 marks)

Q5.

- (a) Explain any three methods that can be used to preserve industrial strains. (9 marks)
- (b) Compare and contrast ale and lager beers. (3 marks)

Q6.

- (a) Explain the steps involved in scale-up of an industrial process. (6 marks)
- (b) What does patent mean? Give two (2) reasons why patent laws are made. (3 marks)
- (c) According to the Nigerian patent and design decree (1970), give two factors that determine if an invention can be patented. (3 marks)