



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

INSTRUCTION: 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</i> sp., <i>Actinomucor</i> <i>elegans</i>	_____
5. _____	<i>Erwinia dissolvens</i> , <i>Saccharomyces</i> sp.	_____

(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)