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DEPARTMENT OF MICROBIOLOGY

2013/2014 HARMATTAN SEMESTER EXAMINATION

MCB 204: MICROBIAL PHYSIOLOGY AND METABOLISM

INSTRUCTION: *Answer* ***THREE*** *questions* **TIME: 1hr 15mins.**

1a. Define plasmid and list the types of plasmid.

b. With the aid of a diagram, describe the types of flagella and endospore useful in identifying bacteria.

c. Outline the phases in the bacterial growth curve and give three reasons why there is no immediate increase in cell number during the first phase.

2a. Describe the pour plate technique and state three reasons why the method will give inaccurate counts.

b. Give two importance of the following structure to bacteria

(i) Bacteria endospore
(ii) Plasma membrane
(iii) Inclusion bodies
(iv) Cell wall.

3a. Explain four (4) nutritional classes of microorganisms giving two (2) examples of microorganisms in each class.

b. Compare autotrophs and heterotrophs with respect to the form of carbon-based nutrient they require.

4a. Classify and explain microorganisms with respect to oxygen requirements.

b. Differentiate between macronutrients and micronutrients and give five (5) examples each.

c. Define growth factors and state three classes under it.

With the aid of a well labelled diagram, explain the structure of a bacterial cell.

Write short note on the following
(i) Autotrophs (ii) Heterotrophs (iii) Prototrophs
(iv) Chemotrophs (v) Lithotrophs

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Draw a typical bacterial growth curve and label the various phases.

In the first phase of bacterial growth curve, the number of bacteria remains constant. Does this mean the cells are dormant and inert? Explain.

An inoculum of 10^7 bacterial cells was introduced into a flask of culture and growth monitored. No change was seen for 18 minutes (the lag phase), growth occurred rapidly. After a further 76mins, the population had to 4.32×10^8 cells. What is the doubling time?

Define Nutrition. List the two categories of essential nutrient required by microorganisms and give one example of each.
Highlight the sources and importance of the following essential nutrients
i) Nitrogen
ii) Oxygen
iii) Hydrogen
iv) Sulfur
vi) Carbon