OLABISI ONABANJO UNIVERSITY, AGO – IWOYE

DEPARTMENT OF MICROBIOLOGY

B. Sc (Microbiology) 2016/2017 HARMATTAN SEMESTER EXAMINATION

Course code and title: MCB301 – Microbial Genetics

Instruction: Attempt one question from each section. Time Allowed: 1½ hours

SECTION A

1. (a) What is Mutation? Briefly explain four ways Mutation may be expressed in a bacterium.

   (b) Highlight three (3) methods of mutant detection.

2. (a) With the aid of annotated diagram, briefly explain Griffith's transformation experiment to prove DNA as a genetic material.

   (b) List the two types of nucleic acids and their constituents.

   (c) Define these terms: (i) Codon (ii) Genome (iii) Phenotype

SECTION B

3. The following is a list of mutational changes observed in a laboratory experiment. Indicate using not more than two words, the type of mutation either as a description of the observation or as a possible cause of the observations

   (a) an A – T base pair in the wild type gene is changed to a G –C base pair

   (b) an A –T base pair is changed to a T – A base pair

   (c) The sequence AAGCTTATCG is changed to AAGCTATCG

   (d) The gene map in a given chromosome arm is changed from bog-rad-fox 1-fox 2-try-duf to bog-rad-fox 1-fox 3-fox 2-try-duf (where fox 1 and fox 2 are highly homologous, recently diverged genes, fox 3 however is a new gene with one end similar to fox 1 and the other similar to fox 2).

4. Bacteria are promiscuous creatures, showing DNA within and between species by several mechanisms

   (a) What are the three general mechanisms of gene transfer in bacteria?

   (b) Which type of transfer mechanism can occur using a plasmid?

   (c) Which type of transfer mechanism requires a bacteriophage ?

   (d) Which mechanism requires recombination to a recipient to produce new genetically stable cells?

   (e) Why is it that the genes *purC* and *pyrB* located half way around the chromosome from each other in *Escherichia coli* are never co-transformed?

SECTION C

5(a) Write concisely on the steps involve in Polymerase Chain Reaction (PCR)?

(b) Mention the function of each enzyme involve in DNA Replication in procaryotes.

(c) What is the importance of Gel Electrophoresis in PCR?

6(a) Highlight the main steps in cloning.

(b) What are Restriction Endonucleases?

(c) Give three examples of restriction endonucleases with their microbial source and recognition sequences.