

OLABISI ONABANJO UNIVERSITY, AGO - IWOYE

DEPARTMENT OF MICROBIOLOGY

B. Sc (Microbiology) 2017/2018 HARMATTAN SEMESTER EXAMINATION

Course code and title: MCB301 - Microbial Genetics

Instruction: Attempt any four (4) questions. Time Allowed: 1½ hours

- 1a. Write extensively on spontaneous Mutation.
- b. Using appropriate diagrams where necessary, describe the two indirect methods of mutant selection.
- 2a. Explain in details how you would test chemicals for their cancer-causing abilities.
- b. In a tabular form, list four (4) mutagens giving their mode of action, example and consequence.
- c. Explain the direct selection method of mutants detection and isolation.
3. Organism A and B with the following characteristics His<sup>+</sup>Trp<sup>+</sup>Xal<sup>-</sup>Meth<sup>+</sup>Val<sup>-</sup> and His<sup>-</sup>Trp<sup>+</sup>Xal<sup>+</sup>Meth<sup>-</sup>Val<sup>+</sup> respectively were conjugated artificially in the laboratory for five minutes without obtaining Trp<sup>+</sup>Xal<sup>+</sup> and Val<sup>+</sup> strains despite the presence of *pur E* gene. The experiment was thus continued for another 25 minutes and all the biochemical attributes lacking were found together with *pyr* gene. If 78, 44, 87, 39 and 0% of the result obtained were His<sup>+</sup>, Trp<sup>+</sup>, Xal<sup>+</sup>, Meth<sup>+</sup>, Val<sup>+</sup> respectively.
  - (a) What can you deduce about the order of the gene?
  - (b) If none of the attributes were coconjugated, why?
  - (c) If the chromosome of organism A above is infected with a phage P22 and P25 with subsequent recovery of P22 from all the chromosomal loci and P25 from just a locus. What is P22 and P25?
  - (d) Differentiate between P22 and P25.
  - (e) If plasmid pFT3 integrates into the chromosome of the two organisms above, what is pFT3?
- 4a. If on a given chromosome arm, the following mutational changes occur as shown below;

Wild organisms A	fox 1-fox2-fox3-aatcgTAGAGTCAG-fox4-ATG
Mutated organism B	fox2-fox3-aatcgTAGAGTCAG-fox4-ATG
Mutated organism C	fox 1- fox7-fox2-fox3-aatcgTAGAGTCAG-fox4-ATG
Mutated organism D	fox 1-fox2-fox3-aatcgTAGAGTTCAG-fox4-ATG.

State the type of mutation above and justify your answer (s).
- b. Write short note on the following: (i) Intron (ii) Exon (iii) open reading frames (iv) Mutation
- 5(a) Write concisely on DNA replication in procaryotes.
- (b) Explain the term 'Okazaki fragment'.
- (c) State four (4) components/reagents required for Polymerase Chain Reaction (PCR) set up.

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