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RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B.Sc. (Special) Degree in Applied Biology

Third Year Semester II Examination – April/ May 2016

MIB 3202 – SOIL MICROBIOLOGY

Time: Two (02) hours

Answer **any four (04)** questions.

1. a) Explain how pores in soil affect the distribution of microorganisms in that environment. **(50 Marks)**
b) “Clays frequently decreases microbial activity.” Comment on this statement. **(50 Marks)**
2. *Pseudomonas* spp. and *Streptomyces* spp. can co-exist in a particular soil habitat with other microorganisms. They belong to fast growing Gram negative bacteria and to slow growing actinomycetes, respectively.
a) Write an account on their survival strategies emphasizing the substrates utilized by each one. **(60 Marks)**
b) Mention the dispersal strategies of these two microorganisms to be successful colonizers. **(40 Marks)**
3. a) Inoculation of soil with various microorganisms is attempted to enhance growth and health of crops. Many such applications do not provide expected outcomes in farmer fields. Discuss the possible reasons for such failures in following cases. **(60 Marks)**
 - i. *Rhizobium* inoculation for nodule formation of soy bean
 - ii. Use of an antagonistic *Trichoderma* sp. for control of *Pythium*. (include a discussion on the effect on mycorrhiza)
- b) Incorporation of chitin to soil reduces infection of crops by *Rhizoctonia* spp., but this is not effective in control of *Pythium* spp. Discuss this phenomenon. **(40 Marks)**

4. Justify the recent interest shown by scientists in experimenting biofilms in soil inoculations for enhancing crop productivity. Assume that you are answering a question posed by a new entrant to the University in Bioscience stream.

(100 Marks)

5. Although rhizosphere and bulk soil habitats can be cross inoculated from each other, explain how their microbial communities become nearly 100% different.

(100 Marks)
