RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

FIRST YEAR

B.A./B.SC. SECOND SEMESTER (January – June), 2012

Mid-Semester Examination, March 2012

Date : 19/03/2012 **MICROBIOLOGY (Honours)**

Time : 11 am – 1 pm Paper : II Full Marks : 50

(Use separate answer scripts for each group)

Group – A

1. What effect does increasing a limiting nutrient have on the yield of cells and growth rate of bacteria? [4]

OR

Suppose you have been supplied with a mixed culture of *Escherichia coli*, *Bacillus subtilis* and *Salmonella typhimurium*. Which culture medium would you use to isolate *E. coli* from it. Justify your answer. [4]

2. a) Define growth factor.
   b) What is divisome?
   c) When would you not find a lag phase in a batch culture? [2×3]

3. Answer any five questions : [2×5]
   a) Write down the IUPAC names and structures of α-linolenic acid and stearic acid.
   b) Cis-unsaturated fatty acids are predominant in cell membrane phospholipids of Arctic seals— why?
   c) $RMgX + CO_2 \xrightarrow[H^+]{H_2O} ?$
   d) What is saponification?
   e) How would you step down the carbon number of monocarboxylic acids?
   f) What happens when concentrated aqueous solution of sodium monocarboxylate is electrolysed?

4. What is t-test? State briefly the criteria of applying t-test. Mention two conditions for using chisquare. [1+2+2]

OR

What do you mean by null hypothesis and alternative hypothesis. In a cross between tall (TT) and dwarf (tt), 1574 tall and 554 dwarf plants were obtained. Suggest if a ratio 3 : 1 is suitable or not.
[given that on 5% level at 1 degree of freedom the table vale of chisquare is 3·84] [2+3]

Group – B

5. Answer any three questions :
   a) Define specific activity and relative activity of a radioactive substance. [1·5+1·5]
   b) What is "artificial radioactivity"? Give examples. [3]
   c) Ca^{45} has a half life of 163 days. Calculate—
      i) the decay constant in terms of day^{-1} and sec^{-1}.
      ii) the percent of initial radioactivity remaining in a sample after 80 days. [2+1]
   d) "Entropy is a measure of the disorder of a system"— Explain briefly. [3]

6. Answer any two questions :
   a) Define molar specific heat of a gas at constant pressure (C_p) and at constant volume (C_v). [1·5+1·5]
   b) Define an equation to relate between half life and average life of a radioactive substance. [3]
   c) Define extensive variables and intensive variables. Explain with proper examples. [3]

7. a) What is amomeric effect? Give examples. [3]

b) How will you convert—

i) ribose to glucose

ii) glucose to glucouronic acid [4]

c) Glucose and fructose give same osazone— Justify. [1·5]

d) What happen when α D glucopyranose is treated with HIO_4? [1·5]