# 2015

## M.Sc.

## 3rd Semester Examination

### MICROBIOLOGY

### PAPER—MCB-304

*Full Marks : 40*

*Time : 2 Hours*

*The figures in the right-hand margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

*Illustrate the answers wherever necessary.*

### Group — A

[*Marks : 20*]

Answer any *two* questions.

**1.** (a) Write down the basic principles of fluid mixing. Draw diagram wherever necessary.

(b) Mention the classes of fluids based on the Reynold's number.

(c) Find the relationship between shear rate and viscosity. 5+2+3

**2.** (a) Elucidate the steps involved in the process of oxygen transfer.

(b) Mention the factors effecting the mass transfer in bulk liquid.

(c) Differentiate Newtonian fluid from Non-Newtonian fluids with proper examples.

5+2+3

**3.** Write short notes on any *two* of the following : 2×5

(a) Packed bed bioreactor ;

(b) Radial flow impeller ;

(c) Solid State fermentation.

## Group — B

[*Marks : 20*]

Answer any *two* questions.

**4.** Briefly elucidate the industrial production of acetic acid (Vinegar). Mention three industrial strains in use. Write the main uses of the acetic acid.

4+2+4

**5.** (a) What is immobilization ? Compare co-valent binding with entrapment method of enzyme immobilizations.

(b) What is adjunct ? Why adjuncts and hops are added during the preparation of beer ?

(c) How sterilization is done in industrial level ?

(1+3)+4+2

**6.** Write short notes on (any *two*) : 5+5

(a) Biohydrogen production ;

(b) Anaerobic treatment of food industry waste ;

(c) IPR.