

## GE1: Introductory Microbiology

### SEM III

#### **THEORY**

**Total Hours: 52**

**Credit 4**

#### **Module 1**

**Full**

**Marks: 20**

**1) Basic microbiology-** Landmark achievements in 20th century: Refutation of a biogenesis: discovery of penicillin: discovery of vaccination: proposal of one gene one enzyme hypothesis: discovery of double helix structure of DNA: discovery of recombinant DNA technology. [8]

**2) Major contribution of scientists-** Leeuwenhoeck, Edward Jenner, Alexander Flemming, Joshep Lister, Robert Koch, Louis Pasteur, Hargobind Khorana. [4]

**3) Scope of Microbiology** [2]

**4) Whittaker's five- kingdom concept of living organism-** [8]

(General characteristics of those five groups), characteristics and importance of yeast, moulds (*Penicillium*, *Aspergillus*), protozoa, *Giardia*, *Plasmodium*, plant diseases (brown spot of rice, stem rot of jute, black stem rust of wheat, apple scab, grey blight of tea, bacterial blight of rice, citrus canker).

- i) Characteristics of pathogenic fungi
- ii) Plant pathogenic toxin and their classification
- iii) Disease expression in a plant, gene for gene concept
- iv) Control of plant disease – physical, chemical, cultural and biological control, IPM

#### **Module 2**

**Full**

**Marks: 30**

**5) Microscopy-** Principles and applications, dark field, bright field, resolving power, numerical aperture, chromatic aberration, phase contrast microscopy, fluorescent microscopy, inverted microscopy, stereo microscopy, electron microscopy, TEM and SEM. [4]

**6) Stains and staining-** Principles of staining, simple staining, negative staining, differential staining, Gram and acid fast staining, flagella staining, capsule and endospore staining. [6]

**7) Introduction to biomolecules-** Outline structure, function and examples of carbohydrate, lipid, protein (primary, secondary, tertiary and quaternary). Amino acids, DNA, RNA.

[10]

**8) Control of microbes-** Sterilisation, disinfection, antiseptic, tyndallisation, pasteurization: Physical- dry heat, moist heat, UV light, ionizing radiation, filtration, HEPA filter, Chemical- phenol and phenolic compounds, (halogen aliphatic alcohol, formaldehyde, ethylene oxide, heavy metals) anionic and cationic detergents.

[10]

**References:** 1. Microbiology Pelczar, Chan and Krieg. (Indian edition)