**3 Hours** **Total Marks: 100**

1. Attempt **all** questions.
2. **All questions** carry **equal** marks.
3. Draw **neat labeled diagrams** wherever necessary.
4. Use of **log tables** and **non-programmable calculators** is **allowed**.

**Q.1 a. Select the correct alternative: (Any Six)** **06**

1. Nucleocapsid of a virus is made up of _____.
   a) Nucleus and capsomers
   b) Envelope and protein
   c) Protein and Nucleic acid
   d) viral nucleus
2. Which of the following is the example of double stranded DNA virus.
   a) Tobacco Mosaic Virus
   b) Retrovirus
   c) Herpes Simplex Virus
   d) Pox Virus
3. Which of the following is not an RNA virus?
   a.Retrovirus
   b. Enterovirus
   c. Rhabdovirus
   d. Adenovirus
4. Which of the following phases determines the specificity of the virus?
   a) Uncoating
   b) Release
   c) Attachment
   d) Penetration
5. The replication of hepatitis B includes which of the following stages?
   a) Movement of intact virus to the cellular cytoplasm for replication
   b) Conversion of relaxed circular viral DNA in to covalently closed circular (CCC) DNA in the nucleus
   c) Virions produced in the cytoplasm by cellular DNA polymerase
   d) Oncogenic activity to transform liver cells.
6. The General steps in a viral multiplication cycle are
   a. adsorption, penetration, synthesis, assembly, and release
   b. endocytosis, replication, assembly, and budding
   c. adsorption, duplication, assembly, and lysis
   d. endocytosis, penetration, replication, maturation, and exocytosis
7. Creutzfeldt-Jakob disease (CJD) , kuru, scrapie, and Mad Cow disease are caused by:
   a. Viroids b. Retroviruses c. DNA viruses d. Prions

8. The process of readily counting Bacteriophages is called---------.
   a. Immunoassays b. ELISA c. Plaque assays d. Tissue cell culture
9. A type of cell culture that can reproduce for an extended number of generations and is used to support viral replication is a —-------.
   a. Primary cell culture b. Continuous cell line
   c. Cell strain d. Diploid fibroblast cell

**Q.1 b. Answer the following questions: (Any Two) 14**

1. Discuss the importance of prions and the diseases they cause.
2. What happens in each step of the viral replication process for DNA containing Viruses?
3. Name the criteria used for classifying viruses as per ICTV classification.

**Q.2 a. Select the correct alternative: (Any Six) 06**

1. Which of these is a Beta lactamase inhibitor
   a) Ampicillin
   b) Tetracycline
   c) Clavulanic Acid
   d) Amoxicillin
2. Which of the following classes of antibiotics bind to 50S subunit of rRNA
   a) Cephalosporins
   b) Macrolides
   c) Aminoglycosides
   d) Carbapenems
3. Tetracycline acts as an antibiotic through the following mode of action
   a) Detergent-like mode of action
   b) Inhibition of DNA synthesis
   c) Inhibition of protein synthesis
   d) Inhibition of folate synthesis
4. What sort of drug is ketoconazole?
   a) An antifungal agent
   b) An antibacterial agent
   c) An anticancer agent
   d) An viral agent
5. Bacitracin are responsible for
   a) Cell membrane disruption
   b) Inhibition of cell wall synthesis
   c) Inhibition of DNA synthesis
   d) Inhibition of protein synthesis

6. Which of the following antibiotics acts by inhibition of nucleic acid synthesis?
   a) Penicillin
   b) Quinolones
   c) Sulphonamides
   d) Cephalosporins
7. Patients with penicillin allergies are frequently allergic to another class of antibiotics. Which one?
   a) Cephalosporins
   b) Macrolides
   c) Aminoglycosides
   d) Fluoroquinolones
8. Most commonly used topical antifungal for treatment of oral candida infection is …….....
   a) Metronidazole
   b) Fluoroquinolones
   c) Nystatin
   d) Amphotericin
9. Which of the following is not used in the HIV-1 treatment?
   a) AZT b) Zidovudine c) Rimantadine d) Stavudine

**Q.2 b. Give an account on the following questions: (Any Two) 14**

1. Explain the mode of action of nucleic acid inhibitors giving suitable examples
2. Explain selective toxicity as a characteristic of a chemotherapeutic agent giving suitable example
3. What are antifungals? Explain any two types of anti-fungal drugs used for systemic infections

**Q.3 a. Select the correct alternative: (Any Six) 06**

1. The scattering of light can yield a number of valuable insights into the properties of macromolecules like
   a) Molecular mass
   b) Dimensions
   c) Diffusion coefficients
   d) All of these
2. Full form of ICP is
   a) Inductively coupled plasma
   b) Inductive cold plasma
   c) Individual coupled plasma
   d) Individual cold plasma

3. The solid samples are analysed in IR spectroscopic analysis by
   a) Heating
   b) Using a mulling agent
   c) Boiling
   d) Neither of these

4. The detection of non-fluorescent compounds can be achieved by coupling a fluorescent probe, this is called
   a) Extrinsic fluorescence
   b) Intrinsic fluorescence
   c) Auto fluorescence
   d) Semi fluorescence

5. When the incident light beam hits a molecule in its ground state, there is a low probability that the molecule is excited and occupies the
   a) Next higher vibrational state
   b) Next lower vibrational state
   c) Heat energy
   d) Neither of these

6. The Golay cells are
   a) Monochromators
   b) Electrodes
   c) Detectors
   d) Neither of these

7. This instrument does not have a light source or a monochromator
   a) Spectrophotometer
   b) Luminometer
   c) Colorimeter
   d) Photometer

8. The major disadvantage of spectrofluorimetry is
   a) Time required
   b) Quenching
   c) Use of two monochromators
   d) Inaccuracy

9. Methods for determination of molecular mass in a solution
   a) Membrane osmometry
   b) Sedimentation equilibrium centrifugation
   c) Light scattering
   d) All of these

**Q.3 b. Discuss the following: (Any Two)** **14**

1. Explain the principle and applications of Infrared spectroscopy.
2. What is dynamic light scattering? Write its applications.
3. Explain the principle and applications of Atomic absorption spectroscopy.

**Q.4 a. Select the correct alternative: (Any Six)** **06**

1. Method of detection and measurement of radioactivity
   a. Ionization of gases
   b. Excitation of solids or liquids
   c. Autoradiography
   d. All of these

2. The unit of radioactive decay is
   a. Electron volt
   b. Becquerel
   c. milli Curie
   d. All of these

3. Small rapidly moving particles that carry a single negative charge are
   a. α- particles
   b. Negatron
   c. γ-rays
   d. None of these

4. In this form of decay a proton captures an electron orbiting in the innermost K shell
   a. Electron capture
   b. Alpha emission
   c. Gamma emission
   d. Neither of these

5. The chromatography that exploits the unique property of extremely specific biological interactions to achieve separation and purification is
   a. Gel permeation
   b. Ion exchange
   c. Affinity
   d. HPLC

6. The elution technique that gives better resolution as compared to stepwise
   a. Continuous elution
   b. Exchanger elution
   c. Ionic elution
   d. Acid elution

7. Chromatography that can be used to concentrate solutions
   a. Gel permeation
   b. Ion exchange
   c. Affinity
   d. HPLC

8. The degree to which a method can quantify the analyte in the presence of interferents is called
   a. Selectivity
   b. Linearity
   c. Precision
   d. None of these

9. The technique that is much superior in terms of speed, efficiency, sensitivity and ease of operation is
   a. Adsorption Chromatography
   b. Ion –exchange Chromatography
   c. High Performance Liquid Chromatography
   d. Gel-permeation Chromatography

**Q.4 b. Answer the following questions: (Any Two)** **14**

1. Explain in detail the applications of tracer techniques in biology.
2. Explain the principle and working of HPLC.
3. Explain the principle, material and applications of Affinity chromatography.

**Q.5 Write Short notes on the following: (Any Four)** **20**

**a.** Anti virals.
**b.** Penicillins.
**c.** Virus assay.
**d.** Applications of Spectrofluorimetry.
**e.** Immunoaffinity chromatography.
**f.** Autoradiography.