

[Time : Three hours]

[Marks: 100]

Please check whether you have received the right question paper

- N.B:**
1. All questions carry equal marks
  2. Attempt all questions

**Option A**

**Q.I A. Define the following: (05)**

- i) Transport media
- ii) Differential staining
- iii) Attack rate
- iv) Vehicle transmission
- v) Sterilization

**Q.1 B. State whether the following statements are true or false: (05)**

- i) Viruses can reproduce only by using the host cellular machinery.
- ii) Pharyngitis is characterized by local inflammation and fever.
- iii) GALT are lymphoid tissues associated with skin.
- iv) Pasteurization is the sterilization of material by dry heat.
- v) Co<sup>60</sup> is a source of gamma radiation.

**Q.I C. Give one example for each of the following: (05)**

- i) Enriched media
- ii) Protozoan that moves with the help of pseudopods
- iii) Bacteria causing travellers' diarrhoea
- iv) Vector transmitting infectious disease
- v) Hypochlorites used as disinfectants.

**Q.I D. Select the most appropriate alternative: (05)**

- i) \_\_\_\_\_ are branching filamentous bacteria ( Mycoplasma, Spirochetes, Actinomycetes)
- ii) \_\_\_\_\_ acne is treated by topical agents like salicylic acid. (Inflammatoy, Commedonal, Infectious)
- iii) Symptoms of tetanus are caused by \_\_\_\_\_ - tetanospasmin. (enterotoxin, cytotoxin, neurotoxin)
- iv) Fire extinguishers contain \_\_\_\_\_ gas to smother fire. (Nitrogen, Ammonia, Carbon dioxide)

- v) \_\_\_\_\_ are provided in the laboratories to prevent inhalation of toxic fumes. (Fume hoods, HEPA respirators, Biosafety cabinets)

**Q.2 A Answer any two of the following: (20)**

- i) Discuss the various methods of isolating pure cultures.
- ii) Write a short note on typhoid fever.
- iii) Justify: 'Condensation of steam, unsaturated steam and air removal in autoclave plays an important role in sterilization'.

**Q.3 A. Answer any three of the following: (18)**

- i) Differentiate between light microscope and electron Microscope.
- ii) Justify – Blood agar is an enriched and differential medium.
- iii) How would you carry out viable count of bacteria?
- iv) Discuss the structure and functions of bacterial spores.
- v) Write a note on bacterial nomenclature.
- vi) Draw the bacterial growth curve and describe its phases.

**Q.3 B. Do as directed: any two (02)**

- i) Explain the impregnation method of staining.
- ii) State a typical characteristic of archaebacteria.
- iii) What is fluorochroming?
- iv) What are volutin granules?

**Q.4 A. Answer any three of the following: (18)**

- i) Justify "*Pseudomonas aeruginosa* is considered a model of an opportunistic pathogen
- ii) List viral diseases. Describe any one in detail.
- iii) Describe important features and functions of respiratory system.
- iv) Explain how quarantine and surveillance prevent disease.
- v) Describe the different reservoirs of infection.
- vi) Discuss the pathology of diphtheria.

**Q.4 B. Do as directed: any two (02)**

- i) Give the full form of GAS
- ii) Name the double layered membrane enclosing the lungs.
- iii) What is flatus?
- iv) Define public health.

**Q.5 A. Answer any three of the following: (18)**

- i) Give the action of phenolics and hypochlorites in disinfection.
- ii) Write a short note on: Biosafety in laboratory environment.
- iii) Justify: 'Employee education and orientation to exposure control plan is an essential for safety in laboratory'.
- iv) Discuss the role of Gas plasma in sterilization.
- v) Explain how 'Biological safety cabinets provide protection to workers from different infectious agents'.
- vi) Comment on: Filters used for sterilization.

**Q.5 B. Do as directed: any two (02)**

- i) Name the lamp used as source of UV light.
- ii) State the function of Type A fire extinguisher.
- iii) Give one example of organism that can be used as a bioterrorism agent.
- iv) Name any one frequently acquired laboratory infection.

## Option B

**Q.I A. Define the following: (05)**

- i) Sporicide
- ii) Alkalophiles
- iii) Fixation
- iv) Genetic engineering
- v) Restriction enzyme

**Q.1 B. State whether the following statements are true or false: (05)**

- i) Ethylene oxide is a strong alkylating agent.
- ii) Viruses have cellular organization.
- iii) Bacteria synthesize starvation protein in response to starvation.
- iv) RNA is copied to DNA by reverse transcriptase enzyme.
- v) Action of BamHI generates blunt ends in DNA fragment.

**Q.I C. Give one example for each of the following: (05)**

- i) Microaerophiles
- ii) Organism producing vitamin -C
- iii) Compounds of chlorine used as disinfectants
- iv) Nucleic acid sequence data base
- v) Marker gene

**Q.I D. Select the most appropriate alternative and fill in the blank. (05)**

- i) Lowest temperature required to kill all microbes in 10 minutes is called as \_\_\_\_\_ (TDP, TDT, LD).
- ii) Resolution is the ability of \_\_\_\_\_ (lens , stain , mirror ) to separate small objects.
- iii) 25 squares on Petroff-Hausser counting chamber cover an area of \_\_\_\_\_ (1, 10, 100) mm<sup>2</sup>.
- iv) The \_\_\_\_\_ ( *ori*, MCS, TEL) allows the plasmid to replicate in the microbial host independently of the chromosome .
- v) When a gene from one organism is cloned into another, it is said to be a \_\_\_\_\_ (homologous, heterologous, marker)

**Q.2 A Answer any two of the following: (20)**

- i) Discuss the effect of pH, temperature and oxygen on microbial growth.
- ii) Give a detailed account of use of aldehydes as germicides.
- iii) Explain in detail various methods of inserting recombinant DNA into host cell.

**Q.3 A. Answer any three of the following: (18)**

- i) Explain features and role of agriculture and medical microbiology.
- ii) State the principle and procedure of capsule staining.
- iii) Explain the role of nitrogen, phosphorus and sulfur in microbial growth.
- iv) Write a note on selective and differential media.
- v) Give an account of senescence and death phase.
- vi) Discuss the methods used for viable count of microorganisms.

**Q.3 B. Do as directed: (any 2) (02)**

- i) State the Abbe equation.
- ii) State the significance of simple staining.
- iii) What are lithotrophs?
- iv) Name the method used to stain *Mycobacterium tuberculosis*.

**Q.4 A. Answer any three of the following: (18)**

- i) Explain the impact of antimicrobial agents on protein synthesis and protein function.
- ii) Write a note on use of low temperature and dehydration in controlling microbes.
- iii) Compare and contrast between ionizing and non-ionizing radiations as antimicrobial agents. (One point of comparison and five differences)
- iv) Discuss the factors affecting germicidal effect of a chemical.
- v) Explain the principle underlying steam sterilization and discuss its application.
- vi) Write a note on sterilization by filtration.

**Q.4 B. Do as directed: (any 2) (02)**

- i) Give an example of heavy metal used for microbial control.
- ii) Plasmolysis occurs in hypertonic environment. State true or false.
- iii) Give an example of alcohol used as disinfectant.
- iv) Define-Antisepsis

**Q.5 A. Answer any three of the following: (18)**

- i) Give an account of protein sequence data bases.
- ii) Explain the application of genetic engineering in agriculture.
- iii) Write a note on artificial chromosome.
- iv) Explain the technique of PCR.
- v) Discuss the use of plasmid as cloning vector.
- vi) Define bioinformatics and explain its applications.

**Q.5 B. Do as directed:(any 2) (02)**

- i) Differentiate between global and local alignment.
- ii) What is algorithm?
- iii) Define oligonucleotide.
- iv) Write restriction site of EcoRI