**[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.1 A.** **Define the following:** **(05)**

i) Synthetic media
ii) Mesosomes
iii) Epidemic
iv) Meningoencephalitis
v) Disinfection

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

i) Mycoplasmas are bacteria that are cell wall deficient.
ii) Pertusis has been controlled by surveillance.
iii) *Corynebacterium diphtheriae* can cause cutaneous diphtheria.
iv) Heat sensitive material can be sterilized by an autoclave.
v) Capillary pore membranes have pores produced by radiation.

**Q.1 C.** **Give one example for each of the following:** **(05)**

i) Group of organisms belonging to Archae
ii) Gram positive organism
iii) Reportable bacterial disease
iv) Bacteria causing acne
v) Filters used for sterilization

**Q.1 D.** **Select the most appropriate alternative:** **(05)**

i) _____ culture method is used for isolation of bacteria in pure culture from clinical specimens ( stroke, stab, streak )
ii) Common cold is caused by _____.(fungi, bacteria, virus)
iii) *Pseudomonas aeruginosa* produces _____ pigment.(pyocyanin, pyocin, cyanin)
iv) _____ is a source of gamma radiation. ($^{32}$ P, $^{14}$N, $^{60}$Co)
v) Type B fire extinguishers are used against _____ fires. (chemical, wood, electrical)

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

i) Discuss different types of media used to cultivate bacteria.
ii) Write a short note on bacterial diseases of upper respiratory tract.
iii) Discuss the mode of action of various disinfectants.

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

i) Differentiate between cell walls of Gram positive and Gram negative bacteria.
ii) Discuss various bacterial shapes giving examples.
iii) Write a note on Bacterial Taxonomy.
iv) State principle and applications of Electron Microscope.
v) What is differential staining? describe any one differential staining method.
vi) Discuss the differences between bacterial flagella and fimbriae.

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

i) What is peptone?
ii) State the significance of Phase contrast Microscopy.
iii) Name a special staining method.
iv) What is Stationary phase?

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

i) Justify "There are many pathovars of *Escherichia coli.*"
ii) List reservoirs of infection. Describe any one in detail.
iii) Describe features and functions of the skin.
iv) Explain how pathogen eradication prevents disease.
v) Discuss principal routes of transmission of diseases.
vi) Give an account of the pathology of rabies.

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

i) Give the full form of NNIS.
ii) Where are paneth cells present?
iii) Name an organism causing viral gastroenteritis.
iv) Define vector.

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

i) Comment : 'Washer disinfector can be used to disinfect linen and sanitary material'.

ii) Write a short note on: Laboratory Autoclaves.

iii) Justify: 'Radiation can be used for sterilization of heat labile material'.

iv) Give an account of the disinfection of rooms and skin.

v) Discuss the post exposure control to be observed in the laboratory.

vi) Write a short note on: Ethylene oxide sterilizer

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

i) Explain: Fume hoods

ii) What are air filters?

iii) Define: Pasteurization

iv) Give one example of heat labile material.

# Option B

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

i) Bactericide
ii) Obligate aerobes
iii) Mordant
iv) Bioinformatics
v) Gel electrophoresis

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

i) Bacterial endospore is resistant to heat and sensitive to desiccation.
ii) Time required to kill microbes at a specified temperature is called as TDP.
iii) Sudan black selectively stains lipids.
iv) Medium in which all chemical components are not defined is called as synthetic medium.
v) Bioinformatics do not need computer.

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

i) Quaternary ammonium compound
ii) Acidic dyes
iii) Organisms producing vitamin $B_{12}$
iv) Type II restriction endonuclease
v) Organic acid used in food preservation

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

i) Disinfection removes _____ (vegetative cells, endospores, both vegetative cells and endospores).
ii) Common household bleach is ____ (5%, 15%, 25%) solution of Na hypochlorite.
iii) Acidophiles grow well at pH between_____ (6-7, 0-5, 8-10).
iv) Generation time for *Escherichia coli* is ___ (1 hr., 2 hrs., 35 min).
v) Algorithm used for sequence alignment is known as ( TrEMBL, BLAST, PIR).

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

i) What is growth? Explain features of growth curve.

ii) Discuss the role of ethylene oxide and heavy metals in microbial control.

iii) Write an account of aims, task and application of bioinformatics.

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

i) Explain the features and role of industrial microbiology and food microbiology.

ii) Write a note on Bright field microscopy.

iii) State the principle and procedure of acid fast staining.

iv) Explain the role of growth factors in microbial growth.

v) Discuss methods of direct measurement of cell number.

vi) Describe the effect of oxygen on microbial growth.

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

i) Define mean generation time.

ii) What is beta haemolysis?

iii) State the significance of differential staining.

iv) Name the method used for endospore staining.

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

i) Explain the concept of microbial death and enlist any four factors which affect death rate.

ii) Discuss the role of freezing temperature and freeze drying in control of microbes.

iii) Compare and contrast between Gamma radiation and UV light as antimicrobial agents. (Any six points)

iv) Discuss the properties of an ideal germicide.

v) Write a note on pasteurization.

vi) Explain germicidal effect of $H_2O_2$ and comment on its application.

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

i) State one application of HEPA filters.

ii) Microbial cells in hypotonic environment are subjected to plasmolysis. State true or false.

iii) What are iodophores?

iv) Define-Asepsis

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

i) Briefly describe the polymerase chain reaction technique.

ii) Explain with the help of schematic representation, cloning of DNA into a vector to make recombinant DNA.

iii) Write an account of protein sequence databases.

iv) Describe various methods of inserting recombinant DNA into host cells.

v) Write a short note on medical applications of genetic engineering.

vi) Explain the features of Cosmids and YACs.

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

i) Give an example of selectable marker.

ii) Name the technique used to detect radioactive probe bound DNA fragment.

iii) Name the template DNA strand synthesized from mRNA.

iv) Write long form of DDBJ.