

Q. P. Code: 20636

[3 hours]

Total marks: 100

N.B. (1) Attempt all questions.

(2) Draw labeled diagrams wherever necessary.

Q1 A Define the following terms :

- i. ATCC
- ii. Resolution
- iii. Mordant
- iv. Disinfectant
- v. Photolithotroph

B State whether the given statement is true or false :

- i. The refractive index of the medium between the object and objective lens affects the numerical aperture of the objective.
- ii. An autotroph derives energy from oxidation of reduced organic compounds.
- iii. Paraffin oil is sterilized by Autoclaving.
- iv. Addition of 7.5 % salt to MacConkeys agar makes the medium selective.
- v. Refrigeration temperature increases microbial growth and reproduction.

C. Give one example for each of the following:

- i. Natural stain
- ii. A simple liquid medium used to grow bacteria.
- iii. A biological indicator used to check efficiency of sterilization in an autoclave.
- iv. Quaternary ammonium compound used as disinfectant.
- v. A chemotherapeutic agent used to control bacterial growth.

D Select the correct alternative and rewrite the statements:

- i. The maximum theoretical resolving power of a microscope with an oil immersion objective is ____ [0.2 μ m, 1.0 μ m, 1.5 μ m]
- ii. A vacuum pump assists during _____. [autoclaving, lyophilisation, aeration]
- iii. _____ is a triphenyl methane dye. [methyl orange, methylene blue, oxazine dye]
- iv. Nickel is a _____. [macronutrient, micronutrient, nitrogen source]
- v. Toxicity of a disinfectant can be checked using _____. [bacteria, chick embryo, viruses]

Q 2 Answer briefly any two of the following:

- i. What is differential staining method? Discuss gram staining and give its significance.
- ii. Discuss any five factors that influence the effectiveness of antimicrobial agents.
- iii. With the help of a neat diagram represent an autoclave, and give its principle of operation.

Q3 A Answer briefly any three of the following

- i. Enlist the six parts of a bright-field microscope that help obtain a good image. Give function of each
- ii. Explain the principle underlying Phase Contrast microscope. Give two uses of the same.
- iii. Write a short note on "use of dyes and stains in biology."
- iv. Give the principle underlying staining of endospores. How would you stain them?
- v. Discuss the importance of different fixatives while staining. Explain with suitable examples.
- vi. Explain how a simple microscope can be converted into a dark-field microscope. Give its advantage

[Turn over]

Q. P. Code: 20636**B. Do as directed [any two]**

- Explain the role of Congo red in cell wall staining by Chance's method.
- What is the refractive index of cedar wood oil?
- What is the total magnification obtained with highpower objective?
- Name the staining method to demonstrate capsules.

Q4 A Answer briefly any three of the following

- What is cold sterilization? Explain how cold sterilization is done?
- What are bacteriological filters? Briefly discuss how they find use in bacteriology.
- Discuss how chlorine finds use as an excellent disinfectant.
- With help of a neat diagram explain how ethylene oxide sterilizer works. What is the mode of action of this sterilizing gas?
- How is efficiency of a disinfectant evaluated?
- What is fractional sterilization? Explain the process and give its significance.

B. Do as directed [any two]

- Define sterilization.
- What temperature is attained at 15psi in an autoclave?
- What is phenol coefficient?
- Give the mode of action of formaldehyde as a disinfectant.

Q 5 A Answer briefly any three of the following:

- How are bacteria cultivated in the laboratory? Discuss briefly.
- Discuss the role of four macroelements that exist in the cell as cations. What is Comatabolism?
- Why are cultures preserved? What is the difference between preservation with paraffin oil overlay method and use of liquid nitrogen?
- Briefly describe physical and chemical types of culture media.
- What are growth factors? Why are they essential to bacteria? Why is glucose not a growth factor?
- Discuss the different types of heterotrophic nutrition shown by bacteria.

B. Do as directed [any two]:

- What type of carbon compound is used by heterotrophs .
- Give the name of a differential culture medium.
- Give one example of a bacterial group that exhibits photolithotrophy.
- What role does Zn^{2+} play as a micronutrient?
