



**QIA Define the following terms:** 05

**Germicide:** A substance that kills pathogenic micro-organisms but not necessarily endospores.

**Microaerophilic organism.:** Aerobes that can use oxygen only when it is present at levels reduced from that in air.

**Plasmoptysis:** passage of water from low concentration into the cell may lead to bursting of cells.

**Organotroph:** They are organisms that extract electrons from reduced organic compounds as source of energy.

**Dye:** is an organic unsaturated cyclic compound that contains both a chromophore and an auxochrome group.

**QIB State True or False** 05

- 1) Tryptic soy broth is a selective medium. **FALSE**
- 2) A medium with known chemical composition is called complex medium. **FALSE**
- 3) Numerical aperture is  $n \sin \theta$ . **TRUE**
- 4) Temperature and time regime used in autoclave is  $160^{\circ}$  for 1hr at 10psi. **FALSE**
- 5) Young cells are easily killed by antimicrobial agent. **TRUE**

**QIC Give one example for each of the following:** 05

- 1) Cationic detergent : **Quaternary Ammonium salts- Cetylpyridinium, Benzalkonium Chloride.**
- 2) Macronutrient: **Carbon/ nitrogen/ hydrogen/ sulphur/ phosphorous/ oxygen**
- 3) Primary stain used in differential staining. **Crystal Violet, ZNCF**
- 4) Radiations used for sterilization: **UV, Gamma**
- 5) Decolorizer: **Alcohol, Acetone, Acid-alcohol mixtures, picric acid(oxidizer)**

**QID Select the correct alternative and rewrite the statement:** 05

- 1) The margin of the bacterial colony can be **undulate.**
- 2) The greatest resolution is obtained by using lens with **largest** NA.
- 3) UV lamps are mounted in **Hospital** for treatment of contaminated surfaces.
- 4) Porosity of a membrane filter is **0.2 $\mu$ .**
- 4) Sudan black selectively stains **PHB** and does not dissolve in aqueous portions of the cell.

**QII. Answer briefly any two of the following:** 20

- 1) The different methods for maintenance and preservation of bacterial culture? Discuss any two in detail. **Pelczar, 5<sup>th</sup> ed. 141-142.**
- 2) Note on ~~chemical~~ <sup>aldehydes</sup> and its ~~compounds~~ <sup>alcohols</sup> as antimicrobial agents. **Prescott 7<sup>th</sup> pg159-163**  
**Pelczar, 5<sup>th</sup> ed. 495-496**
- 3) Phase-contrast microscopes work and form images, [Prescott 7<sup>th</sup> pg 21, 23]enlist four of its uses in the study of microorganisms. [**microbial motility, cilia and flagella visible, shape of living cells, detecting inclusion bodies-PHB, polymetaphosphates, sulfur, observe living tissue, other areas in the biological arena that benefit from phase contrast observation**]

2 are hematology, virology, bacteriology, parasitology, paleontology, and marine biology, polymer science etc.

QIII A. Answer briefly any three of the following:

[18]

- 1) Write a short note describing the working and use of Dark-field microscope. [Prescott 7<sup>th</sup> pg 21, text 3 marks, diagram 2 marks, uses 1mark]
- 2) Type of staining – differential staining? [1 mark], One hypothesis which explains Gram staining. [Modi 253-254]
- 3) State three aims of staining [Modi 227-3 marks]. Name and discuss the two groups present in a dye. [Modi 228-3 marks]
- 4) Name and describe the method used for staining endospores. - [Schaeffer & Fulton method, refer to Journal]
- 5) Define the terms: lenses, refraction, focal point and focal length. How is lens strength related to focal length [Prescott 7<sup>th</sup> pg18]
- 6) Give the function of each: mirror, condenser, Iris Diaphragm, nosepiece, cedar wood oil and mechanical stage in a bright-field microscope. [Prescott 7<sup>th</sup> pg18]

Q III B. Do as directed any two:

[02]

- 1) Name a cellular component with which chemical fixatives react. [proteins & lipids].
- 2) Maneval's method for demonstration of capsule has a washing step in its method. State true or False.
- 3) What type of stain is *Malachite Green*? Basic stain
- 4) Define a microscope. An optical instrument consisting of a lens or combination of lenses, for magnifying minute objects not seen by naked eye.

QIV A Answer any three of the following:

[18]

- 1) How would you sterilize the following :  
Medium containing Serum- Membrane filtration, Nutrient agar- Autoclaving,  
Vitamin solution – Membrane filtration, Paraffin oil- Hot air oven, 160<sup>o</sup>C for 1h., Dry powder- Hot air oven, 160<sup>o</sup>C for 1h., Rubber gloves- gamma radiation.
- 2) Write six distinguishing points between the following: Pelczar, 5<sup>th</sup> ed.476-478  
Moist heat sterilization and Dry heat sterilization.
- 3) Discuss any five factors affecting efficacy of an antimicrobial agent. Pelczar, 5<sup>th</sup> ed.471-473/  
Prescott 8<sup>th</sup> ed. 152 Pelczar, 5<sup>th</sup> ed.471-473/ Prescott 8<sup>th</sup> ed. 152
- 4) Short note on: Tube dilution and agar plate technique for studying antimicrobial activity  
Pelczar, 5<sup>th</sup> ed.504-505
- 5) Give a detail account on phenolics used for disinfection. Pelczar, 5<sup>th</sup> ed. 491-493
- 6) Discuss the mode of action, advantages and limitations of Ethylene oxide as antimicrobial agent. Pelczar, 5<sup>th</sup> ed.502-504

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**QIVB Do as directed any two of the following:**

02

- 1) One use of silver nitrate. Used on ointments/ antimicrobial/against ophthalmic gonorrhoea
- 2) Biological indicator for checking the efficiency of autoclave. *Geobacillus stercorothermophilus*
- 3) One function of Laminar Air flow. Used for doing aseptic work.
- 4) Egg yolk containing medium sterilized: **Inspissation**

**QVA. Answer any three of the following:**

18

- 1) Discuss briefly MacConkey's agar with reference to its function and mechanism of action. **Prescott 8<sup>th</sup> ed. 149**
- 2) Explain diagrammatically pour plate method. **Prescott 7<sup>th</sup> ed. 115**
- 3) importance of macroelements. [**Prescott 7<sup>th</sup> pg 102,104**]
- 4) Give a brief account of the following groups of organisms. **Brock 11<sup>th</sup> ed.161**
  - a) Aerobic and b) Anaerobic micro-organisms.
- 5) Discuss any five trace elements needed by living organisms. [**Prescott 7<sup>th</sup> pg101**]
- 6) Account of defined media and complex media. **Talaro, 7<sup>th</sup> ed. 64/ Prescott 7<sup>th</sup> ed. 111**

**QV B Do as directed any two of the following:**

02

- 1) Photoautotroph: Organisms which use "light" as their energy source and "inorganic carbon"(CO<sub>2</sub>) as source of carbon, for cell proliferation.
- 2) Mixed culture: **Medium hold two or more easily differentiated species of microorganisms.**
- 3) Role of agar in culture media. **Solidification of media at RT**
- 4) Blood agar medium. **Grow fastidious organisms/ study type of hemolysis.( $\alpha, \beta, \gamma$ )**

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