

QIA Define the following terms: [05]

- 1) **Facultative anaerobe:** Bacteria that can grow aerobically as well as anaerobically.
- 2) **Bacteriostatic:** Inhibiting the growth of bacteria without killing them.
- 3) **Resolution:** Resolution is the ability of a lens to separate or distinguish between small objects that are close together.
- 4) **Synthetic medium:** A medium in which all chemical components are defined
- 5) **Cold sterilization:** Sterilization by using radiations.

QIB State True or False [05]

- 1) Purines serve as growth factor. **TRUE**
- 2) Agar is used as a solidifying agent in culture media. **TRUE**
- 3) Oil is sterilized in Hot Air oven. **TRUE**
- 4) Negative staining is a differential staining method **FALSE**
- 5) Methyl alcohol is less bactericidal than ethyl alcohol. **TRUE**

QIC Give one example for the following: [05]

- 1) Differential medium: **MacConkey agar, Salt mannitol agar, SIBA**
- 2) Endospore staining method : **Schaeffer - Fulton**
- 3) Halogen as antimicrobial agent : **Iodine , Chlorine**
- 4) Fixative used in staining: **Heat, Glacial acetic acid, alcohol, formalin**
- 5) Antibiotic affecting the cell membrane permeability: **Polymyxin, Gramicidin**

QID Select the correct alternative and rewrite the statement: [05]

- 1) ATCC is a culture collection centre.
- 2) 70-90% alcohol.
- 3) The auxochrome group in a dye is capable of undergoing electrolytic dissociation.
- 4) Hexylresorcinol is a derivative of Phenol.
- 5) A young cell suspension of *Proteus* is used for flagella staining.

QII. Answer briefly any two of the following: [20]

- 1) Discuss lyophilization technique, how is it different to preservation by liquid Nitrogen. **Pelczar, 5th ed. 142**
- 2) Discuss the effect of desiccation and osmotic pressure on the control of microorganisms. **Pelczar, 5th ed. 479-480**
- 3) What is differential staining? (1 mark) State its principle. (3 mark) Explain the usefulness of Gram Staining and acid-fast staining. (different Gram nature of organisms in a sample, identification of Gram nature of pure culture, presumptive diagnosis of TB) [Modi 252-253]

Q III A Answer briefly any three of the following: [18]

- 1) What are mordants and decolourizers? State their role in staining by giving examples. [Modi 248, 249]
- 2) Discuss "preparation of smear" and "fixation of smear" as important steps in staining. [Modi 246, 247]

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- 3) Write a note on phase-contrast microscopy. [Prescott 7th pg21,23]
- 4) State four differences between Light microscopy and Dark-field microscopy. [Dark-field: hollow cone of light focused on specimen, unreflected & unrefracted rays do not enter objective, use of dark-field stop, only light reflected or refracted by specimen form image, background dark while object illuminated, can reveal internal structures in large eukaryotic microorganisms. State two important aims of staining [Modi pg 227]
- 5) How would you stain metachromatic granules in a bacterial cell? [principle 1 marks, method 4 marks.] Name the method of staining. [Albert's method—1 mark]
- 6) Discuss the importance of lenses, objectives and mirrors in a microscope. [2 marks each, Prescott 7th pg17, 18,20]

QIII B. Do as directed any two of the following: [02]

- 1) Name a stain used in monochrome staining. [any basic stain—CV, BF, Malachite green etc]
- 2) State a significant difference between a compound microscope and simple microscope. [Two sets of lenses, mounted in a holder called body tube.]
- 3) State the relationship between wavelength of light and resolving power. [Shorter the wavelength of light finer is the detail revealed by the objective.]
- 4) Name the method by which intracellular lipid granules are stained in a bacterial cell. [Burdon's method]

QIV A Answer any three of the following: [18]

- 1) Discuss the mode of action, advantages and use of quarternary ammonium compounds as antimicrobial agents. [Prescott 7th pg163, Pelczar 5th ed.499-501]
- 2) Describe the death rate pattern of bacteria when exposed to a lethal agent? [Prescott 7th pg 151-152, Pelczar 5th ed.,470,471]
- 3) Enlist the characteristics of an ideal antimicrobial agent. [Pelczar 5th ed., 489]
- 4) Write short note on phenol coefficient method. Pelczar 5th ed.,505
- 5) Justify 'Moist heat sterilization is more effective and economical method of sterilization compared to dry heat.' [Prescott 7th pg 153-155, Pelczar 5th ed., 477,478]
- 6) Discuss: UV and Gamma radiation as sterilizing agents. [Prescott 7th 156-158, Pelczar 5th ed.,481,482]

QIV B Do as directed any two of the following: [02]

- 1) One use of vaporized Hydrogen peroxide. [can be used to decontaminate biological safety cabinets, operating rooms and large facilities]
- 2) One-point of difference between sterilization and disinfection: Sterilization is complete destruction of micro-organisms. (spores & vegetative forms). Disinfection is killing of bacterial forms of disease producing micro-organisms which does not necessarily kill the resistant spores.
- 3) Material used for making membrane filter: Inert cellulose ester
- 4) Biological indicator used for checking efficiency of Hot Air Oven: *Bacillus atropheus*

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QVA. Answer any three of the following:

18

- 1) Classification of culture media depending upon properties and use. [Prescott 7th pg 111-112, Talaro 7th ed., 60-61]
- 2) Anoxic jar used to cultivate anaerobic bacteria. [Pelczar 5th ed.112]
- 3) Use various forms of nitrogen and phosphorous as their macronutrients. [Prescott 7th pg104-105]
- 4) Give names of any five micro-nutrients used by micro-organisms. [manganese, zinc, cobalt, molybdenum, nickel, and copper]Give their cellular function. [Prescott 7th pg 101-102]
- 5) Discuss any six nutritional types of microorganisms. [Prescott 7th ed. 102-103]
- 6) pure cultures[1 mark], importance [2marks] streak plate method performed 3marks [Prescott 7th ed. 114]

QVB Do as directed any two of the following:

02

- 1) What is agar. [a complex sulfated polysacc used as solidifying agent]
- 2) word describing shape of colony. [circular, filamentous, irregular, rhizoid,spindle]
- 3) pour plate: a method by which microbes are inoculated into molten agar so that colonies are formed in agar matrix
- 4) significance of soil stock in preservation of culture. [To preserve spore bearing organisms]

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