

## PAPER II- METHODS IN BIOTECHNOLOGY

### QUESTIONS BANK

Class - F.Y.B.Sc.

2007-2008

#### Unit I- Biophysical Chemisrty

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Q.1 A) Define/ Explain

- 1) pH
- 2) Buffer
- 3) Specific Gravity
- 4) Surface Tension
- 5) Sedimentation
- 6) Filtration
- 7) Stoichiometry
- 8) Adsorption
- 9) Distillation

B) Multiple Choice Questions

- 1) Bond angle of H-O-H is-----  
a) 104.5°C b) 105.4°C c) 104°C d)105°C
- 2) H<sub>2</sub>O carries -----  
a)Positive charge b)negative Charge c)no net charge d)none of the above
- 3) Melting point of water is-----  
a) 0°C b) 10°C c)100°C d)50°C
- 4) pH range is in between-----  
a) 0-14 b)1-14 c)0-7 d)1-7
- 5) pH of lemon juice is-----  
a)acidic b)basic c)neutral d)none of the above
- 6) Buffers has the ability to  
a) Change in pH b)resist change in pH c)no resist to change in pH d)all of the above
- 7) Force of gravity tends to move particles in a liquid unidirectionally downward to increase their concentration progressively is called----  
a) Specific gravity b) Density c) Viscosity d) Sedimentation

Q.2- Answer the following/short notes (4 marks)

- 1) Specific gravity
- 2) Sedimentation
- 3) Filtration
- 4) Viscosity
- 5) Stoichiometry
- 6) Surface tension
- 7) Adsorption
- 8) Distillation
- 9) Physical & chemical properties of water

Q.3- Answer the following ( 6 marks)

- 1) Physiological buffer
- 2) Buffer preparation (Phosphate buffer)
- 3) Henderson-Hasselbalch equation

Q.4- Answer the following. (12 marks)

- 1) Principle, working & Biological significance of-
  - a) Water distillation plant
  - b) Filtration

## Unit II- Microscopy

Q.1-A) Define/ Explain (2 marks)

- 1) Microscope
- 2) Microscopy
- 3) Magnification
- 4) Resolution
- 5) Numerical aperture

B) Multiple Choice Questions

- 1) The ratio of diameter of lenses to its focal length is referred as---  
a) Magnification   b) resolution   c) Numerical aperture   d) none of the above
- 2) \_\_\_\_\_ is the ability to reveal closely adjacent points as separate & distinct.  
a) Magnification   b) resolution   c) Numerical aperture   d) none of the above
- 3) If green light of wavelength 500nm objective with NA 1.4 is used, then the resolution will be-----  
a)178X   b)178nm   c)178m   d) None of the above
- 4) \_\_\_\_\_ controls the intensity of light entering in microscope.  
a) Iris Diaphragm   b) Mirror   c) Condenser   d) All of the above
- 5) In \_\_\_\_\_ type of microscope, the field surrounding a specimen appears black, while the object itself is brightly illuminated.  
a) Compound microscope   b)Phase contrast microscope  
c) Dark field microscope   d) Fluorescence microscope

Q.2- Answer the following/short notes (4 marks)

- 1) Numerical Aperture
- 2) Microtome & ultramicrotome

Q.3- Answer the following (12marks)

1) Principle, construction, working & applications of-

- a) Compound microscope
- b) Phase contrast microscope
- c) Dark field microscope
- d) Fluorescence microscope
- e) Transmission electron microscope
- b) Scanning electron microscope

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### Unit III- General Staining Techniques

Q.1-A) Define/ Explain (2 marks)

- 1) Stain
- 2) Staining
- 3) Acidic Stain
- 4) Basic Stain
- 5) Intensifier
- 6) Fixative
- 7) Mordant

B) Multiple Choice Questions

- 1) Use of single stain to color the bacteria is commonly called as-----
  - a) Monochrome staining
  - b) Gram staining
  - c) Differential Staining
  - d) all of the above
- 2) A substance that forms an insoluble complex with stain & serves to fix the color to bacterial cell is called-----
  - a) Mordant
  - b) Intensifier
  - c) Fixative
  - d) none of the above
- 3) In Gram Staining, Gram's iodine is act as-----
  - a) Counter stain
  - b) primary stain
  - c) Secondary stain
  - d) Mordant
- 4) A stain which on ionization gives positively charged molecules is referred as \_\_\_\_\_
  - a) Acidic Stain
  - b) Basic Stain
  - c) Anionic Stain
  - d) Basic mordant
- 5) The ---- charged group of bacterial cell surface produces attraction between basic stain.
  - a) Negative
  - b) Positive
  - c) Neutral
  - d) All of the above
- 6) From the following, -----is referred as differential staining technique.
  - a) Monochrome staining
  - b) Gram staining
  - c) Lactophenol cotton blue Staining
  - d) all of the above
- 7) In Gram Staining Safranin is act as-----
  - a) Primary stain
  - b) Mordant
  - c) Counter stain
  - d) decolorizer
- 8) In Gram Staining, Differentiation of microorganisms based on-----

- a) Cell wall
- b) Plasma membrane
- c) Capsule
- d) All of the above

Q.2- Answer the following/short notes (4 marks)

- 1) Acid fast staining
- 2) Smear preparation

Q.3- Answer the following (6 marks)

- 1) Principle & procedure of-
  - a) Monochrome staining
  - b) Gram staining
  - c) Lactophenol cotton blue Staining
  - d) KOH
  - e) Double staining of vascular tissues
  - f) WBC staining

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## Unit IV Cell measurement

Q.1-A) Define/ Explain(2 marks)

- 1) Stage micrometer
- 2) Ocular micrometer
- 3) Growth
- 4) Micrometry

B) Multiple Choice Questions

- 1) Basic unit of bacterial measurement is ----  
a) Micrometer b) Nanometer c) Milimeter d) All of the above
- 2) Basic unit used for virus measurement is ----  
a) Micrometer b) Nanometer c) Milimeter d) All of the above
- 3) 1 meter is equal to---  
a)  $10^9$  b)  $10^{-9}$  c)  $10^6$  d)  $10^{-6}$
- 4) Each division of stage micrometer equal; to-----  
a) 0.01mm b)  $1\ \mu\text{m}$  c) 0.1mm d) None of the above
- 5) Breed methods -----  
A) Direct microscopic count method b) Indirect microscopic count method  
c) Turbidometric method d) none of the above
- 6) The Petroff- Hausser counting chamber consist of-----  
a) 25 squares b) 100 squares c) 50 squares d) none of the above
- 7) For the direct enumeration of bacterial cells in suspension ----- method is used.  
a) TVC b) Turbidometric method c) Electronic method d) all of the above

Q.2- Answer the following/short notes (4 marks)

- 1) Breed method
- b) Turbidometric method
- c) Electronic counting method

Q.3- Answer the following (6 marks)

- 1) Stage micrometer and ocular micrometer

Q.4- Answer the following (12marks)

- 1) Measurement of growth by
  - a) Cell number
  - b) Cell mass

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## Unit V- Isolation & cultivation technique

Q.1-A) Define/ Explain(2 marks)

- 1) Culture
- 2) Pure culture
- 3) Auxenic culture
- 4) Mixed culture
- 5) Isolation

B) Multiple Choice Questions

- 1) A culture containing only one kind of microorganism is called-----  
a) Culture b) pure culture c) Auxenic culture d) all of the above
- 2) Culture containing more than one kind of microorganism is called-----  
a) culture b) pure culture c) Auxenic culture d) all of the above
- 3) Add 1ml of given sample into 99ml of sterile saline, this leads to----- dilution of sample.  
a)  $1:10^1$  b)  $1:10^2$  c)  $1:10^{-2}$  d) none of the above
- 4) To maintain the bacterial population in a----- growth phase is referred as continuous culture.  
a) Lag phase b) log phase c) stationary phase d) death phase
- 5) Slide culture technique is used for-----  
a) Bacterial isolation b) fungi cultivation c) virus cultivation d) all of the above
- 6) From the following ----- type of media is used for fungi cultivation  
a) Nutrient agar b) MacConkey's agar c) Sabouraud's agar d) all of the above
- 7) Macintosh Jar is used for-----  
a) Anaerobes cultivation b) Anaerobes cultivation c) fungi cultivation d) all of the above

8)----- technique is used for virus cultivation.

- a) chick embryo technique b) Slide culture technique c) candle method d) all of the above

9) ----- mainly used for culture of some viruses.

- a) Amniotic Cavity b) allantoic cavity c) chorioallantoic cavity d) yolk sac

Q.2- Answer the following/short notes (4 marks)

- 1) Batch culture
- 2) Continuous culture

Q.3- Answer the following (6 marks)

- 1) Streak plate
- 2) Spread plate
- 3) Pour plate
- 4) Anaerobic cultivation-
  - a) MacIntosh Jar
  - b) Candle method

Q.4- Answer the following ( 12marks)

- 1) Chick embryo technique
- 2) Slide culture technique

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## Unit VI- Sterilization and disinfection

Q.1-A) Define/ Explain(2 marks)

- 1) Sterilization
- 2) Disinfection
- 3) Antiseptic
- 4) Sanitization
- 5) Aseptic condition

B) Multiple Choice Questions

- 1) To maintain sterile condition is referred as-----
  - a)Aseptic technique b)septic technique c)disinfection d)all of the above
- 2) ----- is referred as non ionizing radiations.
  - a)UV rays b) X rays c) Gamma rays d) cathode rays.
- 3) The absorption of UV light is leads with-----
  - a)Formation of T-T dimer b)Formation of purine dimer c)Breakdown of DNA strand d)all of the above
- 4) In Laminar air flow ----- type of filter is located.
  - a)membrane filter b) Seitz Filter c)HEPA d)all of the above
- 5) ----- is referred as biological indicator of autoclave.
  - a)*Bacillus stearothermophilus* b)*Bacillus subtilis* c)*Bacillus megatorium* d)*Bacillus cereus*
- 6) The process of killing or removal of organisms capable of causing infection is called as\_\_\_\_\_
  - a)sterilization b) sanitization c)disinfection d)antiseptis
- 7) The process that reduces the bacterial count to safe levels as may judged by the public health is referred as-----
  - a)sterilization b) sanitization c)disinfection d)antiseptis

Q.2- Answer the following/short notes (4 marks)

1) Characteristic of ideal disinfectant.

2) Mode of action of disinfectant

- a) Alcohol
- b) Phenolic compound
- c) Halogen
- d) Heavy metal
- e)  $H_2O_2$
- f) Detergent

Q.3- Answer the following (6 marks)

1) Biological indicators of sterilization

2) Radiations- Ionizing, Nonionizing

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## Unit VII

Q.1-A) Define/ Explain (2 marks)

- 1) Taxonomy
- 2) Classification
- 3) Binomial Nomenclature
- 4) Taxa
- 5) Species

B) Multiple Choice Questions

1) The art of biological classification is known as-----

- a)Taxonomy b)Classification c) Identification d) Nomenclature

2) The arrangement of organisms into groups based on mutual similarity is referred as--  
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- a)Taxonomy b)Classification c) Identification d) Nomenclature

3) The assignments of names of taxonomic groups in agreement with the published rules is referred as----

- a) Taxonomy b) Classification c) Identification d) Nomenclature

4) Groups of potentially interbreeding natural populations which are reproductively isolated from other such groups is referred as----

- a)Species b) kingdom c) Genus d)all of the above

5) ----- type of classification is also known as Adanson Classification

- a)Numerical taxonomy b) Chemotaxonomy c) Molecular taxonomy d)none of the above

6) Molecular taxonomy determined by DNA base composition based on -----

- a) % of G+C b) % of A+T c) % of A+T+G+C d)all of the above

7) In naming of bacteria, the first name refers to -----

- a) Species b) strain c) genus d) none of the above

8) In molecular taxonomy, ribotyping based on-----asd

- a) 5s rRNA b) 16s r RNA c)23s rRNA d)none of the above

Q.2- Answer the following/short notes (4 marks)

- 1) Binomial nomenclature rules

Q.3- Answer the following ( 6 marks)

- 1) Mole G+C
- 2) DNA-DNA hybridisation
- 3) Ribotyping

Q.4- Answer the following (12marks)

- 1) Numerical taxonomy
- 2) Chemotaxonomy
- 3) Molecular taxonomy

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## Unit VIII

### Q1 A) Multiple Choice Questions

- 1) pH meter standardized with-----  
a) pH 7 b) pH 0 c) pH 14 D) all of the can be used.
- 2) Colorimeter is applied only in relation to-----  
a)UV light b)X rays c)Visible light c)none of the above
- 3) The amount of light absorbed by a material is proportional to the concentration of the absorbing solution is referred as-----  
a) Beer's law b) Boger-lambert law c)Poiseuille's law d)all of the above
- 4) Separation of small molecule can be done by-----  
a) Viscometer b) Centrifugation c) flow cytometry d) spectrophotometer
- 5) Capillary flow in viscometer is based on----  
a) Beer's law b) Boger-lambert law c)Poiseuille's law d)none of the above
- 6) Fluorescent substance is used in-----  
a)Viscometer b) Centrifugation c) flow cytometry d) spectrophotometer

### Q.3- Answer the following (principle & application)( 6 marks)

- 1) pH meter
- 2) Colorimeter
- 3) Viscometer
- 4) Centrifugation
- 5) Flow cytometry
- 6) Spectrophotometer
- 7) Polarimeter
- 8) Laminar air flow