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SEM II SET III
MARKS)

(3 HOURS)

(100

N.B. (1) Attempt all questions. (2) Draw labeled diagrams wherever necessary.

Q I. A. Define the following terms: (5)

1. Plaque- A viral plaque is a visible structure formed within a lawn of cell culture, such as bacterial cultures within some nutrient medium, after lysis of host cells.
2. Prophages- the form of the viruses that remains within its host is called prophage
3. YM shift- change in dimorphic fungi from yeast form to mold form
4. Dikaryotic stage- stage in fungi where cells contain 2 separate haploid nuclei
5. Programmed cell death- Programmed cell death predicts that a fraction of the microbial population is genetically programmed to commit suicide.

Q I B. State whether the following statement is true or false: (5)

1. T4 phages have binal symmetry – **true**
2. Transmissible spongiform encephalopathies is caused by viruses. - **False**
3. In fungi, sexual reproduction must occur between mycelia of opposite mating types. - **True**
4. Chlorophyll a is present in all photosynthetic algae. - **True**
5. When microorganisms are introduced into a fresh culture medium, immediate increase in cell number takes place - **False**

Q I C. Give one example for each of the following: (5)

1. Cell wall less archaea- thermoplasma
2. Bacteria that produce antibiotic- Streptomycetes
3. Red algae – Gelidium, Chondrus, etc
4. Flagellated protozoa – Giardia, trypanosoma, Leishmania
5. Thermobarophile- Halomonas species

Q I D. Select the correct alternatives and rewrite the statement. (5)

1. Viruses have _____ as genetic material. (DNA, RNA, DNA or RNA)
2. Envelope of viruses is responsible for _____ (reproduction, protection, infection)
3. Non motile spores in algae are called _____. (Zoospore, Aplanospore, Basidiospore)
4. _____ is a unicellular fungus. (Saccharomyces, Penicillium, Rhizopus).
5. Manner in which growth is expressed in turbidometric measurement is _____. (absorbance, reflectance, cfu)

Q II. Answer briefly any two of the following: (20)

1. Explain cultivation of viruses using chick embryo and animal tissue culture.
Prescott – 7th edition -417-419
2. Discuss the characteristics and significance of fungi belonging to class Ascomycota and Zygomycota.
Prescott – 7th edition 635-639
3. What is synchronous growth? Discuss the different ways by which it can be induced. Draw a neat labelled diagram to explain one of the methods.

(2)

Ans: Pg 190-191 Stanier 5thedn

Defn - 1 mk,

Techniques to obtain synchronous culture – induction and selection –2 mks

Helmstetter Cummings method and loss of synchrony --5 mks

Diag -2 mks

QIII. A. Answer briefly any three of the following: (18)

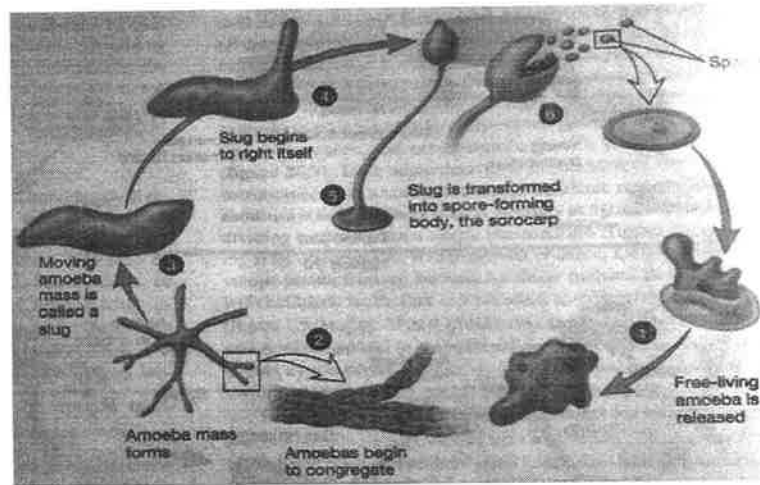
1. Discuss Rickettsia and the role played by arthropod vector in transmission of rickettsial infections
Pelczar 5th edition– 278-79
2. Discuss temperate phage, lysogeny and its significance
Prescott 7th edition -438-439
3. Discuss the viral capsid, its different types, and its function.
Prescott 7th edition -409-412
4. Write a note on : Mycoplasma and L- forms
Pelczar 5th edition– 281-283
5. Discuss the morphology, cell wall, cell membrane and ecology of Archaea.
Prescott 7th edition -503-504
6. Discuss the Streptomyces, their morphology and ecological significance
Brock 12th edn 459-463

Q III B. Do as directed any two of the following: (2)

1. State true or false- The only Rickettsia that can be cultivated in laboratory media is Rochalimaea - ~~False~~ True
2. Name one virus with complex symmetry - poxvirus / *Bacteriophage*
3. Give one example of halophilic archaea – Halobacterium, Halococcus
4. Name one unusual nucleotide base in viral nucleic acids- HMC

Q IV. A. Answer briefly any three of the following: (18)

1. Discuss the role of Algae as primary producers and their use as food.
Pelczar 5th edition– 367-369
2. Diagrammatically explain the structure of *Paramecium*
Pelczar 5th edition– 395
3. Diagrammatically explain the life cycle of cellular slime mold.
(Prescott 7th edition -616



4. Discuss the ecological and commercial significance of fungi

Prescott 7th edition -630

- Important to humans in both beneficial and harmful ways
- Acts as decomposers of organic matter into simple organic and inorganic form and C, N and P are released.
- Cause disease in animal, plants and humans. Give examples.
- Important to industrial process Production of- bread, wine, beer, cheese, soy sauce and Sufu
- Production of Organic acids- citric acid
- Production of Drugs -ergometrine and cortisone
- Production of antibiotics – penicillin and griseofulvin
- Production of cyclosporine
- Research tool for cytologists, geneticists, biochemists, microbiologists.

5. Write a short note on reproduction in Algae.

Pelczar 5th edition– 374-375,

6. Write a short note on different types of asexual spores produced by fungi.

(Prescott 7th edition -632-633)

Asexual reproduction occurs in fungi by – 1) mitosis 2) budding 3) Spore production – Arthrospore, Chlamydo-spore, Sporangiospore, Conidiospore and Blastospore

Q IV B. Do as directed any two of the following:

(2)

1. Microsporidia belong to _____ (slime molds, **fungi**, protozoa)
2. Name the organism producing Agar. - **Gelidium**
3. Give one significance of *Aspergillus*. – pathogenic, preparation of fermented foods.

4. Name the structure used by ciliates to engulf food.- **Cytostome**

QV. A. Answer briefly any three of the following: (18)

1. Discuss the electronic enumeration method of cell numbers. State its disadvantages.

Ans :Pg 128 Prescott 7thedn

2. Write a short note on biofilms

Ans: Pg 143-144 Prescott 7thedn

3. Define balanced and unbalanced growth. How do shift-up and shift-down experiments affect growth?

Ans: Pg 123 Prescott 7thedn

4. How are organisms classified based on their temperature ranges for growth? Discuss giving examples.

Ans :Pg 137-138 Prescott 7thedn

5. Differentiate between the following giving any three valid points:

a. Continuous and batch culture

Ans:

Batch culture	Continuous culture
Nutrient supplies are not renewed	Nutrient supplies are renewed
Wastes are not removed	Wastes are not removed
Exponential growth lasts for only a few generations and stationary phase is soon reached.	A microbial population can be maintained in exponential growth phase for extended periods
No two types specified	Two types- Chemostat and Turbidostat
Growth rate cannot be manipulated as per requirement	Growth rate can be manipulated as per requirement
Study of Microbial growth at very low nutrient concentrations as in natural environments not possible	Study of Microbial growth at very low nutrient concentrations as in natural environments possible

b. Spectrophotometer and Petroff Hausser counter

Ans:

Spectrophotometer	Petroff Hausser counter
A turbidometric method	A microscopic method
Measures cell mass	Measures cell number
Not a counting chamber	A counting chamber with a grid in the centre of the slide

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Based on scattering of light principle	Scattering of light not involved
A larger volume can be sampled	Microbial population should be large since a small volume is to be sampled
Amount of scattering of light is directly proportional to biomass of cells	No scattering of light involved
Cell mass expressed in terms of OD / absorbance	Cell number expressed as number of cells/ml

6. How are plating methods used for enumeration of bacteria? Discuss their advantages and disadvantages. Pg 129-130 Prescott 7th edn

Q V B. Do as directed any two of the following:

(2)

1. Calculate the mean doubling time for a population if its growth rate constant is 2 hr^{-1}

Ans: $g=1/k, =1/2 \text{ hr} = 0.5 \text{ hr} = 30 \text{ min.}$

2. Give an example of an Acidophile.

Ans: *Sulfolobus*, *Picrophilus*, *Ferroplasma*, *Acontium*, *Cyanidium caldarium*

3. A prokaryote which survives large doses of ionising radiations.

Ans: *Deinococcus radiodurans*

4. Name a fluorescent dye used to stain bacteria on a membrane filter.

Ans: Acridine orange

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