

Sl. No. of Ques. Paper : 2039

GC-3

Unique Paper Code : 32581303

Name of Paper : Medical Microbiology

Name of Course : B.Sc. (Hons) Biomedical Sciences (CBCS)

Semester : III

Duration : 3 hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt five questions in all. Question No. 1 is compulsory. Give illustrations and examples wherever required. Subparts of the questions should be attempted together.

1. (a) Identify the scientists from their listed contributions (any four):
- (i) There was a life force that produced spontaneous generation
 - (ii) His research gave series of four generalized principles linking different microorganisms to specific diseases that remain valid today for all infectious diseases
 - (iii) He showed that *Streptococcus pneumoniae* could transform from one strain into a different strain
 - (iv) Was awarded Nobel Prize in Physiology or Medicine in the year 1952 for his discovery of streptomycin, the first antibiotic effective against tuberculosis
 - (v) Recognition of Archae as distinct microbial group. 4×1= 4
- (b) Give one word for the following statements (any five):
- (i) Lowest concentration of the drug that will prevent the growth of the microorganism
 - (ii) Source from which an infectious agent may be disseminated
 - (iii) Chemical agent that destroys or inhibits microorganisms that cause disease
 - (iv) Movement in response to the presence of a chemical
 - (v) Which inclusion body would allow bacteria to float on the surface of water
 - (vi) An attenuated form of *Mycobacteria* used in India as a vaccine for tuberculosis. 5×1 = 5
- (c) State whether the given statement is true or false and justify the statement (any five):
- (i) Identification of an unknown bacteria can be carried out by ribosomal rRNA sequencing.

- (ii) Probiotic drink aids in the digestion in alimentary canal.
- (iii) ID₅₀ for *Campylobacter* sp. is 500 cells and for *Cryptosporidium* is 100 cells, indicating that both the organisms are pathogenic.
- (iv) Penicillin and cephalosporin have a higher therapeutic index than any other antimicrobial.
- (v) A subgroup of a serovar based on biochemical or physiological properties is known as biotype.
- (vi) Bacteria can acquire antibiotic resistance by transformation.
- (vii) Nitrogen and phosphorous need to be added to the beaches following an oil spill in order for the oil-degrading bacteria to grow and clear the spills. 5×1 = 5

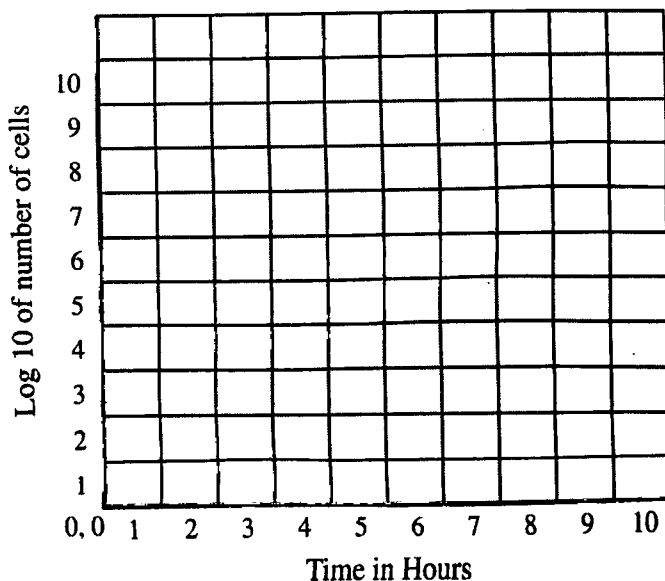
(d) Expand the following acronyms (*any five*):

- | | |
|------------|----------|
| (i) TEM | (ii) NAM |
| (iii) UHT | (iv) SSB |
| (v) FAME | (vi) PFU |
| (vii) MRSA | |

5×1 = 5

2. (a) Illustrate the following sterilization procedures with suitable examples:
Autoclaving, Hot Air and Pasteurization. 3

(b) Draw the following growth curve for *E. coli*, starting with 100 cells, with a generation time of 30 minutes at 35°C, 60 minutes at 20°C and 3 hours at 5°C:



- (i) The cell are incubated for 5 hours at 35°C.
- (ii) After 5 hours, the temperature is changed to 20°C for 1 hour.

- (iii) After 5 hours at 35°C, the temperature is changed to 5°C for 2 hours followed by 35°C for 5 hours. 6

Or

At 10^{-6} dilution of log phase culture, 100 μ l is spread plated on enriched medium and 50 colonies were observed. Find the total number of bacterial cells in 100 ml of the log phase culture.

- (c) Explain how different microbes exhibit different growth responses in the presence of oxygen. 5

3. Differentiate between the following:

- (a) Virion and Prion
 (b) Natural and Artificial Competence
 (c) Gram positive and Gram negative flagella
 (d) Mechanism of action of penicillin and lysozyme on cell wall. $4 \times 3.5 = 14$

4 (a) A teenage male had a history of colitis. He had been treated with parenteral nutrition and pain medication. He had to be admitted because of abdominal discomfort and erythema at the exit site. The doctors suspect Staphylococcus poisoning.

Answer the following questions:

- (i) Investigative test to confirm this diagnosis
 (ii) Pathogenesis of the disease. 4
 (b) Describe different inclusion bodies present in bacteria. 5
 (c) Design an interrupted mating experiment using Hfr and F (minus) conjugation to study sequence of gene entry into recipient cells. Draw illustration to justify your answer. 5

5. (a) Give the causative agents, symptoms, life cycle and etiology of HIV. 6

(b) Write the mechanism of the following drugs:

- (i) Amphotericin-B
 (ii) Erythromycin
 (iii) Chloramphenicol
 (iv) Acyclovir 8

6. Write short notes on (any *four*):
- (i) One Step Growth Curve of Bacteriophage
 - (ii) Plasmids in bacteria
 - (iii) Nosocomial Infection
 - (iv) Infection caused by *Candida*
 - (v) Pasteurization.

4×3.5 = 14