NRT/KS/19/2060

Bachelor of Science (B.Sc.) Semester–II Examination

BIO-CHEMISTRY (Microbiology & Immunology)

Optional Paper–2

Time : Three Hours] [Maximum Marks : 50

N.B. :— (1) All questions are compulsory and carry equal marks.

(2) Draw diagrams wherever necessary.

1. What are the basic nutritional requirements needed for bacterial growth in a culture medium ? 10

OR

What are enrichment cultures ? How can we use an enrichment culture media to isolate a particular bacteria ? Explain using example. 10

2. Write notes on :

(a) Factors influencing anti microbial activity. 5

(b) Mechanism of cell injury. 5

OR

(c) Antibiotics and its uses. 5

(d) Standardization of disinfectants. 5

3. Write notes on :

(a) Bone marrow. 2½

(b) Active and passive immunity. 2½

(c) Antigen and Antibody reaction. 2½

(d) Functions of antibody. 2½

OR

Describe the general properties of different types of antibodies. 10

4. What is complement system ? How does it get activated ? 10

OR

Write notes on :

(a) Clonal selection theory. 5

(b) Hybridoma technology. 5

5. Answer any **ten** questions from the following :

(i) What are the components of nutrient agar medium ?

(ii) What are phototrophs ?

(iii) What is a differential medium ?

(iv) Define sanitizer.

(v) What is meant by oligodynamic action of metals ?

(vi) Name one metal having antimicrobial activity.

(vii) Why is Bone marrow important for immune system ?

(viii) Expand the term MHC.

(ix) T_c-cell recognizes which class of MHC molecules ?

(x) What are monoclonal antibodies ?

(xi) Which complement pathway is activated by antibodies ?

(xii) Which cells give humoral immunity ? 10

Bachelor of Science (B.Sc.) Semester—II (C.B.S.) Examination

MICROBIOLOGY (Microbial Techniques)

Compulsory Paper—2

Time : Three Hours] [Maximum Marks : 50

Note :— (1) **All** questions are compulsory.

(2) Draw well labelled diagrams.

(3) All questions carry equal marks.

1. Discuss principles and working of transmission electron microscopy with well labelled ray diagram. 10

OR

Describe various components of Bright field microscopy and its functions along with ray diagram. 10

2. Discuss principle and working of fluorescent microscopy along with ray diagram. 10

OR

Discuss principle and application of phase contrast microscopy along with well labelled ray diagram. 10

3. (a) Explain principle and procedure of gram staining. 5

(b) Give the procedure of spore staining. 5

OR

(c) Write a note on physical and chemical theories of staining. 5

(d) Describe principle and procedure of flagella staining. 5

4. (a) How pure culture can be obtained by serial dilution method ? 2½

(b) Discuss auxanographic technique for carbon requirement. 2½

(c) Describe Breed's method. 2½

(d) Describe Coulter counter method. 2½

OR

Write short notes on :

(e) Measurement of bacterial growth by turbidity. 2½

(f) Helmstetter Cumming apparatus 2½

(g) Streak plate method 2½

(h) Single cell isolation technique 2½

5. Solve any **TEN** :

(i) Define resolving power.

(ii) Give any two limitation of SEM.

(iii) Give one application of dark field microscopy.

(iv) What is cantilever ?

(v) Give two limitation of Atomic Force Microscopy.

(vi) Give any one application of fluorescent microscopy.

(vii) What is negative staining ?

(viii) Enlist the stains used in acid fast staining.

(ix) Define chromophore group.

(x) What is CFU ?

(xi) What is the significance of replica plate technique ?

(xii) What are the major disadvantage of direct method of cell counting ? 1×10=10

NKT/KS/17/5091

Bachelor of Science (B.Sc.) Semester—II (C.B.S.) Examination
MICROBIOLOGY
Compulsory Paper—2
(Microbial Techniques)

Time : Three Hours] [Maximum Marks : 50

N.B. :— (1) **ALL** questions are compulsory and carry equal marks.

(2) Draw diagrams and give suitable examples wherever necessary.

1. Differentiate between TEM and SEM along with their ray diagrams. 10

OR

Describe various components of Bright field microscope along with their functions. Give ray diagram of bright field microscopy. 10

2. Explain the principle and working of fluorescent microscope. Write its applications. 10

OR

Discuss phase contrast microscopy. Draw well labelled ray diagram. 10

3. (a) Write the principle and procedure of endospore staining. 5

(b) Describe the principle and procedure of acid fast staining. 5

OR

(c) Write the principle and procedure of Gram staining. 5

(d) Describe the principle and procedure of flagella staining. 5

4. (a) How streak plate technique is performed for isolation of pure culture ? 2½

(b) What is Coulter counter technique ? Write its limitations. 2½

(c) Explain synchronous culture technique. 2½

(d) Explain replica plating technique. 2½

OR

(e) Describe pour plate method for measurement of growth. 2½

(f) Explain Breed's method. Write its limitations. 2½

(g) Write a note on single cell isolation technique. 2½

(h) Describe Auxanographic technique. 2½

5. Solve any **TEN** questions :—

(i) Define numerical aperture. 1

(ii) Write application of dark field microscopy. 1

(iii) Why oil is used along with oil immersion lens ? 1

(iv) What is the role of phase shifting plate in phase contrast microscope ? 1

(v) What is the function of excitation filter ? 1

(vi) Give two applications of atomic force microscopy. 1

(vii) What is auxochrome ? 1

(viii) Name the stain used in negative staining of capsule. 1

(ix) Define acidic and basic dyes. 1

(x) What is pure culture ? 1

(xi) Name any two methods for cell mass determination. 1

(xii) Name any two special media used for isolation of pure culture. 1

NRT/KS/19/2058

Bachelor of Science (B.Sc.) Semester—II Examination

MICROBIOLOGY (Microbial Techniques)

Optional Paper—2

Time : Three Hours] [Maximum Marks : 50

N.B. :— (1) **All** questions are compulsory and carry equal marks.
(2) Draw diagrams wherever necessary.

1. Discuss principle and working of TEM with well labelled ray diagram. 10

OR

Describe various components of Bright field microscopy and its functions along with ray diagram. 10

2. Discuss principle and working of fluorescent microscopy along with ray diagram. 10

OR

Discuss principle and working of phase contrast microscope with ray diagram. 10

3. (a) Explain principle and procedure of Gram Staining. 5
(b) Give the procedure of spare staining. 5

OR

(c) Explain physical and chemical theories of staining. 5
(d) Describe principle and procedure of flagella staining. 5

4. (a) Describe auxanographic technique for determination of carbon requirement. 5
(b) Describe Coulter Counter method. 5

OR

Write short notes on :

(c) Synchronous culture 5
(d) Single cell isolation method. 5

5. Solve any **TEN** of the following :
(a) Define resolving power. 1
(b) Give any two limitations of SEM. 1
(c) Give one application of dark field microscopy. 1
(d) What is cantilever ? 1
(e) Give any two applications of Atomic Force Microscopy. 1
(f) Give applications of fluorescent microscopy. 1
(g) What is negative staining ? 1
(h) Enlist the stains used in acid fast staining. 1
(i) Define chromophore group. 1
(j) What is CFU ? 1
(k) Give one significance of Replica Plating. 1
(l) Give limitation of measurement of growth by turbidity. 1