D 93941 (Pages : 3) Name.....

Reg. No.....

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION, NOVEMBER 2020

Microbiology

MBG 1C 02—BIOSTATISTICS—I

(2019 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answer Type Questions)

Answer at least **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 24.

1. What is meant by data on ratio scale and ordinal scale ?
2. What is meant by population ?
3. What is meant by parameter ?
4. What is histogram ?
5. Define median and mode.
6. In a survey of sleep apnea scores among 10 persons, the highest value obtained is 58. But it was wrongly recorded as 85. What is the effect of this error on mean and median ?
7. The mean hemoglobin of a group of pregnant females is 10.6 gm/dL with a variance of 4 gm/dL. What is the co-efficient of variation the group ?
8. If the birth weight of each of the 10 babies born in a hospital in a day are found to be 2.8 kg. What is the standard deviation of this sample ?
9. Give mathematical definition of probability.
10. State addition theorem of probability for two events.
11. Which was the best distribution to study the daily admission of head injury patients in a trauma care center ?
12. Define *t* - distribution.

(8 × 3 = 24 marks)

Turn over

Section B (Short Essay/Paragraph Type Questions)

Answer at least **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

13. Write short notes on : (i) Frequency distribution, (ii) Histogram ; (iii) Frequency polygon ; and (iv) Frequency curve.

14. The total sale(in '000 rupees) of a particular item in a shop , on 10 consecutive days, is reported by a clerk , 35.00, 29.6, 38.00, 30.00, 40.00, 41.00, 42.00, 45.00, 3.60 and 3.80. Calculate the mean. Later it was found that there was a number 10.00 in the machine and reports of 4^{th} and 8^{th} days were 10 more than the true values and in the last two days he puts the decimal in the wrong place thus 3.60 was really 36.0 and 3.80 was 38.0. Calculate the true mean.

15. For following distribution of marks of 70 students in a class, obtain the mean and median :

Marks	10-20	20-30	30-50	50-60	60-70
No. of students	4	16	30	18	2

16. The diastolic blood pressure of 9 patients is given by 83, 75, 81, 79, 71, 95, 75, 77 and 84. Find the mean deviation about median.

17. A town has two doctors A and B operating independently. If the probability that doctor A is available is 0.9 and that for B is 0.8. What is the probability that at least one doctor is available when needed ?

18. You need eggs to make omelets for breakfast. You find a dozen eggs in the refrigerator, but do not realize that two of them are rotten. What is the probability that of the four eggs you choose at random : (i) none is rotten ; and (ii) exactly one is rotten ?

19. Explain the procedure of fitting the Poisson distribution.

(5 × 5 = 25 marks)

Section C (Essay Type Questions)

Answer any **one** *question.*
The question carries 11 *marks.*

20. The following are the marks scored by two students A and B in a series of tests :

A	55	46	60	48	56
B	65	60	72	58	75

Find out whose performance is more consistent.

21. (i) A hospital switch board receives an average of 4 emergency calls in a 10 minutes interval. What is the probability that : (a) there are at the most 2 emergency calls in a 10-minutes interval ? (b) There are exactly 3 emergency calls in a 10 minutes interval ?

(ii) If the skulls are classified as A, B and C according as the length - breadth index is under 75, between 75 and 80 and over 80. Assuming that the distribution is normal with mean 74.4 and standard deviation 3.2, find the probability that a series skulls are of type B.

(1 × 11 = 11 marks)

D 93940 **(Pages : 2)** **Name.....**

Reg. No.....

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2020

Microbiology

MBG 1C 01—GENERAL MICROBIOLOGY

(2019 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A

Answer at least **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 24.

Comment on the following :

1. Spontaneous generation theory.
2. Sphaeroplast and protoplast.
3. Phenol co-efficient.
4. HEPA filter.
5. Pili.
6. Plasmid.
7. Inspissation.
8. Fluorescent dyes.
9. Negative staining.
10. Edward Jenner.
11. Capsule.
12. TEM.

(8 × 3 = 24 marks)

Turn over

Section B

Answer at least **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

Write briefly :

13. Physical methods of control of micro-organisms.
14. Bacterial cell wall.
15. Contributions of Louis Pasteur to microbiology.
16. Gram staining.
17. Bacterial cell membrane.
18. Cytoplasmic inclusions in bacteria.
19. Chemical agents for control of micro-organisms.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*
The question carries 11 *marks.*

20. Describe the structure of endospore. Explain the staining technique for visualisation of endospore.
21. Discuss about the various types of microscopes.

(1 × 11 = 11 marks)

D 93939 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2020

Microbiology

MBG 1B 01—GENERAL MICROBIOLOGY

(2019 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A

Answer at least **eight** *questions.*

Each question carries 3 *marks.*

All questions can be attended.

Overall Ceiling 24.

Comment on the following :

1. Simple staining.
2. Sphaeroplast and protoplast.
3. Pili.
4. Carbol fuchsin.
5. Metachromatic granules.
6. Nucleoid.
7. Resolving power.
8. Mesosomes.
9. Phenol co-efficient.
10. Spontaneous generation.
11. Peptidoglycan.
12. Edward Jenner.

(8 × 3 = 24 marks)

Section B

Answer at least **five** *questions.*

Each question carries 5 *marks.*

All questions can be attended.

Overall Ceiling 25.

Write briefly :

13. Archaebacteria and Eubacteria.
14. Shapes and arrangements of bacteria.
15. Grams staining.
16. Contributions of Robert Koch in microbiology.
17. Bacterial cell membrane.
18. Electron microscope.
19. Halogens.

(5 × 5 = 25 marks)

Section C

Answer any **two** *questions.*

The question carries 11 *marks.*

20. Differentiate between Prokaryotes and Eukaryotes.
21. Discuss various physical methods of control of micro-organisms.

(1 × 11 = 11 marks)

D 93827 (Pages : 3) Name.....

Reg. No.....

FIRST SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION NOVEMBER 2020

Microbiology

MBG 1C 01—GENERAL MICROBIOLOGY

(2018 Admissions)

Time : Three Hours Maximum : 64 Marks

Part A

Answer **all** *questions.*
Each question carries ½ mark.

Fill in the blanks :

1. Swan necked flask experiment was performed by ————.
2. ———— is the mordant used in Gram's staining.
3. The antibiotic penicillin was discovered by ————.
4. Unstained micro-organisms can be better observed by ———— microscopy.
5. Spherical shaped bacteria are known as ————.
6. An agent that kills specifically bacteria is known as ————.
7. ———— is the portion of a bacterial cell consisting of the cytoplasmic membrane and the cell material bounded by it.
8. Ionizing radiation to sterilize materials which do not raise the temperature used is called ————.
9. Mycobacteria have ———— which is a fatty acid in their cell wall ?
10. Bacterial cell wall is made up of ————.
11. Bacterial flagella is made up of proteins called ————.
12. In negative staining technique ———— dyes are used.

(12 × ½ = 6 marks)

Part B

Answer **all** *questions.*
Each question carries 2 *marks.*

Comment on the following :

13. Flagella staining.
14. Archaebacterial cell wall.
15. TEM.
16. Acid alcohol in Ziehl - Neelsen staining.
17. HEPA filter.
18. Bacterial capsule.
19. Plasmid.
20. Joseph Lister.
21. Lysozyme.
22. Dipicolinic acid.

(10 × 2 = 20 marks)

Part C

Answer any **six** *questions.*
Each question carries 3 *marks.*

Write briefly :

23. Cytoplasmic inclusions in Prokaryotes.
24. Contributions of Robert Koch to microbiology.
25. Structure of bacterial cell membrane.
26. Dark field microscope.
27. Physical agents for control of micro-organisms.
28. Endospore staining.
29. Gaseous agents for sterilisation.
30. Structure and arrangements of bacterial flagella.

(6 × 3 = 18 marks)

Part D

Answer any **two** *questions.*

Each question carries 10 *marks.*

31. Differentiate between the cell wall structure of Gram positive and Gram negative bacteria.Explain the principle and procedure of Gram's staining.

32. Discuss various chemical methods of control of micro-organisms.

33. Discuss microscopy and its different types.

(2 × 10 = 20 marks)

D 93828 **(Pages : 3)** **Name**.....

Reg. No.....

FIRST SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2020

Microbiology

MBG 1C 02—BIOSTATISTICS—I

(2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Use of Calculator is permitted.

Section A

Answer **all** *questions in* **one word**.
Each question carries ½ mark.

1. The most suitable method for collecting information in distributive experiment is ————————.
2. Color of a shirt in a store is a ———————— scale of measurement.
3. The middle value of an array of ordered observation is ————————.
4. With the help of Ogivesone can determine ———————— measure of central tendency.
5. The probability that a leap year will have 53 Sundays is ————————.
6. Standard deviation is ———————— of variance.
7. For a normal distribution $N(\mu,\sigma)$, the area to the left of $X = \mu$ is ————————.

Write True *or* False :

8. Marks in a test paper is a quantitative variable.
9. Pie diagram is a one dimensional diagram.
10. Standard deviation is the most unstable measure of dispersion.
11. If A and B are mutually exclusive events then $P(A \cup B) = P(A) + P(B)$.
12. If X is a binomial random variable with probability of success p then variance is $np(1-p)$.

(12 × ½ = 6 marks)

Turn over

Section B

Answer **all** *questions in* **one sentence** *each.*
Each question carries 2 *marks.*

13. Distinguish between inclusive and exclusive classification.
14. Define Sampling.
15. What is cumulative frequency table ?
16. Define mode for a grouped frequency table.
17. Find mode if mean = 30 and median = 27.
18. Define Mean Deviation.
19. Define Classical probability.
20. Define Multiplication theorem for two events.
21. Define Poisson distribution.
22. Define F distribution.

(10 × 2 = 20 marks)

Section C

Answer any **six** *questions.*
Each question carries 5 *marks.*

23. Define a Histogram. Briefly explain the steps involved in constructing the histogram.
24. What is meant by qualitative classification ? Explain briefly with example.
25. For the following data calculate QD :

X	10	20	30	40	50	60
f	8	14	18	23	28	9

26. Find the co-efficient of variation for the following data :

Class	0–10	10–20	20–30	30–40
f	1	3	4	2

27. Define Standard Deviation ? What are the advantages and disadvantages of standard deviation.
28. For a random variable X having binomial distribution with mean = 4 and variance = 4/3 find P (X = 0).

29. Define a Normal Distribution. What are the merits and demerits of Normal Distribution.

30. Write a short note on Chi-square distribution.

(6 × 5 = 30 marks)

Section D

Answer any **two** *questions.*
Each question carries 12 *marks.*

31. a) Distinguish between primary and secondary data.

b) Calculate the median for the following data :

Class	0–10	10–20	20–30	30–40	40–50	50–60
f	7	15	25	24	20	9

(4 + 8 = 12 marks)

32. a) Define probability density function of a discrete random variable. Give its properties.

b) Out of 8000 families with 4 children each, what percentage would you expect to have (i) 2 boys and 2 girls (b) at least one boy (c) no girls. Assume equal probabilities for boys and girls. (Use Binomial distribution)

(4 + 8 = 12 marks)

33. a) Give the properties of Chi-square distribution.

b) Find the mean deviation about mean for the following distribution :

Class		0–10	10–20	20–30	30–40	40–50	50–60	60–70
f	:	4	6	10	20	10	6	4

(3 + 9 = 12 marks)

[2 × 12 = 24 marks]

D 34327 (Pages : 3) Name.....

Reg. No.....

FIRST YEAR B.Sc. (NURSING) DEGREE [SUPPLEMENTARY] EXAMINATION, OCTOBER 2017

Paper III—MICROBIOLOGY

(2007 Admissions)

Time : Two Hours and a Half Maximum : 75 Marks

I. Multiple choice questions :

1 Robertson cooked meat broth is an example of :

(a) Enriched media. (b) Differential media.

(c) Enrichment media. (d) Anaerobic media.

2 Which is the antibody that crosses the placenta ?

(a) IgA. (b) IgE.

(c) IgG. (d) IgM.

3 Which of the following bacteria causes food poisoning ?

(a) Salmonella typhi (b) Clostridium perfringens.

(c) Vibrio cholerae. (d) Shigella sonnei.

4 Black water fever is a manifestation of infection with :

(a) Plasmodium vivax. (b) Plasmodium malariae.

(c) Plasmodium ovale. (d) Plasmodium falciparum.

5 Which of the following fungi causes opportunistic mycosis ?

(a) Sporothrix. (b) Aspergillus.

(c) Histoplasma. (d) Trichophyton.

6 Which of the following reagents is used for microscopic examination of fungi ?

(a) Potassium hydroxide. (b) Calcium hydroxide.

(c) Sodium hydroxide. (d) Sodium chloride.

7 Which of the following is a dry heat method of sterilization ?

(a) Incineration. (b) Inspissation.

(c) Pasteurization. (d) Tyndallization.

8 Which of the following is a Gram negative cocci ?

(a) Pneumococci. (b) Staphylococci.

(c) Gonococci. (d) Enterococci.

9 Which of the following is not a normal commensal of skin ?

(a) Diphtheroids. (b) Candida.

(c) Hemophilus. (d) Staphylococcus epidermidis.

10 Which of the following nematodes enters human body through contaminated food and water ?

(a) Wuchereria. (b) Ascaris.

(c) Onchocerca. (d) Dirofilaria.

(10 × 1 = 10 marks)

II. Match the following :

1 Acid fast bacilli	(a) Dengue.
2 Yersinia	(b) Haemophilus influenzae.
3 urethral swab	(c) Plague.
4 NS1 Antigen	(d) Gonococci.
5 Satellitism	(e) Mycobacterium leprae.

(5 × 1 = 5 marks)

III. Define the following :

1 Opportunistic fungi.

2 Passive immunity.

3 Antibody.

4 Zoonosis.

5 Pasteurization.

(5 × 1 = 5 marks)

IV. List the following :

1 Four nematodes inhabiting intestine.

2 Four agents causing food poisoning.

3 Four agents causing congenital infection.

4 Four gram negative bacilli.

5 Four antigen antibody reactions.

(5 × 2 = 10 marks)

V. Give reasons for the following :

1 Gastric lavage is collected from children to rule out pulmonary TB.

2 Blood for culture should not be drawn from an indwelling catheter.

3 Urine should not be collected from the bag from a patient on Foleys catheter

4 Specimens for culture should be collected before antibiotic therapy.

5 Viruses do no grow on artificial culture media.

(5 × 1 = 5 marks)

VI. Differentiate between :

(a) Sterilization and disinfection.

(b) Active immunity and passive immunity.

(c) Live vaccine and killed vaccine.

(d) Carrier and vector.

(e) Agglutination test and precipitation test.

(5 × 2 = 10 marks)

VII. Write short answers on any *three* :

1 Hospital acquired infections.

2 Prophylaxis of Rabies.

3 Microfilaria.

4 Blood culture.

5 Lab diagnosis of Hepatitis B.

(3 × 5 = 15 marks)

VIII. A 28-year old male was admitted to the hospital with complaints of low grade fever, loss of weight and appetite and chronic cough with expectoration for past 6 months.

(a) What is your provisional diagnosis ?

(b) Describe the pathogenesis of this condition.

(c) What are the specimens collected for lab diagnosis and describe the method of collection ?

(d) Describe the methods for microscopic examination.

(e) Name the commonly used media for culture.

(f) Add a note on treatment and prophylaxis.

D 93825 (Pages : 4) Name.....

Reg. No.....

FIRST SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION NOVEMBER 2020

Microbiology

MBY 1C 01—GENERAL MICROBIOLOGY

(2014 Admissions)

Time : Three Hours Maximum : 64 Marks

Part A

Choose the appropriate and answer the following :

1. A bacillus-shaped bacterium that is exponentially growing, obligately aerobic and motile.

   a) Would likely display the staph cell grouping.

   b) Would have perpendicular division planes.

   c) Regardless of whether it was Gram (+) or Gram (–) would use its cytoplasmic membrane as its permeability barrier.

   d) Two of the above.

2. When a bacterium has a sex pilus ?

   a) The pilin subunits of the pilus will be coded for by genes on the sex factor.

   b) You can assume the bacterium is Gram (–).

   c) The cell will use the pili to recognize and attach to cells without sex pili (female cells).

   d) All of the above.

3. A typical Gram (+) bacterial cell could change its antigenic mosaic by which of the following methods ?

   a) By using or modifying teichoic acid attached to its peptidoglycan or by producing a simple polysaccharide capsule.

   b) By producing different O antigen side chains on its lipopolysaccharide.

   c) By decreasing or increasing the number of porins in its outer membrane.

   d) Two of the above.

4. A bacterium's shape :

   a) Is generally considered most typical during exponential growth.

   b) Is a function of its peptidoglycan composition.

   c) Will be either a coccus or a bacillus.

   d) May be maintained during protoplast formation.

5. Bacterial cells in a medium supporting a doubling time of 45 minutes :

   a) Would have I, C, and D periods of 45 (I), 40 (C) and 20 (D) minutes.

   b) Would be larger than cells in a medium supporting a doubling time of 20 minutes.

   c) Could be made into spheroplasts, but only if they are Gram (+).

   d) Two of the above.

6. Koch's postulates :

   a) Are the basis of the current debate over teaching evolution in public schools.

   b) Were developed by Pasteur but name after Koch because of international treaty.

   c) Describe a series of four ordered steps which must be completed to identify the specific etiological agent of an infectious disease.

   d) Two of the above.

7. Bacteria which form chains :

   a) Have parallel division planes.

   b) Could be cocci.

   c) Obviously have a form of cell-cell attachment capable of withstanding tremendous hydrodynamic and other shear forces.

   d) All of the above.

8. The chromosome of an Escherichia coli infected with a virulent virus like T-4 :

   a) Is the physical location of promoters recognized by RNA polymerase modified by virus sigma.

   b) Is a covalently-closed double stranded DNA molecule, and is degraded by virus nuclease.

   c) Contains the genes coding for virus lysozyme.

   d) All of the above.

9. The peptidoglycan precursor :

   a) In a Gram (+) bacterium consists of N-Acetyl Muramic Acid, N-Acetyl Glucosamine, L -Alanine, D-Glutamic Acid, L -lysine, D-Alanine and D- Alanine.

   b) Is manufactured within the cytoplasm via action of autolytic enzyme, transpeptidase, and carboxylase.

   c) Has a composition that is dependent upon the morphology of the cell.

   d) Two of the above.

10. True (A) False (B) During the eclipse phase of T-4 virus replication, multiple copies of host DNA are replicated and inserted into newly synthesized virus heads.

11. True (A) False (B) In general, binary fission occurs more rapidly in respiring organisms than in fermenting organisms.

12. True (A) False (B) Chemoheterotrophic micro-organisms generate ATP, reducing power, and intermediates through photosynthesis, or fermentation and respiration.

(12 × ½ = 6 marks)

Part B

Write a short note on :

13. What is spontaneous generation ?

14. Define and explain Putrefaction.

15. Note on Fermentation.

16. Define Exponential phase of growth curve.

17. What is Differential media ?

18. Principle of Fuelgen Staining.

19. What is Generation Time ?

20. Define Viruses.

21. Principle of Sterilization and Disinfectant.

22. Selective media.

(10 × 2 = 20 marks)

Part C

Answer in brief any **six** *questions.*

23. Label and explain phylogenic tree.

24. Explain eight Cytoplasmic inclusions of bacteria and their function.

25. Differentiate Pili *vs.* fimbriage.

26. Differentiate chemosynthesis vs photosynthesis mention the reaction.

27. Differentiate SEM *vs.* TEM.

28. Note on nuclear material.

29. Give the disadvantages of plate count.

30. Dramatically represent bacterial cell wall of gram positive and gram negative note down its function.

(6 × 5 = 30 marks)

Part D

Answer in detail any **two** *questions.*

31. Pure culture isolation from a soil sample.

32. Brief note on ultra-structure of bacteria.

33. TEM.

(2 × 12 = 24 marks)

D 93791 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER B.A./B.Sc. DEGREE EXAMINATION, NOVEMBER 2020

(CUCBCSS)

Microbiology

MBG 1B 01—GENERAL MICROBIOLOGY

(2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries ½ mark.

1. The cell wall deficient eubacteria are called ————.
2. ———— is the mordant in Gram staining technique.
3. The term vaccine was coined by ————.
4. Gamma rays can sterilize packed items. True *or* false ?
5. The ocular lens in a light microscope is otherwise known as ————.
6. The first vaccine was developed by ————.
7. Yeasts belong to the group of unicellular ———— organisms since they have true nuclei.
8. Name the method to stain bacterial endospore using malachite green.
9. Peplomers are also known as ————.
10. Cocci arranged in chains are called ———— and that in clusters is known as ————.
11. Name a gaseous sterilant.
12. ———— discovered tubercle bacilli.

(12 × ½ = 6 marks)

Part B

Answer **all** *questions.*
Each question carries 2 marks.

Comment on the following :

13. Sergei Winogradsky.
14. Membrane filters.
15. Mesosomes.
16. Negative staining.

Turn over

17. Archaebacteria.
18. Fimbriae.
19. Alexander Flemming.
20. Capsid symmetry.
21. Actinomycetes.
22. Transmission electron microscope.

(10 × 2 = 20 marks)

Part C

Answer any **six** *questions.*
Each question carries 5 *marks.*

Write briefly on the following :

23. Morphology of fungi.
24. Beneficial micro organisms.
25. Dry heat sterilization.
26. Phase contrast microscopy.
27. Steps in formation of bacterial endospore.
28. Differentiate between prokaryotes and eukaryotes.
29. Structure of a typical bacterial cell.
30. Spontaneous generation versus biogenesis.

(6 × 5 = 30 marks)

Part D

Answer any **two** *questions.*
Each question carries 12 *marks.*

31. Describe the structure and of an autoclave with a diagram. Add a note on its working and applications.
32. Differentiate Gram positive and Gram negative cell walls with the help of diagrams. How archebacterial cell wall is different from these ?
33. Explain any two differential and any two special staining methods used in Microbiology.

(2 × 12 = 24 marks)

D 93790 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER B.A./B.Sc. DEGREE EXAMINATION NOVEMBER 2020

(CUCBCSS)

Microbiology

MBY 1B 01—GENERAL MICROBIOLOGY

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *the questions.*

Each question carries ½ mark.

1. The protein coat that encloses the viral genetic material is ———.
2. ——— discovered vaccination for small pox using cowpox vaccine.
3. Exciter filter and barrier filter are used in ——— microscope.
4. Give an example for basic stain.
5. ——— is an instrument designed to use steam under regulated pressure for sterilization.
6. Cold sterilization refers to the use of ——— for sterilization.
7. Air filter used in laminar air flow cabinets is ———.
8. Bactericidal activity of alcohols is due to ———.
9. Feulgen staining is used for the demonstration of ———.
10. ——— compounds are used in water treatment as an antimicrobial agent.
11. Destruction of micro-organisms by burning is called ———.
12. Nitrogen fixing bacteria in soil was discovered by ———.

(12 × ½ = 6 marks)

Part B

Answer **all** *the questions.*

Each question carries 2 marks.

13. Trichomes.
14. Capsule staining.

Turn over

15. Resolving power.

16. TDT.

17. Phages.

18. Dark field microscope.

19. Phenol coefficient.

20. Formaldehyde as an antimicrobial agent.

21. Fractional sterilization.

22. Autoclave.

(10 × 2 = 20 marks)

Part C

Answer any **six** *questions.*

Each question carries 5 *marks.*

23. Explain the working principle and uses of phase contrast microscope.

24. List the major contributions of Louis Pasteur to microbiology. Add a note on pasteurization.

25. What is dry heat sterilization ? Explain the working principle of hot air oven.

26. Differentiate between prokaryotes and eukaryotes.

27. Comment on the different morphological forms of bacteria giving examples.

28. Give an account on gaseous agents for sterilization.

29. Write a short note on Archaebacteria.

30. Write on filtration techniques as a physical method of sterilization.

(6 × 5 = 30 marks)

Part D

Answer any **two** *questions.*

Each question carries 12 *marks.*

31. What is the principle of staining ? Write a note on the different staining methods used in microbiology laboratory.

32. Explain in detail the use of various chemicals and radiations as antimicrobial agents.

33. List the major contributions of Robert Koch, Alexander Fleming and Edward Jenner to Microbiology.

(2 × 12 = 24 marks)