C 3560 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2021

Microbiology

MBG 4C 09—C-LANGUAGE, DATABASE MANAGEMENT SYSTEM AND SQL

Time : Two Hours Maximum : 60 Marks

Section A (Short Answer)

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

1. Discuss Arithmetic Expression.
2. Write the general syntax of assigning values to a variable.
3. What is operator precedence ?
4. How will you declare a multidimensional array ?
5. What is the use of typedef statements ?
6. Explain any two data models.
7. How will you insert a record into the relation ?
8. What are weak entity sets ?
9. Define Foreign key.
10. What is a Query ?
11. Define DDL.
12. Write the role of DBA.

(8 × 3 = 24 marks)

Turn over

Section B (Paragraph)

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

13. Write an algorithm to find the largest among three numbers.
14. Write a note on break and continue statements.
15. How will you declare and initialize an array ? Explain with an example.
16. What is type casting ? Explain with an example.
17. Write a note on transaction management.
18. Write the design issues in ER model.
19. What are aggregate functions ? Explain its significance with suitable examples.

(5 × 5 = 25 marks)

Section C (Essay)

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

20. Discuss various relational algebra operations in detail.
21. Compare and contrast while and do..while loops in detail.

(1 × 11 = 11 marks)

C 3559 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION, APRIL 2021

Microbiology

MBG 4C 04—IMMUNOLOGY AND MEDICAL MICROBIOLOGY

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.

1. Epidemic disease.
2. Tetanospasmin.
3. Septicemia.
4. Epitope.
5. Piedra.
6. Ig A.
7. Infant botulism.
8. Secondary infection.
9. Exfoliative toxin.
10. Thymus independant antigens.
11. Syphilis.
12. Rabies virus.

(8 × 3 = 24 marks)

Section B

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

13. Discuss the clinical features of type A hepatitis and type B hepatitis.
14. List the different sources of infection. Explain.
15. Explain the pathogenesis and clinical features of Cholera.
16. List the different classes of immunoglobulins. Write their features and functions.
17. Discuss the different types of infections.

Turn over

18. Write the clinical features of HIV infection.

19. Give an account on superficial mycoses.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*

Each question carries 11 *marks.*

20. Explain the pathogenesis and clinical features of pulmonary tuberculosis. Add a note on its treatment.

21. Give an account on emerging viral diseases. Write briefly on Dengue fever and Swine flu.

(1 × 11 = 11 marks)

C 3558 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION APRIL 2021

Microbiology

MBG 4B 04—SOIL AND AGRICULTURAL MICROBIOLOGY

Time : Three Hours Maximum : 80 Marks

Section A (Short Answer Type)

Answer at least **ten** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 30.

1. Phyllosphere.
2. Wilting.
3. Morphological resistance.
4. Nitrifying bacteria.
5. Amensalism.
6. Nematophagus fungi.
7. Symbiont.
8. Humus and its importance.
9. Frankia.
10. Azolla - anabaena.
11. Endomycorrhiza.
12. Ruminant bacteria.
13. Predation.
14. Causative agent of tomato wilt.
15. Azotobacter.

(10 × 3 = 30 marks)

Section B (Short Essay Type)

Answer at least **five** *questions.*
Each question carries 6 *marks.*
All questions can be attended.
Overall Ceiling 30.

16. Explain nitrogen fixation by rhizobium.
17. Biopesticides and their advantages.
18. Explain the role of microbes in carbon cycle.
19. Ruminant microbes and their role.
20. Agronomic practices.
21. Explain papaya ring spot and its control measures.
22. Non symbiotic associations.
23. Types of soil microorganisms.

(5 × 6 = 30 marks)

Section C (Essay questions)

Answer any **two** *question.*
Each question carries 10 *marks.*

24. Explain various factors affecting microbes in soil.
25. Explain different mycorrhizal associations and their significance.
26. Explain nitrogen cycle.
27. Explain different microbe - microbe interactions.

(2 × 10 = 20 marks)

C 2225 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, APRIL 2021

Microbiology

MBG 4C 09—C-LANGUAGE, DATABASE MANAGEMENT SYSTEM AND SQL

(2018 Admissions)

Time : Three Hours Maximum : 64 Marks

Part A (Objective / One word / Fill in the blanks)

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

1. Give the flow chart symbol for decision making.
2. ———— is an example of bit wise operator.
3. What will be the value of i after executing the following code : i = 0 ; for (j = 1; j<5; j++) i++;
4. ———— statement is used to terminate the execution of a loop and move to the next statement.
5. Write the data declaration statement for an integer array of 100 elements.
6. Write the C key word for converting an integer to floating point.
7. ———— operator is used to get the value of a pointer variable.
8. A relational database stores data in the form of a ————.
9. Select appropriate word from the bracket: The (INNER, OUTER) ———— JOIN selects all rows from both the tables as long as the condition is satisfied.
10. The normalization of 1NF relations to 2NF involves the removal of ————.
11. Give the SQL command for deleting a column in a table.
12. ———— statement is used to modify the existing records in a table.

(12 × ½ = 6 marks)

Part B (Short Answer Type Questions)

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

13. Differentiate between long and unsigned integers.
14. Explain the syntax of 'scanf.
15. Differentiate between Static and register variables.
16. Explain the syntax of 'switch' statement.
17. Give and explain any two string functions.

Turn over

18. Give any two purposes of database systems.

19. Define entity and attribute.

20. What is a 'weak entity set' ?

21. Explain any two aggregate function.

22. Define third normal form.

(10 × 2 = 20 marks)

Part C (Short Essay Type Questions)

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

23. With suitable examples, differentiate between while and do — while loops.

24. Draw a flow chart to find the largest of three numbers.

25. Write a recursive function and explain the working of it.

26. Illustrate the definition of structure and union with suitable examples.

27. Discuss the role of a Database administrator.

28. Explain selection and projection operations in relational algebra with suitable examples.

29. Explain DDL and DCL with examples.

30. Explain nested subqueries with an example.

(6 × 3 = 18 marks)

Part D (Essay Type Questions)

Answer any **two** *questions.*
Each question carries 10 *marks.*

31. Write a C program to read an integer array, sort the values in ascending order and print the sorted list. (Use any sort algorithm).

32. Explain E-R diagram with a suitable example. What is the significance of ER diagram in DBMS ? Explain the different types of KEYs with suitable examples.

33. Explain VIEW with an example. Write SQL commands to create a database and a table. Illustrate different join operations with suitable examples.

(2 × 10 = 20 marks)

C 2224 (Pages : 3) Name.....

Reg. No.....

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2021

Microbiology

MBG 4C 04—IMMUNOLOGY AND MEDICAL MICROBIOLOGY

(2018 Admissions)

Time : Three Hours Maximum : 64 Marks

Part A

Answer all the **twelve** *questions.*

1. The immunologically active regions of an antigen that binds to antigen-specific membrane receptors on lymphocytes or to secreted antibodies are known as ————————.
2. The Y-shaped protein used by the immune system to identify the pathogenic micro-organism is known as ————————.
3. The antibody which can cross placental barrier is ————————.
4. The substances that are non-immunogenic but enhance the immunogenicity of any added immunogen is known as ————————.
5. The infections transmitted during the administration of injection and catheterisation is called ————————.
6. A measure of the amount of a substance that is needed to kill half of a test population of animals is known as ————————.
7. An epidemic of an infectious disease that spread across worldwide is known as ————————.
8. The organism which appears in the form of grapelike cluster in microscopy is ————————.
9. Mycobacterium tuberculosis is first identified by ————————.
10. Amoebiasis is caused by ————————.
11. Enteric fever is caused by ————————.
12. In H1N1, N1 stands for ————————.

(12 × ½ = 6 marks)

Part B

Answer all **ten** *questions in one* **or** *two sentences.*

13. Congenital infection.
14. Hapten.
15. Alloantigens.
16. Inhalation.
17. Septicemia.
18. Morphology of *Vibrio cholerae.*
19. WIDAL test.
20. Deep mycoses.
21. AIDS.
22. Chikungunya.

(10 × 2 = 20 marks)

Part C

Answer briefly any **six** *questions.*

23. Classify infection.
24. Types of immunogens.
25. Compare MID and MLD.
26. Discuss the bacterial disease caused by *Clostridium botulinum.*
27. Inspect the infections caused by *Treponema pallidum.*
28. Critically discuss about the Rabies.
29. Write a relevant note on malarial parasite.
30. Critically discuss on hepatitis.

(6 × 3 = 18 marks)

Part D

Answer any **two** *questions in details.*

31. What do you mean by immunoglobulin ? Illustrate the structure of Immunoglobulin G. Add a short note on the types of immunoglobin.

32. Elaborate various methods of transmission of infection with examples.

33. Discuss the morphology, pathogenicity, virulent factors and treatment options of the infections caused by *Mycobacterium tuberculosis.*

(2 × 10 = 20 marks)

C 2223 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, APRIL 2021

Microbiology

MBG 4B 04—SOIL AND AGRICULTURAL MICROBIOLOGY

(2018 Admissions)

Time : Three Hours Maximum : 80 Marks

(Draw diagrams wherever necessary)

Section A

Answer **all** *questions.*

Each question carries ½ mark.

1. What are anammox bacteria ?
2. How mutualism is different from synergism ?
3. The type of soil that has largest particle size is ————.
4. Name one anaerobic bacteria establish symbiotic association with ruminants.
5. Name one sulfur reducing Archaebacteria.
6. The organism causing citrus canker is ————.
7. What is meant by biomagnification ?
8. Define weathering.
9. Name one viral biopesticide.
10. What is meant by nitrification ?
11. Differentiate ectoparasites and endoparasites.
12. The negative interaction within a population of microorganism is called ————.

(12 × ½ = 6 marks)

Section B

Answer **all** *questions.*

Each question carries 2 marks.

13. What are the characteristics of root inhabiting fungi ?
14. What is the significance of humus ?

Turn over

15. What are the parameters analyzed in soil fertility test ?
16. Describe endosymbionts with an example.
17. What is the significance of crop rotation in plant disease management ?
18. What are nod factors ?
19. What are phyllosphere and phylloplane ?
20. Write on luminescent bacteria.
21. Explain amensalism with an example.
22. Differentiate loamy and clay soils.

(10 × 2 = 20 marks)

Section C

Write short notes on any **six** *of the following.*
Each question carries 5 *marks.*

23. Factors influencing soil microflora.
24. Sulfur cycle.
25. Microbial interaction within population.
26. Biofertilizers.
27. *Fusarium oxysporum.*
28. Phosphate solubilizing bacteria.
29. Bacterial biopesticides.
30. Carbon cycle.

(6 × 5 = 30 marks)

Section D

Write essay on any **two** *of the following.*
Each question carries 12 *marks.*

31. Write note on symbiotic nitrogen fixing bacteria and the mechanism of symbiotic nitrogen fixation.
32. Write on classification of mycorrhizae. Discuss the importance of mycorrizae in agriculture field.
33. Discuss the etiology, symptoms and management of angular leaf spot of cotton and tomato yellow leaf curl disease.

(2 × 12 = 24 marks)

C 2222 (Pages : 3) Name.....

Reg. No.....

FOURTH SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION, APRIL 2021

Microbiology

MBY 4C 16 (P)—BIOSTATISTICS (PRACTICAL – WRITTEN)

(2014 Admissions)

Time : Three Hours Maximum : 32 Marks

Part A

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

Fill in the blanks (Questions 1 – 3) :

1. If the observed frequencies and expected frequencies of an experiment completely coincide and they are 30, 42, 14, 78 and 28. Then, value of Chi-square statistic is ————.
2. With the usual notations if $r_{xy} = 0.6$, $b_{xy} = 0.8$, what is b_{yx} ?
3. In ANOVA, if mean sum of squares corresponding to between columns, between rows and residuals are respectively 14, 16 and 22. Then, value of F statistic for between columns is ————.

State True *or* False (Questions 4 – 6).

4. If $r_{12} = 0$ and $R_{1.23} = 0.8$, then $r_{13.2} = 0.8$.
5. Spearman rank correlation coefficient lies between 0 and 1.
6. The degrees of freedom for 3 × 3 contingency table under Chi-square test of independence of attributes is 4.

(6 × ½ = 3)

Part B (Short Answer Type Questions)

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

7. Fill in the blanks of following ANOVA table :

Source of variation	S.S.	d.f.	M.S.S.	F
Between samples	40	—	10	—
Within samples	—	—	—	
Total	196	16		

8. Obtain the rank correlation coefficient from the following ranks given by two judges in a musical competition :

Ranks by Judge I	8	9	6	10	7	5	3	4	1	2
Ranks by Judge II	8	9	5	4	10	6	3	2	1	7

9. Compute the expected frequencies from the following distribution obtained from a survey of 800 families with four children :

Number of boys	0	1	2	3	4
Number of girls	4	3	2	1	0
Number of families	32	178	290	236	64

10. Write down the regression equations from the following :

$\bar{X} = 68, \bar{Y} = 69, V(X) = 4, V(Y) = 6.25, r_{xy} = 0.6.$

11. If $r_{12} = 0.8$, $r_{13} = -0.56$ and $r_{23} = 0.40$, compute $R_{1.23}$

(5 × 2 = 10 marks)

Part C (Short Essays)

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

12. A computer while calculating the correlation coefficient between two variables X and Y from a 25 pairs of observations obtained the following results :

$\bar{X} = 5, \bar{Y} = 4, \sum X^2 = 650, \sum Y^2 = 460, \sum XY = 508.$

It was, however discovered at the time of checking that the copied down two pairs (6, 14) and (8, 6) were incorrect while the correct pairs were (8, 12) and (6, 8). Obtain the correct value of correlation coefficient.

13. A survey amongst women was conducted to study the family life. The observations are as follows :

	Family life		Total
	Happy	Not happy	
Educated	70	30	100
Not educated	60	40	100
	130	70	

Examine whether there is any association between family life and education.

14. On the basis of observations made on 39 cotton plants, the total correlation of yield of cotton (X_1), seed vessels (X_2) and height (X_3) are found to be $r_{12} = 0.8$, $r_{13} = 0.65$ and $r_{23} = 0.70$. Comment on the correlation between yield of cotton and seed vessels, eliminating the effect of height.

15. From a sample of 19 pairs observations, the correlation coefficient is 0.5 and the corresponding population correlation coefficient is 0.3. Is the difference significant ?

(3 × 3 = 9 marks)

Part D (Essay)

Answer any **one** *question.*
The question carries 10 *marks.*

16. (i) The following data shows the number of motor registrations in a certain territory for a term of five years and the sale of motor tyres by a firm in that territory for the same period :

Year	1995	1996	1997	1998	1999
Motor registration	600	630	720	750	800
Number of tyres sold	1250	1100	1300	1350	1500

Estimate the sale of tyres when registration is 850.

(ii) The number of automobile accidents per week in a certain population were as follows :

12, 8, 20, 2, 14, 10, 15, 6, 9, 4. Are the frequencies in agreement with the belief that accidents condition was the same during this ten week period ?

17. The following table gives the box compression strength (in ten lb load at first failure) of corrugated egg boxes on six separate days :

Day	Box Compression Strengths									
I	58	62	66	45	58	65	52	62	51	72
II	61	59	57	55						
III	73	67	69	67.5	61.5	70.5	64	69.5	57.9	
IV	40	63.5	67.5	58	56.5					
V	56	54	66							
VI	72	68	64.5	62	56	77.5	68.5			

Test whether there is any difference between mean comparisons of strengths on various days.

(1 × 10 = 10 marks)

C 2221 (Pages : 3) Name.....

Reg. No.....

FOURTH SEMESTER (CUCBCSS-UG) DEGREE EXAMINATION, APRIL 2021

Microbiology

MBY 4C 15—BIOSTATISTICS II

(2014 Admissions)

Time : Three Hours Maximum : 64 Marks

Use of calculator is permitted.

Part A

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

Fill in the blanks (Questions 1–4) :

1. A hypothesis completely specifies the probability distribution is called ———— hypothesis.
2. The error of rejecting ———— hypothesis when it is true is type I error.
3. The x coordinate of the point of intersection of regression lines for the variables X and Y is ————
4. If there is no linear relation between X and Y, Pearson's coefficient of correlation between X and Y is ————.

Choose the correct answer (Questions 5-8) :

5. If X and Y are related as Y= –2X + 5, then r_{XY} is ————.

   (i) 0. (ii) + !. (iii) – !. (iv) None of these.

6. In an ANOVA independent sample is taken from populations assumed following ———— distribution.

   (i) Binomial. (ii) Poisson. (iii) Normal. (iv) None of these.

7. Two regression lines are perpendicular, then the coefficient of correlation is—

   (i) 0. (ii) + 1. (iii) –1 (iv) Between 0 and +1.

8. If the coefficient of regression x on y is 5, the possible value of the coefficient of regression of y on x among the following is ————.

   (i) 5. (ii) 1/2. (iii) 1/10. (iv) –1/10.

State true *or* false (Questions 9-12) :

9. The two regression coefficients are of same sign.
10. F-distribution is used in test of independence.

Turn over

11. When the regression lines coincide, coefficient of correlation is zero.

12. Rank correlation coefficient when the variables are qualitative in nature.

(12 × ½ = 6 marks)

Part B (Short answer type questions)

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

13. Define simple and composite hypothesis.

14. Define type II error.

15. Define significance level.

16. Identify the regression coefficient Y on X, if the regression line y on x is given as $3x - 4y + 6 = 0$.

17. Write any two properties of Pearson's coefficient of correlation.

18. Define multiple correlation.

19. If the coefficient of regressions x on y and y on x are respectively -4 and $-1/10$, find the coefficient of correlation between x and y.

20. Define a 2 × 2 contingency table.

21. Differentiate positive and negative correlation.

22. Express $r_{12.3}$ in terms of simple correlation coefficients.

(10 × 2 = 20 marks)

Part C (Short Essays)

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

23. Explain the method of two way ANOVA.

24. Explain chi square test of goodness of fit.

25. Identify the regression lines and predict the value of y when $x = 20$ and the value of x when $y = 10$, if the regression lines are $3x + 4y - 8 = 0$ and $6x + 4y + 4 = 0$.

26. Explain the importance of correlation analysis.

27. Prove that covariance between two variable decides the sign of regression coefficients.

28. Describe the procedure of testing significance of coefficient of correlation.

29. Explain the applications of partial and multiple correlations.

30. For three variables X_1, X_2 and X_3 if the simple correlation coefficients r_{12}, r_{13} and r_{23} are respectively 0.4, 0.6 and 0.8, calculated $R_{1.23}$ and $r_{13.2}$.

(6 × 3 = 18 marks)

Part D (Essays)

Answer any **two** *questions.*
Each question carries 10 *marks.*

31. (i) Explain chi square test of Independence.

(ii) A group of randomly selected individuals are classified according to their English language proficiency and numerical ability :

Proficiency in English	Numerical ability		Total
	Yes	No	
Yes	50	26	76
No	20	30	50
	70	56	126

Test whether the two attributes are dependent. (χ^2 table value for 1 d f. and for $\alpha = 0.05, \chi^2_\alpha = 3.841$).

32. (i) Explain rank correlation coefficient.

(ii) The following are the ranks given by a judges for 10 competitors arts and sports performances.. Find the coefficient of correlation between the ranks :

Arts	:	5	4	2	6	7	10	9	1	8	3
Sports		4	1	5	7	8	9	10	6	3	2

33. Yields obtained from 3 plots each with 4 varieties of seed used are given below. Perform ANOVA to test whether there any variation among the seeds used when yield is considered.(F(3,8) d.f. at 5% significance level is 4.07) :

	Seed verities			
Plots	A	B	C	D
1	18	20	18	15
2	17	16	16	18
3	15	15	16	15

(2 × 10 = 20 marks)

C 2220 (Pages : 3) Name.....

Reg. No.....

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2021

Microbiology

MBY 4C 07—MEDICAL MICROBIOLOGY AND IMMUNOLOGY

(2014 Admissions)

Time : Three Hours Maximum : 64 Marks

Section A

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

1. Cross infections occurring in hospitals are called ————————.
2. The neurotoxin produced by *Clostridium tetani* is ————————.
3. The double walled, spherical structure present in HBV infected patient sera is known as ————————.
4. Name the causative agent of oral thrush.
5. The pluripotent cells in bone marrow that differentiates into blood cells are called ————————.
6. The dendritic cells present in the skin is :

   (Langerhan's cells, Histiocytes, Kupffer cells, Interdigitating dendritic cells)
7. The part of antibody recognizing antigenic determinants are called ————————.

   (Epitope, Paratope, Aggretope, Hapten)
8. The heavy chain present in IgM antibody is :

   (γ-chain, α- chain, μ-chain, ε-chain)
9. The disease 'farmer's lung' is an example for ———————— hypersensitivity.

   (Type I, Type II, Type III, Type IV)
10. Among the following the systemic autoimmune disease is ————————.

    (IDDM, Grave's disease, Pernicious anaemia, SLE)

11. The Coomb's test detects ———————— in patient sera.

12. The hepatitis virus with DNA as genetic material is ————————.

(HAV, HBV, HCV, HEV)

(12 × ½ = 6 marks)

Section B

Write briefly on **all** *questions.*
Each question carries 2 *marks.*

13. Differentiate endemic and epidemic infections.

14. WIDAL test.

15. Non-neural vaccines for rabies.

16. Congenital rubella syndrome.

17. 'Black water fever'.

18. Passive immunity.

19. Phagocytosis.

20. Adjuvants.

21. Haptens.

22. Polyclonal sera.

(10 × 2 = 20 marks)

Section C

Write short essays on any of **six** *questions.*
Each question carries 3 *marks.*

23. Sources of infection.

24. Botulism.

25. Life cycle of *Entamoeba histolytica*.

26. Primary lymphoid organs.

27. Classification of antigens.

28. Virulence factors and Pathogenesity of *Staphylococcus aureus*.

29. Immune complex mediated hypersensitivity reactions.

30. Candidiasis.

(6 × 3 = 18 marks)

Section D

Write essays on any **two** *questions.*
Each question carries 10 *marks.*

31. Write a note on autoimmune diseases.

32. Discuss the etiology, pathogenesis, and laboratory diagnosis of AIDS.

33. Discuss the etiology, pathogenesis, and laboratory diagnosis of pulmonary tuberculosis.

(2 × 10 = 20 marks)

C 2219 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2021

Microbiology

MBY 4B 06—SOIL AND AGRICULTURAL MICROBIOLOGY

(2014 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

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

1. ———— is responsible for keeping the oxygen tension at very low level in the tissues of root nodule that is actively involved in fixing nitrogen.
2. Trichoderma is a biocontrol agent used in agriculture to control ————.
3. *Bacillus thuringiensis israelensis* is a bioinsecticide used against ————.
4. *Caedibacter* is an endosymbiotic bacterium that lives inside the cells of protozoa ————.
5. ———— is an example of autotrophic sulfur reducing bacteria.
6. Among sand clay and silt ———— have medium size particles.
7. *Methanobrevioacter ruminantium* is a bacterium found in ————.
8. ———— describes the relationship between two species that interact but do not affect each other.
9. With respect to biogeochemical cycle sedimentary rocks rich in calcium carbonate is a sink of ————.
10. Banana bunchy top virus is transmitted from infected plant to healthy plant by ————.
11. Since Azotobacter can perform ———— their presence is promoted in agricultural field.
12. The pedon contains the solum ; what we call — ————.

(12 × ½ = 6 marks)

Section B

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

Comment on :

13. Luminescent bacteria.
14. *Colletotrichum falcatum.*
15. Heterocyst.
16. Infection thread formed in root hair.
17. Papaya ring spot virus (PRSV).
18. Obligate intra cellular parasite.
19. Soil horizon.
20. Baculovirus.
21. Clay.
22. Bdellovibrio.

(10 × 2 = 20 marks)

Section C

Write short note on any **six** *of the following.*
Each question carries 5 *marks.*

23. What is meant by Mycorrhizae ? Briefly discuss about various types of Mycorrhizae.
24. What is meant by Humus ? How humus is formed ? Give a note on the importance of humus.
25. Discuss the symptoms and disease cycle of Angular leaf spot of cotton.
26. Discuss the General methods of disease transmission and control of plant viral diseases.
27. What is meant by symbiotic nitrogen fixation ? Discuss the phenomenon with the example of Azolla Anabaena association.
28. Discuss briefly about microbial dynamics in Rhizosphere.
29. Discuss briefly about the Phosphorus cycle
30. What is meant by Nematophagous fungus ? Discuss its importance in agriculture with example.

(6 × 5 = 30 marks)

Section D

Answer any **two** *of the following questions.*
Each question carries 12 *marks.*

31. What is meant by biogeochemical cycle ? Discuss their significance in agriculture with respect to nitrogen cycle.
32. Briefly discuss various kinds of interactions in a community of micro-organisms. Give examples for each.
33. What are Bio fertilizers ? Discuss the general method of the preparation of bio fertilizer. Give a note on the advantages of using bio fertilizer.

(2 × 12 = 24 marks)