C 4392 (Pages : 2) Name.....

Reg. No.....

SECOND SEMESTER (CBCSS—UG) DEGREE EXAMINATION APRIL 2021

Microbiology

MBG 2C 04—BIOSTATISTICS—II

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. Define statistical hypothesis.
2. Specify the null and alternate hypotheses, if it is to test whether the average duration μ to recover from a viral attack is 2 weeks.
3. Define test statistic.
4. Name the probability distribution used in : (a) Test of goodness of fit ; and (b) ANOVA
5. What are the two types of regression lines ?
6. If $5x - 7y - 2 = 0$ is the regression line y on x, identify the regression coefficient y on x.
7. Mention any two uses of regression analysis.
8. Define correlation between two variables.
9. Define Pearson's coefficient of correlation.
10. What is the coefficient of correlation between x and y, if regression coefficient x on y and y on x are respectively – 0.5 and – 1.4.
11. Define partial correlation.
12. Express multiple correlation coefficient $R_{1.23}$ in terms of simple correlation coefficients.

(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.

13. Explain the two different types of possible errors in testing of hypothesis.
14. Explain the various steps in one-way ANOVA.
15. For 10 observations on x and y, the following are noted. $\sum x = 130, \sum y = 220, \sum x^2 = 2238, \sum y^2 = 5506, \sum xy = 3467$. Obtain the regression line y on x and estimate the value of y for $x = 20$.
16. Using the following data on 300 adult males, identify whether smoking and heart disease are independent.

	Heart diseased	Not diseased
Smokers	75	105
Non-smokers	25	95

17. Explain the procedure of testing the presence of correlation between two variables
18. Explain rank correlation co-efficient.
19. If $r_{12} = 0.6, r_{13} = 0.4, r_{23} = 0.8$ calculate $r_{12.3}$ and $r_{23.1}$.

(5 × 5 = 25 marks)

Section C (Essay Type Questions)

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

20. Using the following data obtained for 5 days from the admission register, test whether the patients admitted in a hospital is on average 15% of the total patients reached for consultation by the method of chi-square test of goodness of fit.

Patients reached for consultation/day :	240	280	320	260	300
Patients admitted :	40	48	45	42	50

21. Calculate Pearson's coefficient of correlation between x and y using the following observations :

x :	4	6	8	10	12
y :	8	14	15	18	26

(1 × 11 = 11 marks)

C 4391 (Pages : 2) Name.....

Reg. No.....

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

Microbiology

MBG 2C 02—APPLIED MICROBIOLOGY

Time : Two Hours Maximum : 60 Marks

Section A (Short Answer Type)

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

1. Alkaliphiles.
2. Liophilisation.
3. Flocculation.
4. CFU.
5. MPN.
6. Biological Oxygen Demand.
7. Psychrophylic organisms.
8. Indicator organisms.
9. Chemo-organotrophs.
10. Exponential phase.
11. Indicator media.
12. Applications of Swab culture.

(8 × 3 = 24 marks)

Section B (Short Essay Type)

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

13. Explain growth curve of bacteria.
14. Water quality test.
15. Nutritional types of bacteria.
16. What are indicator organisms ? Explain different types.
17. Explain various factors affecting microbes in air.

Turn over

18. Factors affecting microbial population in water.

19. Anaerobic culture methods.

(5 × 5 = 25 marks)

Section C (Essays)

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

20. Explain different media types used for cultivation of aerobes.

21. Explain different water purification methods.

(1 × 11 = 11 marks)

C 4390 (Pages : 2) Name.....

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SECOND SEMESTER (CBCSS—UG) DEGREE EXAMINATION APRIL 2021

Microbiology

MBG 2B 02—MICROBIAL PHYSIOLOGY AND TAXONOMY

Time : Two Hours Maximum : 60 Marks

Section A (Short Answers)

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

Each question carries 3 *marks.*

All questions can be attended.

Overall Ceiling 24.

1. Anaerobic media.
2. Electrogenic transport.
3. Barophiles.
4. Stationary phase.
5. G + C content.
6. Cytopathic effect.
7. Synchronous culture.
8. Binary fission.
9. Jaccard's co-efficient.
10. Stab culture.
11. Lyophilisation.
12. Define species.

(8 × 3 = 24 marks)

Section B (Short Essays/Paragraph)

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

13. Briefly discuss different modes of reproduction in bacteria.
14. Describe quantitative methods for the measurement of bacterial growth.
15. Write a note on lytic and lysogenic bacteriophages.
16. Briefly mention bacterial sporulation.
17. Classify micro-organisms based on their temperature requirement.
18. List out important culture methods for the growth of bacteria.
19. Write about cell culture methods or viral cultivation.

(5 × 5 = 25 marks)

Section C (Essays)

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

20. Describe various nutrients required for the growth of bacteria and classify them based on their nutritional requirements.
21. Explain the different classification systems for bacterial taxonomy.

(1 × 11 = 11 marks)

C 4169 (Pages : 3) Name.....

Reg. No.....

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

Microbiology

MBG 2C 04—BIOSTATISTICS-II

(2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Use of calculator is permitted.

Section A

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

1. Level of significance lies between ———— and ————.
2. Size of critical region is known as ————.
3. Errors in a statistical model are always taken to be distributed as ————.
4. In a regression line of Y on X, the variable X is known as ————.
5. The two regression lines for the variables X and X intersect at the point ————.
6. In testing $H_0 : \rho = \rho_0$, Z_r is distributed as ————.
7. The range of multiple correlation co-efficient R is ————.

Write True *or* False :

8. Correlation coefficient is the geometric mean of regression co-efficients.
9. If $\rho = 0$, the angle between the lines of regression is 90°.
10. Degrees of freedom is related to number of independent observations in a set.
11. In a completely randomized design with t treatments and n experimental units, error degrees of freedom is equal to $n - t - 1$.
12. Tabled value of chi-square distribution at 5% level of with 10 d.f = 18.307.

(12 × ½ = 6 marks)

Section B

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

13. Define power of a test.
14. Define null hypothesis.
15. Mention any two methods of testing the hypotheses.
16. To fit a straight line of the form $y = a + bx$, point out the normal equations by the Principle of least squares.
17. Write down the model for one way ANOVA.
18. Define partial correlation co-efficient.
19. What do you understand by the test of goodness of fit ?
20. Given, $r_{12} = 0.6$, $r_{13} = 0.5$ and $r_{23} = 0.8$, determine the value of $r_{12.3}$.
21. Discuss the type of errors in testing of hypothesis.
22. List out a few applications of chi-square distribution.

(10 × 2 = 20 marks)

Section C

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

23. In a breeding experiment, the ratio of off springs in four classes was expected to be 1 : 3 : 3 : 9. The experiment yielded the data as follows :

Classes	AA	Aa	aA	aa
No. of off springs	8	29	37	102

Test whether the given data is in agreement with the hypothetical ratio.

24. The co-efficient of rank correlation coefficient of marks obtained by 10 students in Statistics and Accountancy was found to be 0.2. It was later discovered that the difference in ranks in the two subjects obtained by one of the students was wrongly taken as 9 instead of 7. Find the correct value of coefficient of rank correlation.
25. How will you test the significance of the correlation co-efficient ?
26. The line of regression of Y on X and X on Y are, respectively, Y = X + 5 and 16X – 19Y = 94. Find the variance of X if the variance of Y is 16. Also, find the covariance of X and Y.
27. The theory predicts the proportion of beans in the four groups A, B C and D should be 9 : 3 : 3 : 1. In an experiment among 1600 beans, the numbers in the four groups were 882, 313, 287 and 118. Does the experimental result support the theory ?

28. In a trivariate distribution, $r_{12} = 0.7$, $r_{23} = r_{31} = 0.5$, find : 1) $r_{23.1}$ and 2) $R_{1.23}$.

29. Given the following data :

Treatments			
T_1	T_2	T_3	T_4
20.9	23.7	13.2	5.8
12.4	14.1	10.2	6.1
10.1	9.0	5.1	4.8
4.2			1.5

Construct ANOVA table.

30. The following table showing the distribution of digits in numbers chosen from a telephone directory :

Digits	0	1	2	3	4	5	6	7	8	9	Total
Freq	1026	1107	997	966	1075	933	1107	972	964	853	10,000

Test whether the digits may be taken to occur equally frequently in the directory.

(6 × 5 = 30 marks)

Section D

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

31. a) Distinguish between correlation and regression.

b) Calculate Karl Pearson's coefficient of correlation for the following :

X	:	63	52	59	57	64	65	55	56	59
Y	:	126	125	117	113	130	129	111	113	116

32. a) Describe the chi-square test of significance.

b) From the following data, obtain two regression equations :

X	:	1	2	3	4	5	6	7	8	9
Y	:	9	8	10	12	11	13	14	16	15

33. a) Express multiple correlation in terms of simple correlation co-efficients.

b) The following table shows the result of inoculation against cholera :

	Not attacked	Attacked
Inoculated	431	5
Not Inoculated	291	9

Examine the effect of inoculation in controlling susceptibility to cholera.

(2 × 12 = 24 marks)

C 4168 (Pages : 3) Name.....

Reg. No.....

SECOND SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2021

Microbiology

MBG 2C 02—APPLIED MICROBIOLOGY

(2018 Admissions)

Time : Three Hours Maximum : 64 Marks

Section A

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

1. ———— is an example of anaerobic media.
2. Microaerophiles that grow best with high CO_2 levels are called ————.
3. At which stage of waste water treatment biological treatment of sewage by micro-oraganisms occur.
4. The organism which can use organic compounds as electron donors are called ————.
5. Roll tube technique is used to isolate ————.
6. ———— is a culture method for the isolation of pure culture.
7. BOD of waste water is related to the amount of ————
8. The shallow ponds constructed for biological treatment of waste water is known as ————.
9. Organisms that live in dry environment are called ————.
10. Give an example of airborne viral infection.
11. Name a cryopreservative used in low temperature preservation of pure cultures.
12. Residue of solid material left after evapouration and drying of small droplet is known as ————.

(12 × ½ = 6 marks)

Turn over

Section B

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

13. Trickling filter.
14. Photoheterotrophs.
15. Generation time.
16. Halophiles.
17. MPN.
18. Pour plate.
19. Differential media.
20. Lyophilisation.
21. Reuter's air sampler.
22. Gas Pack system.

(10 × 2 = 20 marks)

Section C

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

Write short notes on :

23. Explain bacterial growth curve.
24. Describe purification of drinking water.
25. Explain different types of special media.
26. Classify micro-organisms based on oxygen requirement.
27. Air borne bacterial infections.
28. Methods of isolation of pure cultures.
29. Tertiary treatment of waste water.
30. Explain anaerobic culture methods.

(6 × 3 = 18 marks)

Section D

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

31. Discuss important factors affecting the growth of microbial population in aquatic environment.

32. Explain different methods for enumeration of micro-organisms in air.

33. Give an account of nutritional requirements of bacteria and explain important nutritional types of bacteria.

(2 × 10 = 20 marks)

C 4167 (Pages : 2) Name.....

Reg. No.....

SECOND SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION APRIL 2021

Microbiology

MBG 2B 02—MICROBIAL PHYSIOLOGY AND TAXONOMY

(2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*

Each question carries ½ marks.

1. Basophiles are organism growing at ———— condition.
2. Write an example for lytic phage.
3. Who coined the term "protist".
4. Write an example for enrichment medium.
5. A culture containing only one type of bacterium is called ————.
6. For antibiotic sensitivity testing the culture method used for inoculation of bacteria is ————.
7. McIntosh Fields jar is used for cultivating ———— bacteria.
8. Agar is obtained from which algae.
9. The concentration of agar in making semisolid agar is ————.
10. The organisms growing under carbon dioxide enriched conditions are called ————.
11. Thermophiles are organisms growing in a temperature above ————.
12. Write any *one* use of stab culture method.

(12 × ½ = 6 marks)

Part B

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

Each question carries 2 marks.

13. What are Extremophiles ?
14. Write the uses of liquid culture.

Turn over

15. What is indicator medium ?
16. Define species in bacterial taxonomy.
17. What is synchronous culture ?
18. What is lag phase ?
19. What is differential medium ?
20. What are anaeropacks ?
21. What is candle jar method for culturing anaerobes ?
22. What is numerical taxonomy ?

(10 × 2 = 20 marks)

Part C

Write Short notes on any **six** *of the following.*

Each question carries 5 *marks.*

23. Write on passive transport.
24. Cryopreservation methods.
25. Bacterial growth curve.
26. Pock assay.
27. Taxonomic hierarchy.
28. Nucleic acid hybridisation.
29. Five kingdom classification.
30. Morphological types of bacteria.

(6 × 5 = 30 marks)

Part D

Answer any **two** *questions.*

Each question carries 12 *marks.*

31. Write on modes of reproduction in bacteria.
32. Write different culture methods used for cultivation of bacteria.
33. Write on different types of media.

(2 × 12 = 24 marks)

C 4166 (Pages : 4) Name.....

Reg. No.....

SECOND SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION APRIL 2021

Microbiology

MBY 2C 07—C LANGUAGE, DATABASE MANAGEMENT SYSTEM AND SQL

Time : Three Hours Maximum : 64 Marks

Section A

Answer **all** *questions.*

Each question carries ½ mark.

1. The format identifier '%i' is also used for ——— data type.

   (a) Char. (b) Int.

   (c) Float. (d) Double.

2. What will be the output of the following C code ?

```
# include<stdio.h>
void main( )
{
    int k = 8 ;
    int x = 0 = = 1 && k+ + ;
printf("%d,%d \n", x, k) ;
}
```

   (a) 0,9. (b) 0, 8.

   (c) 1, 8. (d) 1, 9.

3. Which of the following are themselves as collection of different data types ?

   (a) String. (b) Structure.

   (c) Char. (d) All of the above.

4. Pointer is data type in C which points to ———— of another variable.

5. DCL stands for ————.

6. In SQL, the AVG command is used for ————.

7. ———— term is used to refer a row in a database table.

   (a) Attribute. (b) Tuple.

   (c) Key. (d) Instance.

8. Which one of the following is a set of one or more attributes taken collectively to uniquely identify a record ?

   (a) Candidate Key. (b) Primary Key.

   (c) Super Key. (d) Foreign Key.

9. The Database schema is written in ————.

   (a) DCL. (b) DML.

   (c) HLL. (d) DDL.

10. In the Relational model, cardinality is termed as ————.

    (a) Number of tuples. (b) Number of attributes.

    (c) Number of tables. (d) None of the above.

11. **Say True or False** : Register storage class can be specified to global variables.

12. **Say True or False** : SQL provides the ***AS*** keyword, which can be used to assign meaningful column names to the results of queries using the SQL built-in functions.

(12 × ½ = 6 marks)

Section B

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

13. List the fundamental data types in C.

14. Explain the function of scanf( ) and printf( ) statements in C.

15. What is if construct ? Explain the syntax of simple if 'construct in C.

16. Explain the use of ***continue*** statement in C.

17. What are strings ? Explain how they are represented in C.

18. What is foreign key ? Give its significance.

19. What is SQL ? Explain the need of SQL in database management systems.

20. What is E-R diagram ?

21. What do you mean by Normalization in Database Management Systems ?

22. Differentiate between Views and Schemas.

(10 × 2 = 20 marks)

Section C

Answer any **six** *questions.*

Each question carries 3 *marks.*

23. What is recursion ? Explain with an example.

24. Explain the differences between call-by-value and call-by reference.

25. What is array ? Explain how will you declare and initialize two dimensional array in C.

26. Write a C program to find the reverse of a number.

27. Explain any *two* string handling functions in C.

28. What is relational algebra ? Give any *two* operations.

29. Explain DML and DDL with examples.

30. What is embedded SQL ? Explain its usage.

(6 × 3 = 18 marks)

Section D

Answer any **two** *questions.*

Each question carries 10 *marks.*

31. Give an account on different storage classes in C.

32. What are the different data models ? Explain each *one*.

33. Given the following relational schema :

SALARYDATA (EmpCode integer, EmpName varchar(30), Salary integer) ;

ADDRESSDATA (EmpCode integer, Address1 varchar(20), address2 varchar(20) ;

Write SQL statements for the following queries :

(i) Creating above two schema using appropriate key constraints in each schema.

(ii) List the address of those employees who draws salary > Rs. 40,000.

(iii) Get the count of the employees who draws salary in between Rs. 12,000 and Rs. 20,000.

(iv) List the name of all employees whose address 1 and address 2 are same.

(4 + 2 + 2 +2 = 10 marks)

[2 × 10 = 20 marks)

C 4165 (Pages : 2) Name.....

Reg. No.....

SECOND SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION APRIL 2021

Microbiology

MBY 2C 03—MICROBIAL METABOLISM AND GENETICS

Time : Three Hours Maximum : 64 Marks

Section A (Objective)

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

Each question carries ½ mark.

1. ———— are called as biological catalysts.
2. ——— is a combination of both anabolic and catabolic pathway.
3. A complete conjugated enzyme is known as ————.
4. ———— is also known as an Embden-Meyerhof pathway.
5. ———— bond is used to stabilize the double helix of DNA.
6. Sudden heritable change in the genome of an organism is called ————.
7. ———— is the region of the bacterial cell which contains the bacterial chromosome.
8. An organism containing a foreign gene is called ————.
9. ———— is an example of inducible operon.
10. A codon contains ———— nucleotides.
11. Transfer of genes from one cell to another by a bacteriophage is called ————.
12. ———— is an example for intercalating agent.

(12 × ½ = 6 marks)

Section B (Short Answer Questions)

Answer all **ten** *questions.*

Each question carries 2 marks.

Comment on :

13. Nucleoside.
14. Recombinant DNA.

15. F'cell.
16. Plasmids.
17. Catabolism.
18. Non-sense mutation.
19. specificity of enzyme.
20. Genetic engineering.
21. Fermentation.
22. properties of genetic code.

(10 × 2 = 20 marks)

Section C (Short Essay Questions)

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

23. With a neat diagram explain DNA structure.
24. Replica plating.
25. Elaborate the mechanism of enzyme action.
26. Briefly explain glycolysis.
27. Ames test.
28. What is transduction ? Explain its types.
29. What are the applications of genetic engineering ?
30. Explain the various types of mutation.

(6 × 3 = 18 marks)

Section D (Essay Type Questions)

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

31. With neat labelled diagrams explain different types of conjugation.
32. Write an essay on regulation of gene expression.
33. Explain in detail TCA cycle.

(2 × 10 = 20 marks)

C 4164 (Pages : 2) Name.....

Reg. No.....

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

Microbiology

MBY 2B 02—MICROBIAL PHYSIOLOGY AND TAXONOMY

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*

Each question carries ½ mark.

1. Classification based on observable traits, but not on evolutionary relations is called ————.
2. Population doubling time is also known as ————.
3. Give an example for anaerobic culture medium.
4. Name the cellular growth in two phases, generally caused by the presence of two sugars in a culture media, one of which is easier for the target bacterium to metabolize.
5. ———— is also known as defined medium .
6. The energy source of a photoautotroph is ————.
7. Name the active transport in which two nutrients are transported in the opposite direction across the membrane.
8. Name the structure when a Gram positive bacterium loses its cell wall.
9. Phytanols are present in ———— cell membrane.
10. Name the sexual spores of mushrooms.
11. Name the group of micro organisms which prefer a temperature optima of 20°C or below.
12. What is the structure formed by invagination of bacterial cell membrane which mainly helps it to carry out cellular respiration more efficiently ?

(12 × ½ = 6 marks)

Part B

Answer **all** *questions.*

Each question carries 2 marks.

Comment on the following :

13. Differential media.
14. Chemolithotrophs.
15. Thylacoid membrane.
16. Stab culture method.

Turn over

17. Symport.
18. Fermentation.
19. Phylogenetic.
20. Thermophiles.
21. Breeds count.
22. Numerical taxonomy.

(10 × 2 = 20 marks)

Part C

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

Write briefly on the following :

23. Criteria in bacterial classification.
24. Quantitation methods for viral growth.
25. Nutritional requirements for bacteria
26. Bacteriophage replication cycles.
27. Explain bacterial growth curve in batch cultures.
28. rRNA sequencing.
29. Anaerobic culture methods.
30. Pour plate culture method.

(6 × 5 = 30 marks)

Part D

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

31. Describe photosynthesis in bacteria.
32. Describe endospore formation in bacteria with suitable diagrams.
33. Discuss the structure and composition of bacterial cell wall.

(2 × 12 = 24 marks)