

**(FOR THE CANDIDATES ADMITTED
DURING THE ACADEMIC YEAR 2021 ONLY)**

21UBY510

REG.NO:

N.G.M.COLLEGE (AUTONOMOUS): POLLACHI
END-OF-SEMESTER EXAMINATIONS : NOVEMBER-2023

PART - III

MATHEMATICS FOR BIOLOGISTS

SECTION - A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

MULTIPLE CHOICE QUESTIONS.

(K1)

1. Which formula is used for to find the volume of cylinder?
a) πr^2 b) $2\pi r$ c) $\pi r^2 h$ d) $\frac{1}{2} bh$
2. What is the determinant of the identity matrix I ($n \times n$)?
a) 1 b) 0 c) n d) -1
3. When using a questionnaire to collect data, what type of data is typically collected?
a) Qualitative b) Continuous c) Discrete d) both quantitative & qualitative
4. Which test is commonly used to assess whether observed categorical data fits an expected distribution or theoretical model?
a) t-test b) ANOVA c) Regression analysis d) Chi-square goodness of fit test
5. If you want to calculate the sample standard deviation in Excel, Which function should you use?
a) STDEV.P () b) STDEV.S () c) STDEVS () d) STDEV

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES. (K2)

6. Find $\log_5 25 = \dots$
7. If $A = \begin{bmatrix} 5 & -1 \\ 2 & 9 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 4 \\ 6 & 9 \end{bmatrix}$, then $3A - 2B$ is.
8. Write the continuous data formula for standard deviation.
9. Write the continuous data formula for Normal distribution.
10. What shortcut key used to create new document in word.

SECTION – B (5 X 4 = 20 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Sum the series $1 + \frac{1+3}{2!} + \frac{1+3+3^2}{3!} + \frac{1+3+3^2+3^3}{4!} + \dots + \infty$
(OR)

b) If a, b, c denote three consecutive integers then Show that

$$\log_b = \frac{1}{2} \log_b a + \frac{1}{2} \log_b c + \frac{1}{2ac+1} + \frac{1}{3} \frac{1}{(2ac+1)^3} + \dots$$

(CONT'D.....2)

12. a) Find the inverse of the matrix $\begin{bmatrix} 1 & 0 & -1 \\ 3 & 4 & 5 \\ 0 & -6 & -7 \end{bmatrix}$

(OR)

b) If $A = \begin{bmatrix} 9 & 1 \\ 4 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 5 \\ 7 & 12 \end{bmatrix}$ Find X in the equation $3A + 5B + 2X = 0$

13. a) The annual profit of 90 companies are given below. Find the Arithmetic mean

Annual profit :	0-19	20-39	40-59	60-79	80-99
No of companies:	5	17	32	24	12

(OR)

b) Calculate the mode for the following data

Marks :	10-19	20-29	30-39	40-49	50-59	60-69
No.of students :	12	15	16	17	10	9

14. a) Explain Binomial, Poisson and Normal Distribution.

(OR)

b) Explain clarify the technique ANOVA for data with one way classification.

15.a) Describe the main components of Microsoft Office and their respective functions?

(OR)

b). Explain how to find the Standard Deviation for using Excel.

SECTION - C

(4 X 10 = 40 MARKS)

ANSWER ANY FOUR OUT OF SIX QUESTIONS.

**(16th QUESTION IS COMPULSORY AND ANSWER ANY THREE QUESTIONS
(FROM Qn. No: 17 to 21) (K4 (Or) K5)**

16. Solve the following system of simultaneous equations by Cramer's Rule

$$2X + 3Y + 3Z = 22, \quad X - Y + Z = 4, \quad 4X + 2Y - Z = 9$$

17. Show $\log\sqrt{12} = 1 + \left(\frac{1}{2} + \frac{1}{3}\right)\frac{1}{4} + \left(\frac{1}{4} + \frac{1}{5}\right)\frac{1}{4^2} + \left(\frac{1}{6} + \frac{1}{7}\right)\frac{1}{4^3} + \dots$

18. Show that the matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ satisfy the equation $A^3 - 6A^2 + 9A - 4I = 0$.
Hence deduce the value of A^{-1}

19. Find the missing frequency if $N = 100$ and median = 90

CI: 0-20	20-40	40-60	60-80	80-100	100-120	120-140	140-160	160-180
F: 6	9	-	14	20	15	-	8	7

20. A certain drug is claimed to be effective in curing cold. In an experiment on 500 person's cold, half of them were given the sugar pills. The patients reaction to the treatment are recorded in the following table.

	Helped	Harmed	No effect	Total
Drug	150	30	70	250
Sugar Pills	130	40	80	250
Total	280	70	150	500

On the basis of the data can it be concluded that there is a significant difference in the effect of the drug and sugar pills?

21. Explain aggregate function with example.