

M.Sc. Botany - 1st Semester (Batch 2021-23)

(2221)

Paper: BOT-C516 Theoretical Biology

Time Allowed: 3hrs.

Max. Marks: 50

Note: -

- (i) There are four sections (A, B, C & D) of the question paper. Attempt **five** questions in all, selecting at least **one** question from each section. The fifth question may be attempted from any section.
- (ii) Each question carries 10 marks. Questions subdivided into parts (a and b) carry 5 marks each.
- (iii) The answer to each question should not exceed 6 pages.

<u>Section-A</u>	
Q1.	Find the slope (m) and intercept on Y-axis (C) of linear function type $Y = mX + C$ for the following equation $3Y - 6X + 15 = 0$. Draw the graph of the above equation. Note: No need for graph paper. Just use pencil and scale to draw the graph.
Q2.	Write the general formula for power function. What is its application in theoretical biology?
<u>Section-B</u>	
Q3.	Differentiate the following with respect to x (i) e^{3x} (ii) $\log(\log x)$, $x > 1$
Q4.	(a) Integrate the following with respect to dx $\int (3x^2 - 3 \cos x + 5\sqrt{x}) dx$ (b) Evaluate the definite integral $\int_{-1}^{+1} (2x + 1) dx$

<u>Section-C</u>											
Q5.	Evaluate $\frac{n!}{(n-r)!}$, when (i) $n=5, r=2$ (ii) $n=8, r=5$										
Q6.	Differentiate the function with respect to x using the chain rule of differentiation (i) $\sin(\cos x)$ (ii) $\sin(x^3+5)$										
<u>Section-D</u>											
Q7.	Write the general formula for calculating Mean, Standard Deviation and Standard Error and calculate the above statistics for the following data: 3.5, 4.5, 5, 5, 7										
Q8.	Write the general formula for calculating correlation and regression equations. Also, find the correlation coefficient of the following data										
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">2</td> <td style="text-align: center;">4</td> <td style="text-align: center;">6</td> <td style="text-align: center;">9</td> </tr> <tr> <td style="text-align: center;">Y</td> <td style="text-align: center;">3</td> <td style="text-align: center;">6</td> <td style="text-align: center;">10</td> <td style="text-align: center;">16</td> </tr> </tbody> </table>	X	2	4	6	9	Y	3	6	10	16
X	2	4	6	9							
Y	3	6	10	16							