

Roll No.

[2]

Unit—II

2. (a) Discuss discrete population model for single species.
- (b) Discuss the single species population models.
- (c) Describe age-structured population model.

Unit—III

3. (a) Discuss the Lanchester's combat model.
- (b) Discuss the Richardson's model for Arms Race.
- (c) Describe mathematical model for one-way traffic problem.

Unit—IV

4. (a) Find the four state eight period fixed points.
- (b) Compare deterministic and probabilistic epidemic models.
- (c) Describe P. D. E. model for stochastic epidemic process with no removal.

Unit—V

5. (a) Explain mathematical model for logistic population growth.
- (b) Show that if $p = q = \frac{1}{2}$, the solution of :

$$p_n = p p_{n+1} + q p_{n-1}$$

$$\text{is } p_n = 1 - \frac{n}{a}.$$

- (c) Discuss a formal model for consensus and negotiation in environmental management.

D-3704

B. Sc. (Part III) EXAMINATION, 2020

MATHEMATICS

(Optional)

Paper Third (E)

(Mathematical Modelling)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt any *two* parts of each question. All questions carry equal marks.

Unit—I

1. (a) Consider the following differential equations :
 - (i) $x' = x$
 - (ii) $x' = x - t$Using syncline, draw slope field by hand for each equation.
- (b) Find the unique solution of the differential equation :
$$\frac{dy}{dx} = x + y$$
passing through (0, 1).
- (c) Describe the mathematical model for spread of technological innovations.

D-3704

2,600

(A-67) P. T. O.

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