Answer the followings

No-1

(a)Write the formula for exponential population growth.

(b)Give one example of Euler equation.

(c) What does predatory –prey model describe.

(d)What is half life in exponential decay.

(f) What is a phase plane.

(g) Write two example of exponential decay.

(h)What do you mean by equilibrium point.

(i)How drug assimilate into blood.

(j) What is epidemic model.

(k)What are the assumptions required for predatory-prey model.

(l)Check whether the solution of $y^{II} +4y = 0$ are independent or not.

(m)Write word equation for lake pollution model.

(n)Draw compartmental diagram of lake pollution.

(o)Write word equation based on balance law drug assimilation into the blood stream.

(p)Write balance equation in word form for the limited growth with harvesting.

(q) Formulate the differential equation of simple battle model.

(s) Find an expression for the time for the population to double in size.

(t)Define half life .If half cycle is z then find k in terms of z.

Q.No–2

(a) Find the equilibrium point for the following differential equation $\dfrac{dX}{dt} = Y–2XY, \dfrac{dY}{dt} = XY–Y^2$

(b) Formulate the differential equation of simple battle model.

(C) Write the differential equation of Lotka-Volterra Predatory prey system.

(d)Formulate the differential equation of density-dependent growth model.

(e) Find an expression for time for the population to double its size.

(f) What do you mean by epidemic model.

(g)Solve $(D^2 –5D+ 6)y = e^{2x}$.

(h)Find the particular integral of $(D^2 +4)y = Sinx$.

(i) Write formula for P.I by usin method of variation of parameter.

(j) Define order and degree of differential equation.

Q.No-3

(a) Sketch the phase plane trajectory of Battle model.

(b) How long will it take for the lake pollution level to reach 5% of its initial level if only fresh water flows into the lake.

(c) Solve $(D^2 +4)y = secx$

(d) Solve $(D^2 – 6D +9)y = sin2x$

(e)Solve $(D^2 +4)y = xsinx$

(f) Solve $\dfrac{d^2y}{dx^2} = \dfrac{2xy}{x^2+y^2}$

(g)Discuss about battle model.

(h) Find the equilibrium solution of the differential equation of predator-prey model

$$\frac{dX}{dt} = \beta_1 x – C_1 xy$$
$$\frac{dY}{dt} = -\alpha_1 y + C_2 xy$$

(i)Use chain rule to find a relation between X and Y from the differential equation

$$\frac{dX}{dt} = –XY, \frac{dY}{dt} = –2Y$$

(j)Discuss about predator-prey model

No-4

(i)   Solve the differential equation $(2x +tany)dx + (x – x^2 tany)dy = 0$

(ii) $(6x +4y +1)dx +(4x +2y +2)dy = 0$ $y(1) =2$

(iii) $dy/dx + 3y/x = 6x^2$

(iv)   Discuss about exponential growth model .

(v)   Solve the initial value problem $D^2y +4y = sinx$, $y(0)=2, y'(0) = 1$

(vi)   Find P.I of $D^2 + 4)Y = xsinx$

(vii)   Discuss about lake pollution model.

(viii) Solve $dy/dx -y/x = - y^2/x$

(ix) $dy/dx + y/2x = x/y^3$, $y(1) = 2$

(x)   Discuss basic properties of linear differential equation.