Instructions:

   i.   Write legibly

   ii.   Scientific and non programmable calculators are permitted

Part A

(2 Q x 4 M= 08 Marks)

1. Solve: $\dfrac{d^2 y}{dx^2} - y = x \sin x$.

2. Obtain the general solution of $(1+x)^2 \dfrac{d^2 y}{dx^2} + (1+x)\dfrac{dy}{dx} + y = 2\sin\{\log(1+x)\}$.

Part B

(2 Q x 6 M= 12 Marks)

3. Solve: $\dfrac{dx}{dt} + 2y = -\sin t, \dfrac{dy}{dt} - 2x = \cos t$

4. By the method of variation of parameters solve : $\dfrac{d^2 y}{dx^2} - 2\dfrac{dy}{dx} + y = e^x \log x$

Part C

(1 Q x 10 M= 10 Marks)

5. Obtain the power series solution of $\dfrac{d^2 y}{dx^2} + xy = 0$

Max Marks: 30   Max Time: 55 Mins   Weightage: 15 %   **Set B**

TEST 2

H Semester 2016-2017   Course: **MATH A 106 Differential**   20 March 2017
Equations & Fourier Series

Instructions:
  i.   Write legibly
  ii. Scientific and non programmable calculators are permitted

Part A

(3 Q x 3 M = 09 Marks)

1. Solve: $\dfrac{d^3y}{dx^3} - 2\dfrac{d^2y}{dx^2} - \dfrac{dy}{dx} + 2y = 0$.

2. Solve: $4\dfrac{d^2y}{dx^2} - 4\dfrac{dy}{dx} + y = 100$ to get the general solution.

3. Solve: $\left(D^2 + 9\right)y = \sin 2x$.

Part B

(2 Q x 6 M = 12 Marks)

4. A resistor of $R = 10$ *ohms*, an inductor of $L = 2$ *henries* and a battery of E *volts* are connected in series with a switch S. At $t = 0$, the switch is closed and the current $I = 0$. Find the current I for $t > 0$, if (a) $E = 40$ and (b) $E = 20e^{-3t}$.

5. Solve $\left(D^2 - 2D + 1\right)y = x^2 e^{3x}$.

Part C

(1 Q x 09 M = 09 Marks)

6. Solve: $\dfrac{d^2y}{dx^2} - 6\dfrac{dy}{dx} + 25y = e^{2x} + \sin x + x$.

Max Marks: 30   Max Time: 55 Mins   Weightage: 15 %   **Set B**

TEST 1

II Semester 2016-2017   Course: **MATH A 106 Differential Equations & Fourier Series**   20 February 2017

Instructions:

  i.   Write legibly

  ii.   Scientific and non programmable calculators are permitted

Part A

(3 Q x 3 M = 09 Marks)

1. Solve the initial value problem $\dfrac{dy}{dx} = 1 + x^2 + y^2 + x^2 y^2$ with $y(0) = 1$

2. Obtain the general solution of the differential equation $2xy\,dx + x^2 dy = 0$

3. Find the solution of $\dfrac{dy}{dx} + y = e^{-x}$

Part B

(2 Q x 6 M = 12 Marks)

4. Solve : $\dfrac{dy}{dx} + y \tan x = y^2 \sec x.$

5. Solve the differential equation $(x^2 y^2 + xy + 1)y\,dx + (x^2 y^2 - xy + 1)x\,dy = 0$

Part C

(1 Q x 09 M = 09 Marks)

6. (a) State law of growth and decay.

    (b) The number N of bacteria in a culture grew at a rate proportional to N. The value of N was initially 100 and increased to 332 in 1 hour. What was the value of N after 1.5 and 3 hours?

Max Marks: 30   Max Time: 55 Mins   Weightage: 15 %   **Set A**

TEST 2

II Semester 2016-2017   Course: **MATH A 106 Differential Equations & Fourier Series**   20 March 2017

Instructions:
   i.   Write legibly
   ii. Scientific and non programmable calculators are permitted

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Part A

(3 Q x 3 M= 09 Marks)

1. Solve: $\dfrac{d^3y}{dx^3} - 7\dfrac{d^2y}{dx^2} + 14\dfrac{dy}{dx} - 8y = 0$.

2. Obtain the general solution of $\dfrac{d^2y}{dx^2} + 4\dfrac{dy}{dx} + 4y = e^{2x}$.

3. Solve: $\left(D^2 - 4\right)y = \cos x$.

Part B

(2 Q x 6 M– 12 Marks)

4. Find the orthogonal trajectories of the family of curves $r^n = a^n \cos n\theta$.

5. Solve $\left(D^2 - 4D + 3\right)y = e^x \cos 2x$.

Part C

(1 Q x 09 M= 09 Marks)

6. Solve: $\dfrac{d^2y}{dx^2} + 3\dfrac{dy}{dx} + 2y = 2\cos(2x+3) + 2e^x + x^2$.

PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Max Marks: 30   Max Time: 55 Mins   Weightage: 15 %   **Set A**

TEST 1

Instructions:

  i.   Write legibly

  ii. Scientific and non programmable calculators are permitted

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Part A

(3 Q x 3 M = 09 Marks)

1. Solve the initial value problem $\dfrac{dy}{dx} = e^{x-y} + x^2 e^{-y}$ with $y(0) = 1$

2. Obtain the general solution of the differential equation $[(x+1)e^x - e^y]dx = xe^y dy$

3. Find the solution of $\dfrac{dy}{dx} + \dfrac{y}{x} = x^2$

Part B

(2 Q x 6 M = 12 Marks)

4. Solve : $\dfrac{dy}{dx} = \dfrac{x+y+4}{x-y-6}$

5. Solve the differential equation $(y^4 + 2y)dx + (xy^3 + 2y^4 - 4x)dy = 0$

Part C

(1 Q x 09 M = 09 Marks)

6. (a) State Newton's law of cooling.

   (b) A metal ball is heated to a temperature of $100^0 C$ at time $t = 0$ and it is placed in water which is maintained at 40^0C. If temperature of the ball is reduced to 60^0C in 4 min, Find the time at which the temperature of the ball is 50^0C.