# 2017

## ELECTRONICS

( *Mathematical Foundation for Electronics Labs* )

**[ Honours ]**

( CBCS )

( Practical )

PAPER – C2P

*Full Marks* : 20

*Time* : 2 hours

*The questions are of equal value*

Answer any **one** question, selecting it by a **lucky draw**

**1.** Write a program in SCILAB/MATLAB to find the value of $y(1)$, by Euler's Method, from the differential equation

$$\frac{dy}{dx} = -\frac{y}{1+x}$$

when $y(0{\cdot}3) = 2$, correct up to four decimal places, taking step length $h = 0{\cdot}1$.

2. Write a program in SCILAB/MATLAB to find the solution of the differential equation

$$\frac{d^2y}{dx^2} = 2y$$

which satisfies $y = 1$ at $x = 0$ and $\frac{dy}{dx} = 0$ at $x = 1$. Tabulate the solution at the points 0·1, 0·2, .... 1.

3. Write a program in SCILAB/MATLAB to solve the differential equation

$$\frac{d^2y}{dt^2} + 3y = t$$

subject to the initial conditions $y(0) = y'(0) = 0$ numerically over the range $t \in [0, 1]$.

4. Write a program in SCILAB/MATLAB to explore the behavior of the series,

$$\sum_{k=1}^{\infty} \frac{\cos(k\pi)}{k+1}.$$

Explain whether the series seems to converge or diverge.

5. Write a program in SCILAB/MATLAB to explore the behavior of the series,

$$\sum_{k=1}^{\infty} \frac{1}{k^2}.$$

Explain whether the series seems to converge or diverge.

6. Write a program in SCILAB/MATLAB to solve the system of equations, by Gauss-elimination method,

$$3x_1 + 9x_2 - 2x_3 = 11$$
$$4x_1 + 2x_2 + 13x_3 = 24$$
$$4x_1 - 2x_2 + x_3 = -8$$

correct up to four decimal places.

7. Write a program in SCILAB/MATLAB to solve the system of equations, by Gauss-Seidel method,

$$20x_1 + 5x_2 - 2x_3 = 14$$
$$3x_1 + 10x_2 + x_3 = 17$$
$$x_1 - 4x_2 + 10x_3 = 23$$

correct up to four decimal places.

## Distribution of Marks

| | |
|---|---|
| Experiment | : 15 marks |
| Laboratory Note Book | : 02 marks |
| Viva-voce | : 03 marks |
| Total | : 20 marks |