2018

CBCS

1st Semester

ELECTRONICS

PAPER—C2P

(Honours)

(Practical)

Full Marks : 20

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Mathematical Foundation for Electronics Lab.

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

1. Write a program is SCILAB/MATLAB to solve the differential equation $\frac{dy}{dx} = xy$, subject to $y(01) = 1$. Plot ten solution and compair it with exact solution.

(b) Verify Cayley-Hamilton theorem on

$$\begin{bmatrix} 0 & 0 & c \\ 1 & 0 & b \\ 0 & 1 & a \end{bmatrix}$$

a,b,c are scalars. 5

(ii) (a) Solve the differential equation using power series 6

$$y'' + y' + x^2 y = 0$$
$$y(0) = 1$$
$$y'(0) = 2$$

(b) Let C devote the positively oriented boundary of the square whose sides lie along the lines $x = \pm 2$ and $y = \pm 2$. 4

Find $\int_c \frac{\tan\left(z/2\right)}{(z - x_0)^2} dz$ $(-2 < x_0 < 2)$

2. Write a program in SCILAB/MATLAB to solve the second-order differential equations $\frac{d^2y}{dx^2} = \cos(2x) - y$, with two initial condition $y(0) = 1$ and $y'(0) = 0$.

3. Write a program in SCILAB/MATLAB to solve the second-order differential equations ,

$$2x^2 \frac{d^2y}{dx^2} + 3x\frac{dy}{dx} - y = 0.$$

4. Write a program in SCILAB/MATLAB to explore the behavior of the series, $\sum_{k=1}^{\infty} \frac{4(-1)^{k+1}}{2k-1}$.

Explain whether ten series seems to converge or diverge.

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

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

explain whether ten series seems to converge or diverge.

(Continued)

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

$$12x_1 + 3x_2 - 5x_3 = 1$$
$$x_1 + 5x_2 + 3x_3 = 28$$
$$3x_1 + 7x_2 + 13x_3 = 76$$

Correct up to four decimal places.

7. Solve the following differential equation using SCILAB/ MATLAB/Other Mathematical Computational Software.

$$2x^2 \frac{d^2y}{dx^2} + 3x \frac{dy}{dx} - y = 0$$

8. Solve the following system of linear equations using any mathematical software.

$$4x_1 - x_2 - x_3 = 3$$
$$-2x_1 + bx_2 + x_3 = 9$$
$$-x_1 + x_2 + 7x_3 = -6$$

Distribution of Marks

Experiment :	***15 Marks***
Laboratory Note Book :	***02 Marks***
Viva Voce :	***03 Marks***
Total	***20 Marks***