

FACULTY OF ENGINEERING

B.E. I-Year (Backlog) Examination, May / June 2019

Subject : Mathematics-II

Time : 3 hours

Max. Marks : 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

- 1 Solve $x dy + y dx = (x^2 + y^2) dy$. 3
- 2 State Newton's law of cooling. 2
- 3 Solve $2x^2 y'' + 3xy' - y = 0$. 3
- 4 If xe^{2x} is one of the two linearly independent solutions of $y'' + 4y' + 4y = 0$, find the second solution. 2
- 5 Classify the singular points of $x(x-1)y'' + 2y' + xy = 0$. 3
- 6 Prove that $P_n(-x) = (-1)^n P_n(x)$. 2
- 7 Evaluate $\Gamma\left(\frac{9}{2}\right)$. 3
- 8 Write the Bessel's differential equation and Bessel's function $J_2(x)$ of order 2. 2
- 9 Find $L\{e^{-t} \sin 2t\}$. 3
- 10 State convolution theorem of Laplace transforms. 2

PART – B (50 Marks)

- 11 a) Solve $(y^4 + 2y) dx + (xy^3 + 2y^4 - 4x) dy = 0$. 5
 b) Find the orthogonal trajectories of the family $ay^2 = x^3$, where 'a' is a parameter. 5
- 12 a) Solve $y'' - 2y' + y = xe^x \sin x$. 5
 b) Apply the method of variation of parameters to solve $\frac{d^2 y}{dx^2} + y = \sec x$. 5

- 13 a) Find the power series solution of the differential equation
 $(1-x^2)y'' - 2xy' + 2y = 0$ about $x = 0$. 6
- b) Express $2x^3 + 3x^2 - x + 1$ in terms of Legendre polynomials $P_n(x)$. 4
- 14 a) Prove that $s(m, n) = \int_0^1 \frac{x^{m-1} + x^{n-1}}{(1+x)^{m+n}} dx$. 5
- b) Show that $J_{5/2}(x) = \sqrt{\frac{2}{fx}} \left[\frac{(3-x^2)\sin x}{x^2} - \frac{3\cos x}{x} \right]$. Using Laplace transforms. 5
- 15 a) Find the Laplace transform of $f(t) = \frac{e^{-2t} \sin 3t}{t}$. 5
- b) Solve $y'' + 4y' + 3y = e^{-t}$, $y(0) = 1$, $y'(0) = 1$. 5
- 16 a) Find the general and singular solutions of the Clairant's equation
 $y = xy' + e^{-y'}$. 5
- b) Solve $y''' + y'' - 2y = 0$, $y(0) = 2$, $y'(0) = 2$, $y''(0) = -3$ 5
- 17 a) Prove that $nP_n(x) + P_{n-1}'(x) = xP_n'(x)$. 5
- b) Evaluate $\int_0^{f/2} \sqrt{\cot u} du$ using Beta and Gamma functions. 5

FACULTY OF ENGINEERING
B.E. (B.C) I – Semester (Backlog) Examination May/June 2019

Subject: Programming in C

Time: 3 Hours

Max. Marks: 75

Note: Answer all questions from Part – A & answer any five questions from Part-B.

Part – A (25 Marks)

1. Draw and explain the block diagram of a digital computer? [3]
2. Write a flowchart for finding roots of a quadratic equation? [3]
3. What is the difference between assignment and equality operation? [2]
4. Write the sequence of steps to develop and execute a C program? [3]
5. Differentiate between for loop and while loop? [2]
6. Write a 'C' program to find the largest among two numbers using Conditional Operator? [2]
7. Write a program to swap two numbers using functions? [3]
8. What are the uses of functions in C language? [3]
9. Define pointer? What are the advantages of pointers? [2]
10. What is the use of fseek() function in files. Write its syntax? [2]

Part – B (5 × 10 = 50)

11. (a) What are the steps involved in program development process? Explain. [5]
 (b) Write an algorithm and flowchart to find the Fibonacci series till term 1000? [5]
12. (a) Explain about the basic data types in C language with example? [5]
 (b) Write the importance of precedence and associativity? Write the table for operator Precedence? [5]
13. (a) Discuss about selection statements with examples? [6]
 (b) Write a program to print the following series on the screen? [4]
 1
 1 2
 1 2 3
 1 2 3 4
 1 2 3 4 5
14. (a) What is recursion? Differentiate between recursion with iteration? [5]
 (b) Write a program for finding the GCD among two numbers using recursion? [5]
15. (a) Explain about different string manipulation functions with examples? [6]
 (b) Write a program to find given string is palindrome or not? [4]
16. (a) Explain about structure and union with examples? [6]
 (b) Write a program to copy content of a file to another file? [4]
17. (a) How to pass structure variable to functions? Explain with example? [5]
 (b) Write a program to perform multiplication on two matrices using pointers? [5]
