Implement the following operations by writing an appropriate constructor and an overloaded operator +.

i. OCTAL h = x ; where x is an integer
ii. int y = h + k ; where h is an OCTAL object and k is an integer.

Display the OCTAL result by overloading the operator <<. Also display the values of h and y.

14. Design, develop, and execute a program in C++ to create a class called BIN_TREE that represents a Binary Tree, with member functions to perform inorder, preorder and postorder traversals. Create a BIN_TREE object and demonstrate the traversals.

Note: In the examination each student picks one question from a lot of *all* the 14 questions.

ELECTRONIC CIRCUITS & LOGIC DESIGN LABORATORY
(Common to CSE & ISE)

Subject Code: 10CSL38	**I.A. Marks : 25**
Hours/Week : 03	**Exam Hours: 03**
Total Hours : 42	**Exam Marks : 50**

PART-A

1. a) Design and construct a suitable circuit and demonstrate the working of positive clipper, double-ended clipper and positive clamper using diodes.
   b) Demonstrate the working of the above circuits using a simulation package.

2. a) Design and construct a suitable circuit and determine the frequency response, input impedance, output impedance, and bandwidth of a CE amplifier.
   b) Design and build the CE amplifier circuit using a simulation package and determine the voltage gain for two different values of supply voltage and for two different values of emitter resistance.

3. a) Design and construct a suitable circuit and determine the drain characteristics and transconductance characteristics of an enhancement-mode MOSFET.
   b) Design and build CMOS inverter using a simulation package and verify its truth table.

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4. a) Design and construct a Schmitt trigger using Op-Amp for given UTP and LTP values and demonstrate its working.
   b) Design and implement a Schmitt trigger using Op-Amp using a simulation package for two sets of UTP and LTP values and demonstrate its working.

5. a) Design and construct a rectangular waveform generator (Op-Amp relaxation oscillator) for given frequency and demonstrate its working.
   b) Design and implement a rectangular waveform generator (Op-Amp relaxation oscillator) using a simulation package and demonstrate the change in frequency when all resistor values are doubled.

6. Design and implement an astable multivibrator circuit using 555 timer for a given frequency and duty cycle.

PART – B

7. a) Given a 4-variable logic expression, simplify it using Entered Variable Map and realize the simplified logic expression using 8:1 multiplexer IC.
   b) Design and develop the Verilog /VHDL code for an 8:1 multiplexer. Simulate and verify its working.

8. a) Realize a J-K Master / Slave Flip-Flop using NAND gates and verify its truth table.
   b) Design and develop the Verilog / VHDL code for D Flip-Flop with positive-edge triggering. Simulate and verify its working.

9. a) Design and implement a mod-n (n<8) synchronous up counter using J-K Flip-Flop ICs and demonstrate its working.
   b) Design and develop the Verilog / VHDL code for mod-8 up counter. Simulate and verify its working.

10. a) Design and implement a ring counter using 4-bit shift register and demonstrate its working.
    b) Design and develop the Verilog / VHDL code for switched tail counter. Simulate and verify its working.

11. Design and implement an asynchronous counter using decade counter IC to count up from 0 to n (n<=9) and demonstrate its working.

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12. Design and construct a 4-bit R-2R ladder D/A converter using Op-Amp. Determine its accuracy and resolution.

Notes:

1. **In the examination, each student picks one question from the lot of questions, either from Part-A or from Part-B. About half the students in the batch are to get a question from Part-A while the rest are to get the question from Part-B.**
2. **Any simulation package like MultiSim / Pspice etc may be used.**

IV SEMESTER

ENGINEERING MATHEMATICS – IV

CODE: 10 MAT 41 | **IA Marks: 25**
Hrs/Week: 04 | **Exam Hrs: 03**
Total Hrs: 52 | **Exam Marks:100**

PART-A

Unit-I: NUMERICAL METHODS - 1

Numerical solution of ordinary differential equations of first order and first degree; Picard's method, Taylor's series method, modified Euler's method, Runge-kutta method of fourth-order. Milne's and Adams - Bashforth predictor and corrector methods (No derivations of formulae).

[6 hours]

Unit-II: NUMERICAL METHODS – 2

Numerical solution of simultaneous first order ordinary differential equations: Picard's method, Runge-Kutta method of fourth-order.
Numerical solution of second order ordinary differential equations: Picard's method, Runge-Kutta method and Milne's method.

[6 hours]

Unit-III: Complex variables – 1

Function of a complex variable, Analytic functions-Cauchy-Riemann equations in cartesian and polar forms. Properties of analytic functions.

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