Semester Final Examination 2022/02
B.Sc. Engineering in Computer Science Program
CSE 1201: Discrete Mathematics

Marks: 60 **Time: 3.00 Hour**

[The figures in the right margin indicate full marks for the respective question.]
[Answer any *Five* sets rest of the following questions.]

1. a) What is proposition? Briefly explain with example. 3
   b) Briefly explain about conjunction, disjunction and negation of proposition. 6
   c) State and proof the following De-Morgans law 3
      i) $(p \vee q)' = p' \wedge q'$ ii) $(p \wedge q)' = p' \vee q'$.
2. a) How can the following sentence be translated into a logical expression? 4
      i) "You can access the Internet from Rabindra Maitree University campus only if you are a Computer Science major not a freshman".
      ii) "The automated reply cannot be sent when the file system is full".
   b) i) Let W (x, y, z) denote the statement "x + 2 <= z - y". What are the truth values of the propositions L (1, 8, -3) and L (-10, 12, 2)? 4
      ii) Let J (x, y) denote the statement "y >= X * 3". What is the truth values of the propositions G (15, 11) and G (15, 10)?
   c) Let p (x) denote the statement "x > 3". What is the truth value of the quantification $\forall x\ p(x)$ where the universe of discourse consists of all real numbers? 4
3. a) Describe set and object with example. 4
   b) Draw a Venn diagram that represents V, the set of vowels in English alphabet. 3
   c) Find out the cardinality and power set of the sets given below: 5
      i) A = {5, 7, 3} ii) Null set.
4. a) Briefly explain about the converse, inverse and contradiction with example and truth table (if necessary). 9
   b) What is the negation of the statement $\forall x\ (x^2 >= x)$. 3
5. a) Define the following terms: 4
      i) Theorem ii) Proof.
   b) Translate into English of the following statement. 4
      $\forall x \forall y((x > 0) \wedge (y < 0) \rightarrow (xy < 0))$
      Where the universe of discourse for both variables consists of all real numbers?
   c) Prove that p v (q ^ r) and (p v q) ^ (p v r) are logically equivalence. 4
6. a) What is implication? Write down the necessary rules for implication. 4
   b) What is biconditional proposition? Write down the necessary rules for biconditional proposition. 4
   c) Briefly explain about universal and existential quantifier. 4
7. a) Briefly explain about free and bound variable with proper example. 6
   b) Let f_1 and f_2 be functions from R to R such that $f_1 = x^2$ and $f_2 = x - x^2$. What are the functions $f_1 + f_2$ and $f_1 f_2$? 4
   c) Prove that if (3n + 2) is odd, then n is odd. 2
8. Define the following terms: 12
      i) Graph ii) Adjacent nodes iii) Degree of nodes iv) Weighted graph.

Final Examination 2022/02

B.Sc. Engineering in Computer Science and Engineering

EEE 1201 : Introduction to Electrical Engineering

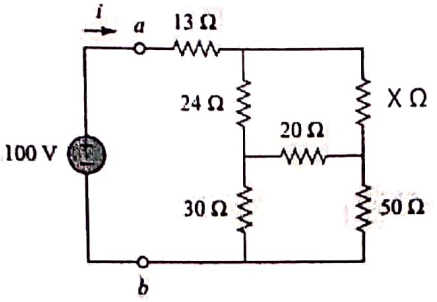
Marks: 60 **Time: 3.00 Hours**

[The figures in the right margin indicate full marks for the respective question]

[Answer any *FIVE* sets from the following questions]

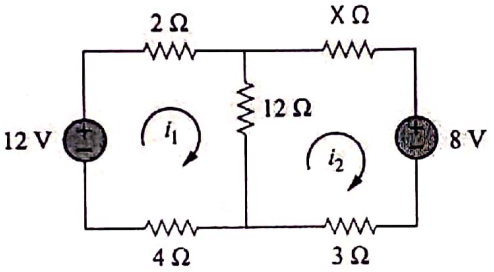
1. a. State Ohm's law. 2

   b. For the bridge network in the following figure, find R_{a-b} and i, where X = Last two digit of your ID. 10



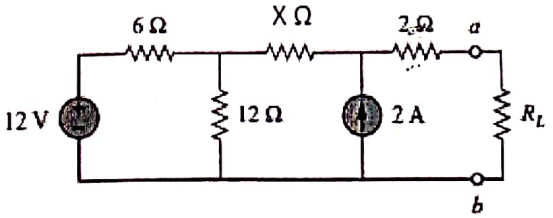
2. a. State KCL and KVL. 2

   b. Calculate the mesh currents i1 and i2 in the following circuit, where X = Last two digit of your ID. 10



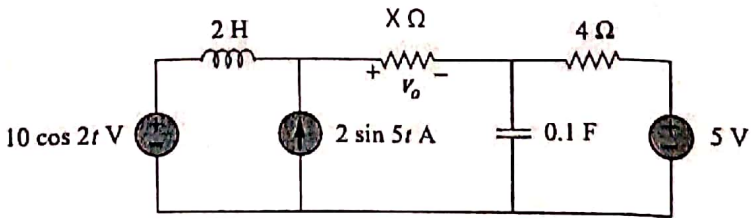
3. a. State Thevenin's Theorem. 2

   b. Draw the Thevenin and Norton Equivalent circuit from the following circuit, also find the value of maximum power transferred to the load, R_L, where X = Last two digit of your ID. 10



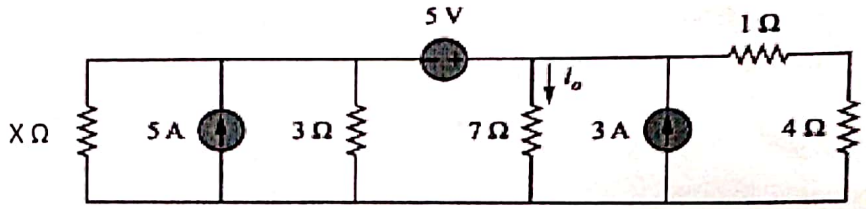
4. a. State Superposition Theorem 2

   b. Find V_0 in the following circuit using the superposition theorem, where X = Last two digit of your ID. 10



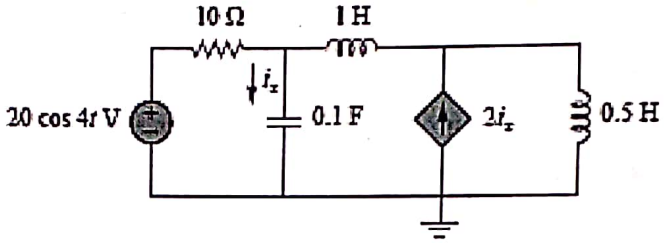
5. a. State Source Transformation Theorem. 2

b. Find the current i_0 from the following circuit, where X = Last two digit of your ID. 10



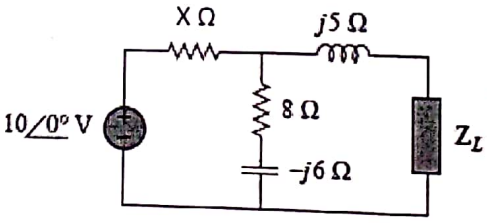
6. a. Define Voltage and Current. 2

b. Find the current i_x from the following circuit, where X = Last two digit of your ID. 10



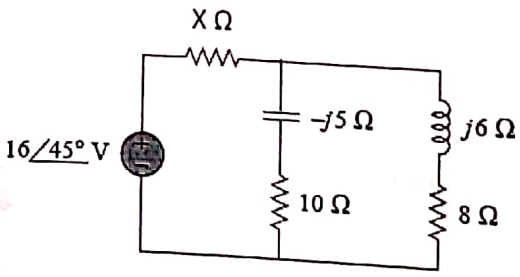
7. a. Define Power factor. 2

b. Draw the Thevenin and Norton Equivalent circuit from the following circuit, also find the value of maximum power transferred to the load, Z_L, where X = Last two digit of your ID. 10



8. a. Draw the power triangle. 2

b. For the entire circuit in the following figure, calculate (i) Power factor (ii) Real power (iii) Reactive power (iv) Apparent power (v) Complex power, where X = Last two digit of your ID. 10



Semester Final Examination 22/02

B.Sc Engineering in Computer Science Program

CSE 1202: Object Oriented Programming using C++

Marks: 60 **Time: 3 Hours**

[The figures in the right margin indicate full marks for the respective question.]

[Answer any **FIVE** sets rest of the following questions]

1. a) Define Object Oriented Programming with example. 2
   b) Describe basic concepts in OOP. 6
   c) Write the advantages of OOP over procedure oriented programming languages. 4

2. a) Define Inheritance in C++. 2
   b) Define friend function with example. 4
   c) Describe the different types of inheritance in C++. 6

3. a) Write the differences between virtual function and pure virtual function. 4
   b) Describe abstract class with example. 4
   c) Write a C++ program that operates in function overloading. 4

4. a) Define constructor and destructor. 3
   b) Classify different types of constructor in C++ languages. 6
   c) Write the formatted input/output functions in C++ 3

5. a) Define stream classes in C++. 3
   b) Describe early binding and late binding with example in C++. 6
   c) Write the cascading input/output operator with example in C++. 3

6. a) Define File handling in C++. 2
   b) Write the unformatted input/output function in C++ 4
   c) Write a code how to create, read and write data from a file. 6

7. a) Define exception handling in C++ 2
   b) What are the differences between try and catch keywords in C++. 4
   c) Write a C++ program using try and catch keywords in exception handling. 6

8. Write all Short Note with example:
   a) Encapsulation 4
   b) Inline Function 4
   c) Hierarchical Inheritance 4

Semester Final Examination- 2022/02
Department of CSE
MATH 1201: Integral Calculus, Ordinary and Partial Differential Equations, and Series Solutions

Marks: 60 *[The figures in the right margin indicate full marks for the respective question]* Time: 03 hours
[Answer any five of the following questions]

1. Find the integrals below:

a) $\int \cos^4 x \sin x \; dx$ 2

b) $\int \frac{\ln(\ln x)}{x} dx$ 3

b) $\int \tan^{-1} x \; dx$ 3

c) $\int \frac{2x^2 - 1}{(1+x)^2(x-2)} dx$ 4

2. a) Evaluate the following definite integral: 4

$$\int_0^{\pi} \frac{x}{\cos x + \sin x} dx.$$

b) Evaluate: 3

$$\int_0^{\pi} x \cos^4 x \, dx$$

c) Evaluate $\int_a^b \sin x \, dx$ by first principal / definition. 5

3.

a) Find the value of $\lim_{n\to\infty} \left[\frac{1}{n} + \frac{1}{\sqrt{n^2-1}} + \frac{1}{\sqrt{n^2-2^2}} + \cdots\cdots + \frac{1}{\sqrt{n^2-(n-1)^2}}\right]$ 6

b) Derive the reduction formula for 6

$$\int \cos^n x \; dx$$

4. a) Derive the reduction formula and hence find the of the integral 6

$$\int_0^{\pi} \cos^3 x \cos 2x \; dx$$

b) Show that the area between the parabola $y^2 = 4x$ and the straight line $y = 2x - 4$ is 9 square unit. 6

5. a) Find the perimeter of the hypocycloid $\left(\frac{x}{a}\right)^{2/3} + \left(\frac{y}{b}\right)^{2/3} = 1$. 6

b) The part of the curve $y = \sin x$ form $x = 0$ to $x = \pi$ revolves about the x-asix. Find the volume and the surface area of the solid that generated. 6

06. a) Define the terms:
   i. Differential equation.
   ii. Order of differential equation.
   iii. Degree of differential equation.
   iv. Linear differential equation.

   b) Form a differential equation by eliminating the constants from $y = ax + bx^2$.

   c) Solve: $y^2dx + 2xydy = 0$

07. a) Solve the equation: $(x^2 - 3y^2)dx + 2xydy = 0$

   b) Solve the equation: $4xydx + (x^2 + 1)dy = 0$

   c) Solve the differential equation: $\frac{d^3y}{dx^3} - 4\frac{d^2y}{dx^2} + \frac{dy}{dx} + 6y = 0.$

08. a) Solve the differential equation: $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} - 3y = 2e^x - 10\sin x.$

   b) Using Frobenis method, solve: $2x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + (x - 5)y = 0.$

Department of English
1st Year 2nd Semester Final Examination 2022-02
Course: GED 03 – Advanced Reading and Writing

Bangla, CSE & Fine Arts

Full Marks: 60 Time: 3 Hours

N.B: Marks are displayed at the right side of each question.

Read the following passage carefully and answer the questions (1-5) below.

The function of education, then, is to help you from childhood not to imitate anybody, but to be yourself all the time. And this is a most difficult thing to do: whatever you are ugly or beautiful, whether you are envious or jealous, always to be what you are, but understand it. To be yourself is very difficult, because you think that what you are is ignoble, and that if you could only change what you are into something noble it would be marvelous, but that never happens. Whereas, if you look at what you actually are and understand it, then in that very understanding there is a transformation. So freedom lies, neither in trying to become something different, nor in doing whatever you happen to feel like doing, nor in following the authority of tradition, of your parents, of your guru, but in understanding what you are from moment to moment.

1. Identify the following sentences are true or false? If false state the correct statement. 01×05 = 05

a. Education helps you to be a famous person.
b. The most difficult thing is to be yourself.
c. A famous quote "Know thyself" is the function of education.
d. Freedom lies in doing whatever you wish to do.
e. You should learn to understand the process of making to lead a better life.

2. Select the correct answers from the options. 01×05 = 05

a. Marvelous means _____.
i. authentic ii. astonishing iii. extravagant

b. If you are ignoble, you will change yourself to be _____.
i. educated ii. famous iii. noble.

c. What is the aim of education?
i. To be oneself ii. Be successful iii. Imitating.

d. What should you understand?
i. What we are ii. Be prosperous iii. Beauty of a human

e. Freedom lies in _____ what you are?
i. transforming ii. rebelling iii. understanding.

3. Match Column A & Column B and write it in your paper. 01×05 = 05

Column A	Column B
1. Education is a	a. imitate anybody.
2. Don't think about	b. nor following your teachers.
3. Do not	c. human right.
4. Freedom lies	d. moment to moment understanding.
5. Education is	e. transform yourself.
	f. you're ugly or beautiful.

(Please Turn Over)

4. Re-order the sentences (any Five) 01×05 = 05

a. also/ need / we / the/ weather / in mind / to / keep/ local.
b. brother / an / wants / be / my / astronaut / to.
c. history / mother / the / their / college / at / teaches.
d. music / like / the / I / evenings / listen / in / to.
e. was / performance / impressed / with / quite / his / I.
f. effect / we / in / did / much / sales / last / not / year / improvement.
g. it / a lot of / before / actually requires / the visit / preparation.

5. Make sentences by using the following words. (any Five) 01×05 = 05

a. Evaporation
b. Tougher
c. Absorb
d. Tradition
e. Mentally
f. Survive
g. Affected.

6. Fill in the blanks with the right form of verbs. (any Five) 01×05 = 05

a. Isabella __ home yesterday from her university. **(come)**
b. Jane __ him long since. **(see)**
c. Shawn __ not __ to the hospital to see his wife. **(go)**
d. Masha __ in this school since 2015. **(read)**
e. Two days__ away since he left me. **(pass)**
f. It __ for two hours. **(rain)**

7. Generalize an application to the Registrar of Rabindra Maitree University for the post of English Lecturer with CV. 01×10 = 10

8. Formulate a paragraph. (any One)
a. RMU Campus 01×10 = 10
or,
b. Mix Culture.

9. Assemble an Essay. (any One)
a. Your Recent Visit to a Historical Place 01×10 = 10
or,
b. Governing System.

SEMESTER FINAL EXAMINATION (Spring) 2022

CSE, 1st Year 2nd Semester

Course Title – physics-I, Course code: PHY-1201

Time : 3 Hours | Full Marks -60

(Answer any Five (5) of the following questions)

	Marks
1. Calculate the resultant wave for the interference of two waves .	12
2. Evaluate the differential equation of the simple harmonic oscillator with requisite picture.	12
3. Construct the Coulomb`s law from Gauss`s law with picture.	12
4. Evaluate the electric potential due to an electric dipole with proper diagram.	12
5. Describe the construction of semiconductor with diagram.	12
6. (a) Define p-type semiconductor.	02
(b) Describe the formation of p-type semiconductor with proper diagram.	10
7. Evaluate the magnetic induction due to magnetic field describing Biot-Savart law with Laplace rule with requisite diagram.	12
8. A dipole of strength 1.6×10^{-29} coul.metre is situated at 5×10^{-10} metre from a nucleus of charge +3e. Find the force and torque on the dipole, when it is oriented along a radius from the nucleus, positive and further aways.	12