Pokhara
First Term Exam
2022

Program: BIT **Full Mark: 50**
Semester: Second **Time: 2 hr**

Course: Mathematics II (BSM 102)

Candidates are required to give their answer in their own words as far as practicable. Figures in the margin indicate full marks.

Group A

Solve any five questions $(2 \times 5 = 10)$

1. How many numbers of three different digits can be formed from integers $0, 1, 2, 3, 4, 5$?
2. In how many ways can the letter of the word INDEPENDENCE be arranged?
3. By using divergence test, show that the series $\sum_{n=1}^{\infty} \frac{n^2}{2n^2+7}$ diverges.
4. The series $\sum_{n=1}^{\infty} \frac{1}{n^2}$ converges and $\sum_{n=1}^{\infty} \frac{1}{n}$ diverges. Give the reasons for each statement?
5. Determine whether the series is convergent or divergent :
$$4 + \frac{8}{5} + \frac{16}{25} + \frac{32}{125} \cdots$$
6. If $f(x, y, z) = x^2y - y^2z + xz^2$, then find f_x, f_y, f_z

Group B

Solve any five questions $(5 \times 5 = 25)$

7. From a group of 6 gentlemen and 4 ladies, a committee of 5 is to be formed. In how many ways can this be done so as to include at least 2 lady?
8. In how many different ways can the letters of the word MONDAY be arranged ? How many arrangements begin with M ? How many begin with M and do not end with N ?
9. State the condition for the convergence of the alternating series. use it to test the convergence or divergence of the series
$$\sum_{n=0}^{\infty} \frac{(-1)^{n+3}}{n^3 + 4n^2 + 8}$$

Gandaki University

BIT Program

First Internal Examination-2079

Subject: Discrete Mathematics | Course Code: CIT 104

Year: 1 | Semester: 2

FM: 50

Group "A"

Attempt **All** questions: **2*5=10**

1. Differentiate between Propositional logic and Predicate logic.
2. Prove that the statement ~P -> (P -> Q) is tautology.
3. Define universal and existential quantifiers.
4. Show that implication and its contrapositive are logically equivalent.
5. Prove that (P or Q) is logical consequence of (P & Q) but (P & Q) is not logical consequence of (P or Q).

Group "B"

Attempt **All** questions: **5*5=25**

1. Define direct proof. Using direct proof, prove that for every positive integer $n^3 + n$ is even.
2. Use mathematical induction to prove that $n^3 - n$ is divisible by 3 where n is a positive integer.
3. Define mathematical induction. Why it is important in the field of Information Technology? Explain with suitable example.
4. Write any five rules of inference for propositional logic.
5. What do you mean by quantifiers? Explain with examples.

Group "C"

Attempt **All** questions: **7.5*2=15**

6. Show that the premises "It is not sunny this afternoon and it is colder than yesterday," "We will go swimming only if it is sunny," "If we do not go swimming, then we will take a canoe trip," and "If we take a canoe trip, then we will be home by sunset" lead to the conclusion "We will be home by sunset."
7. Define DFA. Design a DFA with $\sum = \{0, 1\}$ accepts the set of all strings with three consecutive 0's.

***

Gandaki University

BIT Program

First Internal Examination-2079

Subject: Discrete Mathematics | Course Code: CIT 104

Year: 1 | Semester: 2

FM: 50

Group "A"

Attempt **All** questions: **2*5=10**

1. Differentiate between Propositional logic and Predicate logic.
2. Prove that the statement ~P -> (P -> Q) is tautology.
3. Define universal and existential quantifiers.
4. Show that implication and its contrapositive are logically equivalent.
5. Prove that (P or Q) is logical consequence of (P & Q) but (P & Q) is not logical consequence of (P or Q).

Group "B"

Attempt **All** questions: **5*5=25**

1. Define direct proof. Using direct proof, prove that for every positive integer $n^3 + n$ is even.
2. Use mathematical induction to prove that $n^3 - n$ is divisible by 3 where n is a positive integer.
3. Define mathematical induction. Why it is important in the field of Information Technology? Explain with suitable example.
4. Write any five rules of inference for propositional logic.
5. What do you mean by quantifiers? Explain with examples.

Group "C"

Attempt **All** questions: **7.5*2=15**

6. Show that the premises "It is not sunny this afternoon and it is colder than yesterday," "We will go swimming only if it is sunny," "If we do not go swimming, then we will take a canoe trip," and "If we take a canoe trip, then we will be home by sunset" lead to the conclusion "We will be home by sunset."
7. Define DFA. Design a DFA with $\sum = \{0, 1\}$ accepts the set of all strings with three consecutive 0's.

***

Gandaki University

Bachelor in Information and Technology

Web Technology - I(Code: CIT-106)

Set A

December 23, 2022

Time: 2 hr | *First (1st) Term* | Maximum Marks: 50 | Pass Marks: 20

1. Answer shortly. [10]
   (a) Define any five terms:
      i. Server [2]
      ii. Client [2]
      iii. Internet [2]
      iv. GET [2]
      v. POST [2]
      vi. RESPONSE [2]

2. Answer in brief. Answer any five. [25]
   (a) Internet is unreliable. Justify. [5]
   (b) What are the different types of selectors available in CSS? Discuss the priority order of CSS of rendered element if multiple CSS rules are applied. [2+3]
   (c) Write a HTML form document consisting of text input, number input, multiple choice question, single choice question, textarea with row=10 and col=200. [5]
   (d) Discuss about any CSS measurements used to render a HTML document. [5]
   (e) What do you mean by pseudo class? How can you select a html element having attribute name as "herostyle" and attribute value as "rajesh"? [4+1]
   (f) Differentiate between inline and block elements. [5]

3. Long Answer Questions. Answer any two. [15]
   (a) Write the HTML Layout for Figure 1a. Image path can be any. [7.5]
   (b) Write the CSS of Figure 1a . [7.5]
   (c) Develop a suitable html form using Figure 1b. [7.5]

GANDAKI UNIVERSITY

First Internal Examination -2022

Program: BIT **Time: 2 hrs** **F M: 50**

Subject: Digital Logic (ELX 201) **P M: 23**

Candidates are required to give their answer in their own words. Figures in the margin indicate full marks.

Short Answer Questions (Attempt any five questions): **5x2=10**

1. What are gray codes? Mention the application of these codes.
2. What is the weight of 0 in 10111?
3. Convert $(7562.45)_{10}$ to octal.
4. Why NAND gate is called universal gate?
5. What are the applications of Alphanumeric codes?
6. What is duality principle in Boolean algebra?

Descriptive Answer Questions: **5x5=25**

1. State and verify De Morgan's law for three variables using Truth Table.
2. What are the steps to convert Decimal into Hexadecimal number? Explain with example.
3. Define r's and r-1's complement. If A = -20 and B = 9, then calculate A-B using signed 2' s Complement data.
4. Define Digital signals. Compare Analog system and Digital system with examples.
5. Use r's complement method to perform the operation: 234 – 1278.

Long Answer Questions: **7.5x2=15**

1. Explain the universal property of NOR and NAND gates.
2. Simplify the given expression, F= (A'+B')'+(A+B)'+(A+B')' and implement using logic gates.

****

Gandaki University

Bachelor in Information and Technology

Web Programming(Code: CIT-106)

Set A

December 2, 2022

Time: 1 hr | *Internal (1st) Assessment* | Maximum Marks: 40 | Pass Marks: 16

1. Answer shortly. [40]
   (a) What is HTML? Describe the basic design of a HTML page. [10]
   (b) Describe the ordered lists in HTML. Build a numbered list of items (total=13 items). Numbering starts from 11. [10]
   (c) Build a HTML page having different web elements using h(1,2,3,4), p and img tags. [10]
   (d) Build a HTML document using the concepts of form. Use input (text, number, button, checkbox), select, label and fieldset tags. [10]

GANDAKI UNIVERSITY
PRE-BOARD EXAMINATION

Level: Bachelor | Semester - II | Year : 2079

Programme : BIT | Full Marks: 75

Course: Discrete Mathematics (CIT 104) | Time : 3 Hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

Group "A"

Brief Answer Questions:

Attempt **Any Ten** questions: **10*2=20**

1. Define Contradiction.
2. Represent the statement "All roman were either loyal to caser or hated him" in predicate logic.
3. Define direct and indirect proof.
4. What do you mean by logical equivalence?
5. Define graph.
6. Show that implication and its contrapositive are logically equivalent.
7. Define quantifiers.
8. What do you mean by recurrence relation?
9. Find the recurrence relation an initial conditions of the sequence 3, 8, 13, 18,.....
10. Define CFG.
11. Define Bipartite graph.

Group "B"

Short Answer Questions:

Attempt **Any Eight** questions: **8*5=40**

1. Design a DFA with $\sum = \{0, 1\}$ accepts the set of all strings with three consecutive 0's.
2. Convert the following NFA into equivalent DFA.

Gandaki University

Bachelor in Information and Technology

Web Technology - I(Code: CIT-106)

Set A
February 23, 2023

Time: 2 hr | *Second (2nd) Term* | Maximum Marks: 50 | Pass Marks: 20

1. Answer shortly. [10]
   (a) Define any five terms:
      i. HTML5 [2]
      ii. XHTML [2]
      iii. DNS [2]
      iv. Functions (in JavaScript) [2]
      v. Object (in JavaScript) [2]
      vi. Associative Arrays (in PHP) [2]

2. Answer in brief. Answer any two. [10]
   (a) Differentiate between GET and POST. [5]
   (b) What are the different types of selectors available in CSS? Discuss the priority order of CSS of rendered element if multiple CSS rules are applied. [2+3]
   (c) What do you understand by Event Handling in JavaScript? Discuss its implementation with suitable examples. [5]

3. Programming Exercise. Use Figure 1 and Figure 1b. Attempt All. [15]
   (a) Write the HTML for the page shown in Figure 1. [5]
   (b) Write the CSS for the page shown in Figure 1. [5]
   (c) Write the form validation for the contact page shown in fig 1b. Use the html- Listing 1 [5]
   The conditions for form validation are:
      1. All the required fields must be filled.
      2. Full name and Father Name should be same.
      3. Age can't be greater than 30 and less than 10.
      4. ID Card Number should start with 9922 and end with 3.
      5. File Uploaded must be either pdf or image file.

Listing 1: Form Page HTML

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <title>Form Page</title>
    <link rel="stylesheet" href="form.css">
</head>
<body>
    <div class="container">
        <form id="contact" action="" method="post">
            <h1>Registration Form</h1>
            <h3>Fill the form below and press the submit button!</h3>
            <div class="row">
                <!— first column —>
                <div class="column">
                    <fieldset>
                        <input type="text" placeholder="Full_Name_" name="name" required >

                        <input type="text" placeholder="Father_name_" name="fname" required >

                        <input type="email" placeholder="Your_email_" name="email" required >

                        <input type="date" placeholder="Date_of_birth_" name="date" required >

                        <input type="text" placeholder="Phone_number_" name="phone" id="phone"
                            required >
                    </fieldset>
```

```
                </div>
                <!-- second column -->
                <div class="column">
                    <fieldset>
                        <p>What is your gender?</p>
                        <div class="radio">
                            <input type="radio" id="male" name="gender" required>
                            <label for="male">Male</label>
                        </div>
                        <div class="radio">
                            <input type="radio" id="female" name="gender" required>
                            <label for="female">Female</label>
                        </div>
                    </fieldset>
                    <fieldset>
                        <label for="idCard">Enter your ID Card in given formate.</label>
                        <div class="idCard">
                            <input type="text" name="idCard" placeholder="#####" maxlength="5"> -
                            <input type="text" name="idCard" placeholder="######" maxlength="7"> -
                            <input type="text" name="idCard" placeholder="#" maxlength="1">
                        </div>
                    </fieldset>
                    <fieldset>
                        <p>Upload File</p>
                        <input type="file" id="file" required>
                    </fieldset>
                </div>
            </div>
            <fieldset>
                <button type="submit" id="button">Submit Now</button>
            </fieldset>
        </form>
    </div>
</body>
</html>
```

4. Long Answer Questions. Answer any two. [15]

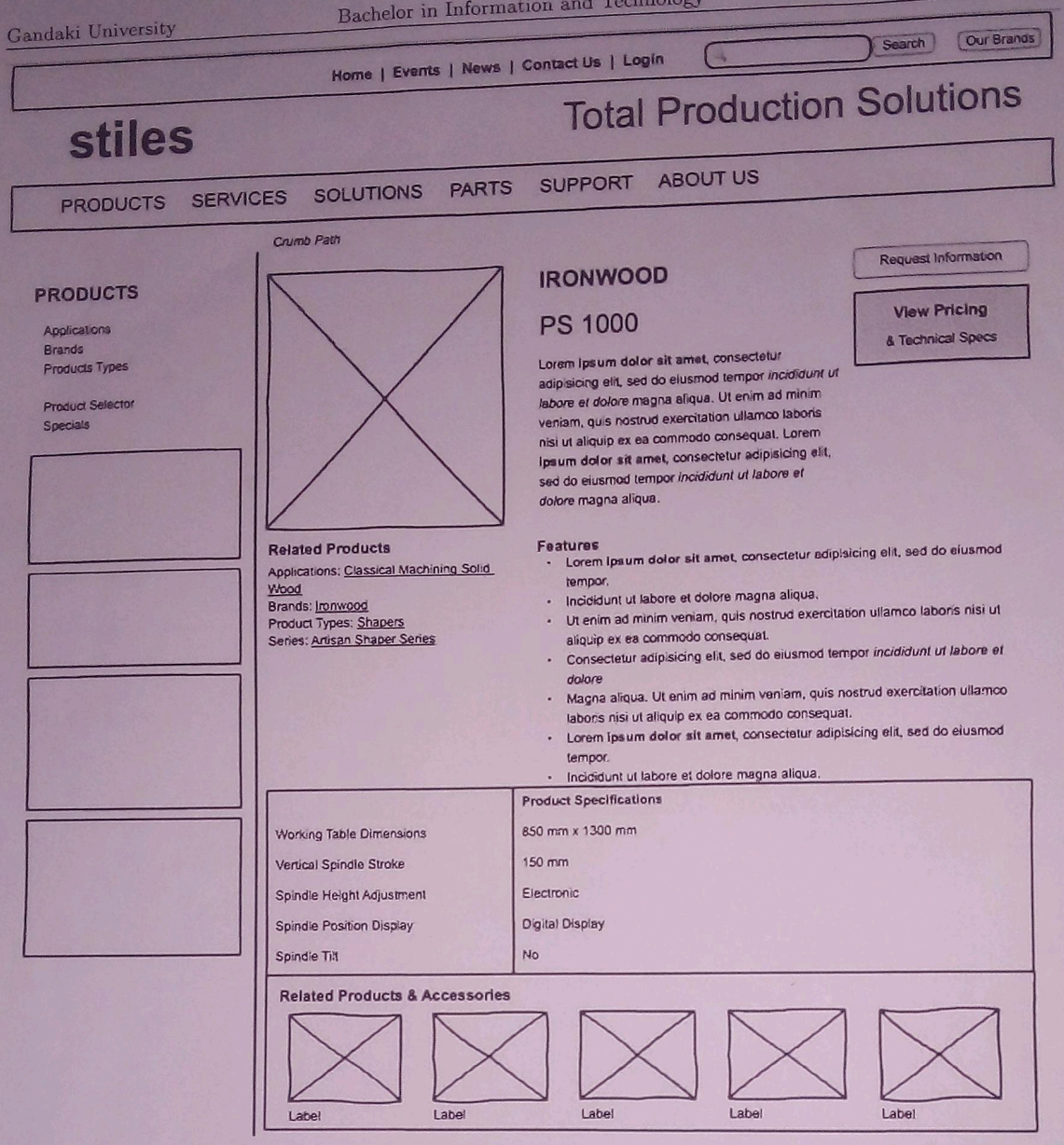
   (a) What do you mean by DOM? Discuss on different methods available for DOM elements (e.g. input, text, div) [7.5]

   (b) Write a PHP/JS script that can be used to iterate over a list of marks and display the average on each subjects and calculate sum and percentage of each students. Use Table 1. Display output as HTML table. Add rows and columns where necessary. [7.5]

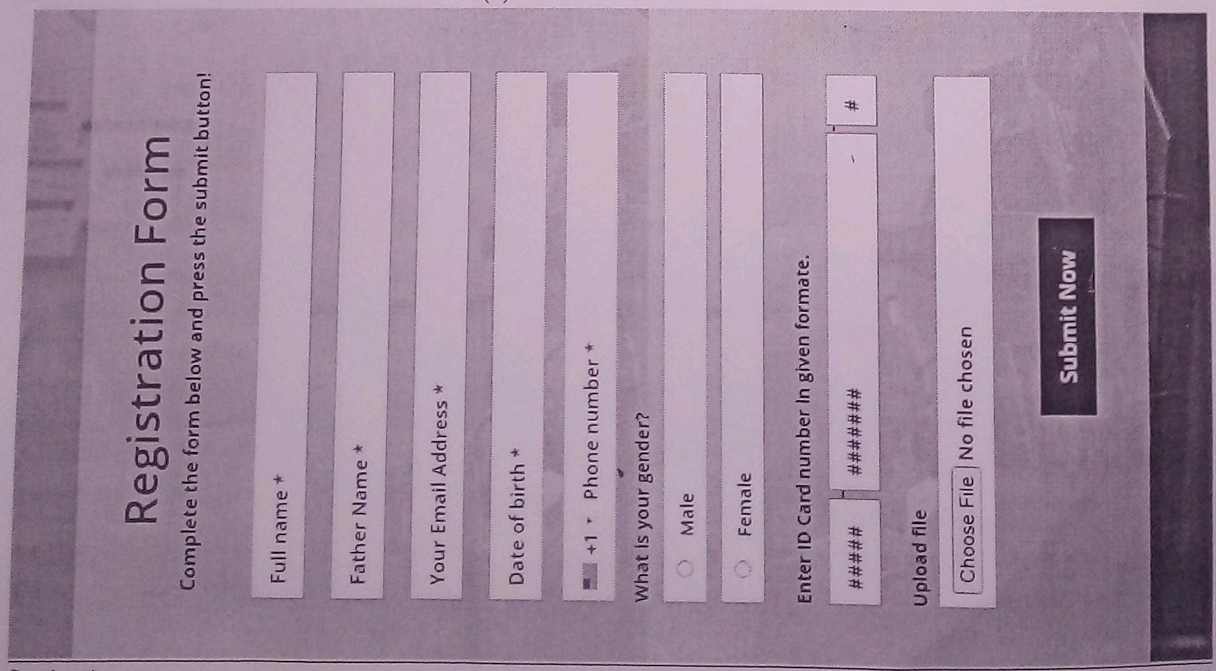
Table 1: Score Table

id	Name	Gender	Age	Section	Science	English	History	Maths
1	Bronnie	Female	13	C	21	81	62	49
2	Lemmie	Male	15	B	29	41	17	40
3	Danya	Female	14	C	12	87	16	96
4	Denna	Female	14	B	15	53	82	33
5	Jocelin	Male	14	A	43	6	3	21
6	Malissa	Female	14	C	98	51	85	76
7	Ichabod	Female	14	B	38	74	54	60
8	Beverlie	Male	14	B	25	51	41	80
9	Corrine	Male	15	A	39	16	22	49

   (c) What do you mean by pseudo class? Describe any 14 of the pseudo classes. [7.5]



(a) HTML CSS Exercise



(b) Form Validation

Figure 1: HTML Exercise

GANDAKI UNIVERSITY
PRE-BOARD EXAMINATION

Level: Bachelor | Semester - II | Year : 2079
Programme: BIT | Full Marks: 50
Course: Digital Logic (ELX 102) | Time : 2 Hrs.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.
Attempt all the questions.

Brief Answer Questions (Any five): **5x2= 20**

1. Flip Flop is a 1-bit memory. Justify it.
2. Draw a PAL circuit for the expression: F1= AB+C'D, F2= A'B+CD'.
3. What is clocked RS Flip Flop?
4. How do you recognize combinational logic circuit?
5. What is the weight of 1 in binary number 0.000010?
6. What is positive and negative logic?

Short Answer Questions (Any five): **5x5= 25**

1. What is Multiplexer? Design 12x1 Multiplexer using NOR gates.
2. Design and explain JK Flip flop with its functional and excitation table.
3. Perform the arithmetic of (42)10 +(-13)10 using 2's complement representation method.
4. Design a combinational circuit that takes 3-bit input and output generate 1's complement of using NOR gates only.
5. Differentiate between adder and subtractor circuit. Draw a circuit diagram of Half subtractor circuit.
6. Prove the universal properties of NOR and NAND gates.

Long Answer Questions (Any Two): **2x7.5=15**

1. Explain r's complement and (r-1)'s complement method. Use r's complement method to perform: $(1010)_2 - (0101)_2$.
2. If F (P,Q,R,S) = π (0,1,4,5,11,14,15) and d (P,Q,R,S) = π (2,3,7,8,9,13) then design a circuit using NOR gates and basic gates.
3. Differentiate between combinational and sequential logic circuits. What is the major limitation of RS Flip Flop.

The End

GANDAKI UNIVERSITY

Second Internal Examination

Level: Bachelor
Semester: II
Program: BIT(CIT 105)

Subject: Programming-II(Java)
Full marks: 50
Time: 2:00 hrs

Candidates are required to give their answers in their own words as far as practicable
Attempt all the questions.

Very Short answer questions. (2*5=10 marks)

1. Differentiate between Java and C++.
2. What are the uses of 'extends' and 'implements' keywords?
3. Provide an example code to display a simple Frame.
4. How is the package used in Java?
5. Differentiate between constructor and method.
6. Differentiate between AWT and Swing.

Short Answer Questions. (5* 5=25 marks)

7. Create a class Number with the three integer instance variables x, y, and z . the class will have one constructor to initialize instance variables. The class also will contain method getMin() method that will return the smallest number. Create a class NumberDemo with the main method that returns the smallest number. Create a class NumberDemo with the main method that will create object of Number and print the smallest number.
8. Name different types of operators in Java. Write a simple program to illustrate ternary operator.
9. Write the types of inheritance. Explain how multiple inheritance is achieved in Java with suitable examples.
10. Write a program that opens a file reader on inputfile.txt. for reading the data from a file and writing the data to another file named output.txt. Also, use exception handling as well.
11. Create an abstract class called Fmachine with the methods getdata() and putdata(). Derive a class Airplane with the instance variables code, name, capacity, and methods getdata() and putdata() that overrides Fmachine's getdata() and put data() to read and display the results. Create some instances of Airplane and call the required methods.
12. Name different Listener interfaces. Make a simple program showing the action Performed() method.

Long Answers Questions:(2*7.5=15 marks)

13. Create a class named 'Member' with the data members as name, age, phone, address, salary. It has also methods print Member Details to display the member details. Second classes named Employee and Manager inherit the 'Member' class. These classes have data members as specialization and department. The Employee class contains method named print Specialization and Manager class contains method named 'print Department'. Provide the main class and create the objects of Employee and Manager and print them. Use the concept of concept of super() as well.
14. Define exception. Why it is important to handle the exception? Write a program for illustrating the exception handling concepts using try/ catch /throw.
15. What is event handling? Write a program to create an application in swing with two text fields, two labels and a button. When a button is clicked, the sum of the values in the text fields are shown in the labels.

Gandaki University

Gandaki University
Pokhara
Pre-Board Exam
2023

BIT Second Semester
Mathematics II (BSM 102)

Full Marks: 75
Time: 3 hours

Candidates are required to give their answer in their own words as far as practicable.
Figures in the margin indicate full marks.

Group A
Very Short Answer Questions

Attempt any **ten** questions $10 \times 2 = 20$

1. In how many ways can 7 students from a ring?
2. In how many ways can the letter of the word MISSISSIPPI be arranged?
3. By alternating series test, show that the following seres $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^2}$ is convergent.
4. State the conditions for convergence and divergence of infinite series by root test.
5. If $f(x, y) = \ln\left(x^2 + y^2 + z^2\right)$ find f_x, f_y and f_z.
6. Find all the second order partial derivatives of the functions $z = x^2y + \cos y + y \sin x$, then verify the Euler's Theorem.
7. Show that the following differential equation is exact. $\left(x^3 + 3xy^2\right) dx + \left(3x^2y + y^3\right) dy = 0$
8. Use the separation of variables to find the general solution of the differential equation $\frac{dy}{dx} = \frac{x^2}{y^2}$
9. If square roots of $x + iy$ are $a + ib$, where $a = \pm\left(\frac{\sqrt{x^2+y^2}+x}{2}\right)^{\frac{1}{2}}$ and $b = \pm\left(\frac{\sqrt{x^2+y^2}-x}{2}\right)^{\frac{1}{2}}$ then find the square root of $7 - 24i$
10. Prove that the polar representation of $z = 3 + 3\sqrt{3}i$ is $6\left(\cos\frac{1}{3}\pi - i\sin\frac{1}{3}\pi\right)$
11. Express the complex number $z = \frac{1+2i}{3-4i}$ in the form of $a + ib$

...

Group B
Short Answer Questions

Attempt any **eight** questions $8 \times 5 = 40$

12. How many four digit numbers can be formed from the digits $1, 3, 5, 7, 8, 9$
    (i) if each digit may be used once in each number?
    (ii) if each digit may be used repeatedly in each number?

13. In how many different ways can we select a committee consisting of 3 engineers, 2 biologists, and 2 chemists from 10 engineers, 5 biologists, and 6 chemists?

14. Determine if the following series is convergent or divergent. $\sum_{n=1}^{\infty} \frac{9^n}{(-2)^{n+1} n}$

15. Find the general solution of the differential equation $\frac{dy}{dx} = 4x^3y^2$; Use initial condition $y = 2$ when $x = 0$ to find particular solution.

16. Determine whether the function $z = x^2 + y^2 - 2x + 1$ has relative maxima or minima.

17. Given $f(x, y) = x^2 + x - 3xy + y^3 - 5$, find all critical points i.e solve for x and y with $f_x(x, y) = 0$ and $f_y(x, y) = 0$ simultaneously.

18. If $z = x + iy$, then by using Cauchy-Riemann equation prove that $f(z) = z^3$ is analytic.

19. State the De'Moivre theorem, Use it to find the cube root of unity.

Group C
Long Answer Questions

Attempt any **two** questions $2 \times 7.5 = 15$

20. State the conditions for the convergence and divergence of infinite series by ratio test. Find the center, radius and interval of convergence of power series: $\sum_{n=1}^{\infty} \frac{(-1)^n (z-3)^n}{5^n}$ [1+1+4+1.5]

21. Verify that $u = x^2 - y^2$ is harmonic in the whole complex plane and find a harmonic conjugate function v of u. Also find the corresponding analytic function. [2–4+1.5]

22. Test for exactness of the given differential equation. Then solve it:
    $\cos(x + y)dx + \left(3y^2 + 2y + \cos(x + y)\right) dy = 0.$ [2+5.5]

The End

Gandaki University
Pokhara

BIT/Second Semester/2080/Final Examination | Full Marks: 50
ELX102 Digital Logic | Time: 2 hrs | Pass Mark: 22.5

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all the questions.

1. Answer the following questions in brief *(any five)*. **[5 × 2 = 10]**

a. Differentiate between analog and digital signal.

b. Differentiate between combinational and sequential logic circuits.

c. What is ripple counter?

d. Differentiate between PAL and PLA.

e. What is shift register?

f. What do you mean by Product of Sum (POS)? Explain with example.

Answer the following questions *(any five)*. **[5 × 5 = 25]**

2. State De-Morgan's Theorem. How NAND gate can be used as universal gate? Explain
3. Simplify the function using K-map $F= \Sigma_m(0,1,4,8,10, 11, 12)$ and $D = \Sigma_m(2, 3, 6, 9, 15)$ & design a circuit using basic gates.
4. What is an encoder? Design 3:8 line decoder circuit.
5. Design a 3-bit even parity generator and 4-bit even parity checker circuit.
6. Realize a full-adder using standard K-map & logic gates.
7. What is ripple counter? Explain 3 bit asynchronous up/down counter with necessary diagrams.

Answer the following questions. **[2 × 7.5 = 15]**

8. Perform the following as indicated in the brackets:
   a. $(10.0101)_2 = (?)_{16}$
   b. $(101111001)_{Binary} = (?)_{Gray}$
   c. $(10.001)_2 - (11.101)_2$ using 2's complement method
9. Differentiate between synchronous and asynchronous counters. With clear circuit and timing diagram, explain the operation of Parallel in - Serial out shift register.

The End

Gandaki University
Pokhara

BIT/Second Semester/2080/Final Examination
CIT106 Web Technology I

Time: 2 hrs

Full Marks: 50
Pass Mark: 22.5

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all the questions.

1. Answer the following questions in brief *(any five)*. **[5 × 2 = 10]**

a. Differentiate webpage and website. Also define webserver.

b. Write source code to insert an image and hyperlink.

Image address: gandakiuniversity.edu.np/logo.png

Hyperlink: gpu.edu.np

c. What is a comment in HTML? How do you write the comment in HTML and CSS?

d. Write the purpose of the parseInt() function in JavaScript.

e. Write examples of trim() and ucwords() functions in PHP.

f. Write a function in JavaScript to calculate sum of two numbers.

Answer the following questions *(any five)*. **[5 × 5 = 25]**

2. Define Table tag and demonstrate the use of different attributes in table design with an example.

3. Write HTML code for the demonstration of Lists.

a. Unordered List

b. Ordered List

c. Nested List

4. Write the JavaScript program that take a number form user and generate the factorial of that number.

5. Write the program that take the name and email from the form in index.php and display those values from the page welcome.php.

Gandaki University

Pokhara

BIT/Second Semester/2080/Final Examination

CIT104 Discrete Mathematics

Time: 3 hrs

Full Marks: 75

Pass Mark: 34

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all the questions.

1. Answer the following questions in brief (*any ten*). **[10 × 2 = 20]**

a. Define bi-condition. Translate the sentence **"You will get A on the final, but you don't do every exercise in this book"** into equivalent logical expression using propositions.

b. Show that $p \rightarrow q$ and $\neg q \rightarrow \neg p$ are logically equivalent.

c. What rule of inference is used in the argument **"if it rains today, the university will close. The university is not closed today. Therefore, it did not rain today"**.

d. Write any two applications of Finite State Machine.

e. Give the formal definition of Context Free Grammar with suitable example.

f. Define induction. Why mathematical induction is important in IT?

g. Define Recurrence relation. Write recurrence relation for finding n^{th} Fibonacci number.

h. Prove that the sum of indegree is equals to sum of out degree is equals to total number of edges in a directed graph.

i. Define isomorphism in a graph with suitable example.

j. Write any one way of computer representation of graph with suitable example.

k. Define graph coloring. What is chromatic number of K_n graph.

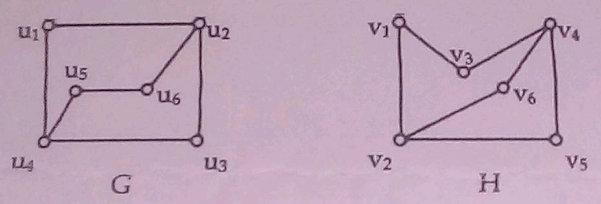
[8 × 5 = 40]

Answer the following questions *(any eight)*.

2. Differentiate between proposition and predicate with suitable example. Write the applications of Propositional logic.
3. State mathematical Induction. Prove by mathematical induction that,

$$1+a+a^2+a^3+\ldots\ldots+a^k = (a^{k-1}-1)/(a-1)$$

4. Define proof by contradiction. Show that 3n+2 is odd if n is odd integer using proof by contradiction.
5. Define Finite State Automata with suitable example. Create a DFA over {0,1} that accepts all the strings that ends with 01.
6. Define alphabet, language and grammar with suitable example. Explain chomasky's Hierarchy.
7. Solve the recurrence relation $f_n=f_{n-1}+f_{n-2}$, for n>1 and $f_0=0$, $f_1=1$.
8. Determine whether the given pair of graphs is isomorphic or not.



9. Define Graph Coloring and chromatic number of a graph. Explain any two application of graph coloring.
10. Define planar graph. Suppose that a connected graph has 20 vertices, each of degree 4. Into how many regions does a representation of this planer graph split the plane?

Answer the following questions

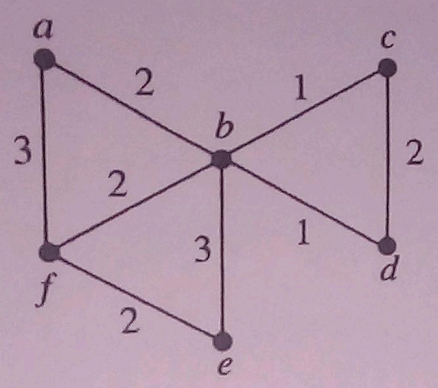
[2 × 7.5 = 15]

11. What is valid argument. What relevant conclusion can be drawn from given set of premises? Explain the rule of inferences used to obtain conclusion from the premises. **"All foods that are healthy to eat do not taste good". "Tofu is a healthy to eat". "You only eat what tastes good". "You do not eat tofu". "Cheeseburgers are not healthy to eat".**

OR

Define inverse, converse and contrapositive of an implication with suitable example and truth tables. Show that $(p \vee q) \wedge (\neg p \vee r) \rightarrow (q \rightarrow r)$ using Truth table.

12. Define shortest path algorithm. Find the shortest distance from a to d of given graph using Dijkstra algorithm.



The End

Gandaki University

Pokhara

BIT/Second Semester/2080/Final Examination

BSM102 Mathematics II

Time: 3 hrs

Full Marks: 75

Pass Mark: 34

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all the questions.

1. Answer the following questions in brief (*any ten*). **[10 × 2 = 20]**

a. A committee is to be chosen from 12 men and 8 women and is to consist of 3 men and 2 women. How many committees can be formed?

b. Solve the differential equation:

$$(3x-2y+1)\,dx + (3y-2x-1)\,dy = 0$$

c. Define ordinary differential equation with example.

d. Define analytic function of complex variables with example.

e. Show that $u = 2x + y^3 - x^2y$ is harmonic function.

f. Examine for the convergence of the series $1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \ldots\ldots\ldots$

g. Solve the differential equation: $\frac{dy}{dx} = \frac{x}{y}$.

h. If $u = f(x, y)$; write the formula to find first and second order partial derivative.

i. In how many ways can 7 different coloured beads be made into a bracelet?

j. Write the example of finite and infinite series.

k. If $\sqrt{-1} = i$, express $\frac{4+\sqrt{-36}}{2-\sqrt{-9}}$ in the form of $a + ib$.

Answer the following questions *(any eight)*. **[8 × 5 = 40]**

2. In how many ways can the letters of the word "TUESDAY" be arranged? How many of those arrangements do not begin with T? How many begin with T and do not end with Y?

3. Distinguish between permutation and combination. A committee of 5 is to be formed out of 6 gents and 4 ladies. In how many ways can this be done when:

i) exactly two ladies are included.

ii) at least two ladies are included.

4. Write the conditions for convergence and divergence by ration test. Test for convergence and divergence of the series

$$\sum_{n=1}^{\infty} \frac{9^n}{n.(-2)^{n+1}}$$

5. Find the interval of convergence of the power series $\sum_{n=1}^{\infty} \frac{2^n(z-3)^n}{n+3}$

6. If $u = \log(x^3 + y^3 + z^3 - 3xyz)$, then show that,

$$\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = \frac{3}{x+y+z}$$

7. Examine and find the maximum and minimum value of $x^3 + y^3 - 3axy$.

8. Solve the differential equation $xy\frac{dy}{dx} = x^2 + y^2$

9. State De Moivre's theorem. Using De Moivre's theorem, find the cube root of unity.

10. Find the harmonic conjugate and corresponding analytic function of $u(x,y) = y^3 - 3x^2y$.

Answer the following questions **[2 × 7.5 = 15]**

11. Define order and degree of a differential equation. Find the general and particular solution for the differential equation $\frac{d^2y}{dx^2} = 25e^{5x}$, $f'(0) = 4$ *and* $f(0) = -2$.

12.

a. Show that $u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ satisfies Laplace equation.

b. What do you mean by homogeneous differential equation? What are the processes to solve homogeneous differential equation?

The End

Gandaki University
Pokhara

BIT/Second Semester/2080/Final Examination — Full Marks: 50

CIT105 Computer Programming II (Java) — Time: 2 hrs — Pass Mark: 22.5

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all the questions.

1. Answer the following questions in brief *(any five)*. **[5 × 2 = 10]**

a. What is event delegation model?

b. Define object and class giving real world example.

c. Explain the following statement:

System.out.println("Hello World");

d. Differentiate between unary and binary operator.

e. What is java.io?

f. Name different types of access protection mechanisms.

Answer the following questions *(any five)*. **[5 × 5 = 25]**

2. Explain the package with its types. What is the difference between an abstract class and an interface in Java?

3. Define POP and OOP. Explain the advantages of OOP over POP.

4. Why is the exception handling constructs try, catch and finally important? Explain them with suitable programming example.

5. WAP to read roll and name of a student and write it to file named 'std.txt'.

6. Create class Compare with necessary data member and functions to find the largest among 5 numbers entered by user.

7. Differentiate between AWT and swing.

Answer the following questions. **[2 × 7.5 = 15]**

8. Create a GUI with a button name btn_ok and three textfields named txt_fn, txt_sn and txt_res. When the user clicks the ok button, the sum of two numbers in txt_fn and txt_sn should be displayed in txt_res. The program must validate for blank field, and prompt whether or not to close the program when the user presses the close button in window. Use adapter class for event handling and GridLayout as layout manager.
9. Briefly explain the different types of inheritance. How can you use the concept of interface to achieve multiple inheritance? Discuss with suitable example.

The End