Patan Multiple Campus
Bachelor in Information Technology
Mid-Term Exam - 2080

Course Title: Introduction to Information Technology(BIT101)
Semester: I Time: 2 Hrs. **Full Marks: 40**
Pass Marks:16

Group-A

Section "A"
Long Answer Questions

Attempt any one question. (1 × 10 = 10)

1. Explain basic organization of computer system with block diagram. (10)
2. What is RISC and CISC? Explain instruction set architecture RISC and CISC with example. (2+8)

Section "B"
Short Answer questions

Attempt any six questions. (6*5 = 30)

3. Explain types of computer on the basis of its size. (5)
4. What is instruction set? Explain instruction cycle in brief. (2 + 3)
5. Define primary memory. Discuss different types of primary memory. (1 + 4)
6. Explain SRAM and DRAM with concept and term. (5)
7. Define data model. Explain relational data model with example. (2+3)
8. Explain recent concept of data warehouse and data mining. (5)
9. What is cryptography? Explain objectives of cryptography. (2+3)
10. Define security policy. Explain effective guidelines for security policy.(1+4)

Patan Multiple Campus
Bachelor in Information Technology
Pre-Board Exam - 2080

Course Title: Introduction to Information Technology (BIT101)

Semester: I | Time: 3 Hrs. | **Full Marks:** 60

Section A | **Pass Marks:**24

SET-B

Group-A

Attempt any two questions. (2 × 10 = 20)

1. What is cloud computing? Explain cloud reference model with example. (2 + 8)
2. Why do we need computer network? Discuss different types of network topologies along with their merits and demerits. (2 + 8)
3. What is switching? Explain packet switching and circuit switching. (2 + 8)

Group-B

Attempt any eight questions. (8 × 5 = 40)

4. Discuss characteristics of fourth generation of computers. Compare it with fifth generation. (3 + 2)
5. Explain TCP/IP protocol in brief. (5)
6. Draw diagram of memory hierarchy? Differentiate primary and secondary memory with example. (2 +3)
7. Explain Instruction set architecture RISC and CISC with example. (5)
8. Convert $(DAD)_{16}$ to binary. Subtract (111)2 from (11)2 by using 2's complement. (2 + 3)
9. Define IP address with example. Explain Internet of Things (IOT) with example. (2 + 3)
10. What are the components of multimedia? Discuss. (5)
11. What is modulation? Why needed modulation? (2 + 3)
12. Write short notes on: (2 × 2.5 = 5)
    a. GIS
    b. Smart city and e-governance

Patan Multiple Campus
Bachelor in Information Technology
Mid-Term Exam - 2080

Course Title: Digital Logic(BIT102) **Full Marks:** 40
Semester: I Time: 2 Hrs. **Pass Marks:** 16

Group A

Attempt any One Question: [1×10=10]

1. Simplify (Using k-map) the given Boolean function in both SOP and POS using the don't care condition d: and draw NAND-NAND logic diagram for minimal SOP and NOR-NOR for the minimal POS.
$$F(A,B,C,D) = \pi(0,1,3,7,8,12) and\ \pi d(5,9,13,14)$$
2. Design a combinational circuit has four inputs and one output. The output is equal to 1 when (1) all the inputs are equal to 1 or (2) none of the inputs are equal to 1 or (3) an odd number of inputs are equal to 1.
   a. Obtain the truth table.
   b. Find the simplified output function in SOP.
   c. Find the simplified output function in POS.
   d. Draw the logic diagrams for both SOP and POS

Group B

Attempt any Six Questions: [6×5=30]

3. Convert $(573.35)_8$ into decimal and Hexadecimal.
4. Subtract (735.4 – 55.3) using both 10's and 9's complement.
5. Perform A + B, B – A:
   A = +19 and B= - 37
6. What is Boolean algebra? Simplify the given Boolean expression using algebraic method:
$$z(y + z)(x + y + z)$$
7. What is Universal Logic Gate? Realize NAND Gate as Universal Logic Gate.
8. Express the given function in Sum of minterms.
   F(x, y, z) = x y' + z
9. Define parity bit? Design 3- bit even parity generator circuit with logic diagram and truth table.
10. Implement full adder circuit using two half adder circuits and one OR gate.

Tribhuvan University

Patan Multiple Campus

Bachelor in Information Technology

Pre-Board Exam – 2080

Course Title: Digital Logic (BIT103) **Full Marks:** 60
Semester: I Time: 3 Hrs. **Pass Marks:**24

SET-A

Group-A (Long Answer Questions)

Attempt any Two questions. **[2 x 10 = 20]**

1. Design a combinational circuit with four input lines that represent a decimal digit in BCD and four output lines that generate the 9's compliment of the input digit. [2+8]
2. Define magnitude comparator? Design a 4-bit magnitude comparator circuit. [2+8]
3. What is counter? Design a 3-bit synchronous up-down counter along with state diagram and timing sequence. [2+8]

Group-B (Short Answer Questions)

Attempt any Eight questions. **[8 x 5 = 40]**

4. Convert $(2375.35)_8$ into hexadecimal and octal number system. [2.5 + 2.5]
5. Perform the arithmetic operation (+ 43) + (– 17) and (– 41) – (– 4) in binary using signed 2's complement representation for negative number. [2.5 + 2.5]
6. Simplify(using K-map): F = (A + B + C + D') (A + B + C' + D) (A + B' + C' + D') (A + B' + C' + D) (A' + B' + C' + D) (A' + B + C + D') (A' + B + C' + D) in both SOP and POS. [2.5 + 2.5]
7. Define multiplexer. Implement 8 x 1 multiplexer using 2 x 1 multiplexer. [1 + 4]
8. What is Flip Flop? Differentiate between Combinational circuit and Sequential Circuit. [1 + 4]
9. Realize JK flip-flop from RS flip-flop. [5]
10. Define shift register. Explain the operation of 4-bit Serial-In Serial-Out Shift register with data input 1011. [1 + 4]
11. Define shifter. Design a 4-bit shifter circuit. [1 + 4]
12. Write short notes on: (Any two) [2 x 2.5 =5]
    a) PAL
    b) De-Multiplexer
    c) Excitation table

Patan Multiple Campus
Bachelor in Information Technology
Pre-Board Exam - 2080

Course Title: C Programming (BIT102) **Full Marks:** 60
Semester: I Time: 3 Hrs. **Pass Marks:** 24

Set A

Group A

Attempt any Two questions [2×10=20]

1. What is an array? How array can be passed as function argument? Write a program to add the diagonal elements of a 2D array and display it.
2. What is pointer? Explain function associated with dynamic memory allocation in C. Write a program to sort an array and display it using DMA.
3. Differentiate between structure and union? Write a program to read employ id, name, post and salary of 20 employee and display detail of those employee whose post is "clerk".

Group B

Attempt any Eight questions [8×5=40]

4. What is problem analysis? What are the steps to be followed before writing a computer program? Explain.
5. What is loop? Explain for loop. Write a program to reverse a number.
6. What is operator associativity? Explain unary operators with suitable example.
7. Why data file is needed? Write a program to write N numbers in file "number.txt" and then read it and display only even numbers.
8. What is pass by reference? Explain with suitable example.
9. What are valid rules for identifiers in C? Explain.
10. Explain if else statement with syntax and semantic. Write a program to read cost price and selling price of a good and find profit or loss amount.
11. Write a program to change a given string to uppercase without using library function.
12. Write short notes:
    a. Preprocessor
    b. NULL pointer

Patan Multiple Campus
Bachelor in Information Technology
Pre-Board Exam - 2080

Course Title: C Programming (BIT102) **Full Marks:** 60
Semester: I Time: 3 Hrs. **Pass Marks:** 24

Set B

Group A

Attempt any Two questions **[2×10=20]**

1. What is two-dimensional array? How it can be declared? Explain. Write a program to add two square matrices and display the result.
2. What is function? Explain the component of user defined function. Write a program to find sum of first n natural numbers using recursion.
3. What is loop? Explain different types of loop with syntax and semantic. Write a program to display first 10 terms of sequence 6, 3, 10, 5, 16, 8, 4, …

Group B

Attempt any Eight questions **[8×5=40]**

4. Explain the different file opening mode in C? Write a program to create an exact copy of an original file.
5. What is union? Write a program to add 2-time values and display result (mm: ss) using structure.
6. What is break statement? How it differs from continue statement? Explain with example.
7. What is nested loop? Write a program to print prime number between 1 to 100.
8. What is DMA? Write a program to read N numbers using DMA and then display only odd numbers.
9. What is recursion? WAP to display first 10 numbers in Fibonacci series using recursion.
10. What is pointer? Illustrate the similarity between array and pointer using suitable example.
11. What is odd loop? Write a program illustrating the use of odd loop.
12. Write short notes:
    a. Macro
    b. Switch Statement

Patan Multiple Campus
Bachelor in Information Technology
Mid-Term Exam - 2080

Course Title: C Programming (BIT102)
Semester: I | Time: 2 Hrs. | **Full Marks:** 40
Set-A | **Pass Marks:** 16

Group A

Attempt any One question: **[1×10=10]**

1. What is an array? How one-dimensional array can be passed as function argument? Write a program to arrange an array having 10 integer numbers in ascending order using function.
2. Define function and list its advantages. Difference between passing arguments by value and passing arguments by address with suitable programs.
3. What is loop? Explain different types of loop along with its syntax and suitable examples. Write a program to display the Floyd's Triangle

```
1
2 3
4 5 6
7 8 9 10
```

Group B

Attempt any Six questions: **[6×5=30]**

4. What do you mean by operator associativity in C? Explain Logical and relational operator.
5. What do you mean by problem analysis? Explain the Compilation and Execution of any C program.

6. Define nested if else statement with suitable flowchart. Write a C code to check if user given input is exactly divisible by 5 or 11 using nested if else statement. [1+3]

7. "Size of character array is always declared one more than the input size." Justify the statement. Write a program to read a character array input as "TRIBHUVAN UNIVERSITY" from the user and find out how many times a character 'I' occurs in the array? [1+4]

8. What is operator associativity? Find out value of the variable *a* in each step below:

```
int i=1, j=5, k=9; float a=1.5, b=2.5, c=4.5;
[1] a=c-i/j+c/k;
[2] a=(c-i)/k+(j+b)/j;
[3] a=c+k%2+b;
[4] a=(b+4)%(c+2);
```

9. Write the syntax of *switch* statement. Write a program to compute the sum of digits of an unsigned integer using *while* loop.

10. Write syntax to declare and initialize 2-dimensional array? Write a program to add any two 3*3 matrices.

11. Explain if else statement with syntax and semantic. Write a program to read cost price and selling price of a good and find profit or loss amount.

12. Explain standard I/O functions. Give examples to use puts (), gets () and scanf() functions. [2+3]

Patan Multiple Campus
Bachelor in Information Technology
Mid-Term Exam - 2080

Course Title: Sociology(BIT105) **Full Marks:** 40
Semester: I Time: 2 Hrs. **Pass Marks:** 16

Section-A

Group A

Short Answer Questions

Attempt any Four Questions: [4×5=20]

1. Define sociology and explain its significance in understanding social phenomena.
2. How does sociology differ from other social and natural sciences? Provide examples of interdisciplinary relationships.
3. Discuss the transition from traditional to technological societies and its impact on social structures.
4. What are the four realms of sociology, and how do they contribute to understanding society in the twenty-first century?
5. Explain the concept of social codes and their role in maintaining social order.

Group B

Long Answer Questions

Attempt any Two Questions: [2×10=20]

6. In what ways does sociology interact with information technology, biology, anthropology, and psychology? Provide specific examples to illustrate these interdisciplinary connections.
7. Explore the significance of social groups in shaping the social structure. Discuss the roles and functions of various social groups such as family, community, social class, and ethnic groups, and analyze their impact on individuals and society as a whole.
8. Investigate the influence of information technology on contemporary social structures. How has the advent of digital communication and social media platforms transformed social interactions, group dynamics, and societal norms? Provide examples to support your analysis.

Patan Multiple Campus
Bachelor in Information Technology
Pre-Board Exam - 2080

Course Title: Sociology (SCO105) **Full Marks:** 60
Semester: I Time: 3 Hrs. **Pass Marks:** 24

SET: A

Group A

Attempt any TWO questions from group 'A ' (2x10 = 20)

1. Discuss the evolution of sociology as a discipline, tracing its origins and key perspectives. How does the sociological viewpoint contribute to understanding social concerns in contemporary society?
2. Analyze the relationship between sociology and other social and natural sciences, focusing on their interplay with information technology, biology, anthropology, and psychology. How do these interdisciplinary connections enhance our understanding of social phenomena?
3. Evaluate the impact of technological advancements on the transition from traditional societies to technological societies. How does sociology address the challenges and opportunities presented by this shift in the twenty-first century?

Group B

Attempt any EIGHT questions from group 'B' (8x5 = 40)

4. Define culture and its components, including symbols, language, values, norms, and material culture. How does culture shape human behavior and interaction?
5. Discuss the concept of ideal and real culture, highlighting examples of cultural universals and the role of globalization in cultural diffusion.
6. Explain the significance of social codes and customs in maintaining social order. Provide examples of different forms of social control and their impact on individual life.
7. Compare and contrast different types of social groups, such as primary and secondary groups, and discuss their roles in shaping social interactions.
8. Describe the functions of major social institutions, including economic, political, and familial institutions. How do these institutions contribute to social differentiation and stratification?
9. Explore the factors contributing to social change, including modernity, post-modernity, and globalization. How do these factors influence societies and civilizations?
10. Discuss the application of sociology in social policy and planning, highlighting its role in addressing social problems and promoting societal well-being.
11. Identify and analyze key social problems prevalent in contemporary society, such as poverty, inequality, and environmental degradation. How can sociological perspectives contribute to addressing these issues?
12. Examine the concept of globalization and its implications for changing world dynamics. How does globalization impact cultures, economies, and social structures worldwide?

Patan Multiple Campus
Bachelor in Information Technology
Mid-Term Exam - 2080

Course Title: Basic Mathematics(MTH104) **Full Marks:** 40
Semester: I Time: 2 Hrs. **Pass Marks:**16

Section-A

Long Answer Questions

Attempt any One Question: **[1×10=10]**

1. What do you mean by asymptotes? Discuss the different types of asymptotes with suitable examples.
   Find the required asymptotes of the functions: [7 + 3]

$$f(x) = \frac{x^3-2}{|x|^3+1}$$

2. How can you define the slope of tangent at a point?
   a) Show hat the point (7, 0) lies on the curve $y(x-2)(x-3)-x+7=0$. Then find the equation of tangent and normal to the curve at that point.
   b) Find $\frac{dy}{dx}$ of the following implicit function:
   i) $x^2(x-y)^2 = x^2 - y^2$ [1 + 7 + 3]

Section-B

Short Answer Questions

Attempt any Six Questions: **[6×5=30]**

3. Find the area of region bounded by the curve $y = x e^{-x}$ and the x – axis from x = 0 to x = 4.
4. Define limit of a function. Find the value of Delta algebraically for given value of $\in$.
   a) $f(x) = \sqrt{19-x}, L = 3, C = 10, \in = 1$
5. The positions S = f(t) of a body moving on a Co-ordinate line with S in meters and t in seconds. Then $S = 6t - t^2$, $t \in [0, 6]$.
   a) Find the body's displacement and average velocity for the given time interval.
   b) Find the acceleration at the end points of the interval.

6. Integrate the following: [2 + 3]

   a) $\int \frac{dx}{(x-1)(x-2)}$ b) $\int tan^4 x\, dx$

7. Define gradient vector.
   Find the derivatives of $f(x) = xe^y + COSxy$ at the point (2, 0) in the direction of V = 3i – 4j . [1 +4]

8. Find f_x and f_y as a function if,
   $f(x, y) = \frac{2y}{y + COS\, x}$ [2.5 + 2.5]

9. Test for convergence of $\int_0^\infty \frac{dx}{x^2+9}$ [5]

*** ***Best Of Luck*****

Patan Multiple Campus
Bachelor in Information Technology
Pre-Board Exam - 2080

Bachelor Level/First Year/First Semester/Science
Course Title: Basic Mathematics
Course No: MTH 104

Full Marks: 60
Pass Marks: 24
Time: 3 hours

SET-A
~~Section A~~

Long Answer Questions

Attempt any two questions. **(2 × 10 = 20)**

1. (a)Sketch the graph of the function $f(x)=x^2$ shifted vertically up to 2 and -3 units and horizontally up to 4 and -4 units

   (b) How can you define average rate of change? Find the average rate of change of the functions $y=2x^2-10$ at point P (3,8). Also find the equation of tangent at that point. (4+1+2+3)

2. Define Taylor's series and Maclaurin Series. Find the Taylor's Series and Taylor's polynomials generated by f(x) = cosx at x=0. Does it converge? (1+1+5+1+2)

3. Define Monotonic functions. Find the critical point of $f(x)=x^3-12x-5$ and verify the open intervals on which f is increasing and on which f is decreasing. (2+8)

Section B

Short Answer Questions

Attempt any eight questions. **(8 × 5 = 40)**

4. Define absolute maximum and minimum. Find the absolute maximum and minimum values of $f(x) = x^2$ on [-2, 1] (2+3)
5. Find the equations of tangent and Normal to the curve $x^2+y^2=49$ at the point (3, -4) (2.5+2.5)
6. Find the area of the region between the x-axis and the graph of $f(x)=x^3-x^2-2x$, where $-1 \le x \le 2$ (5)
7. Find the area of the surface generated by revolving the curve $y=2\sqrt{x}$, $1 \le x \le 2$ about the x-axis. (5)
8. Evaluate the integral $\int_0^{\pi/4} \frac{dx}{1-\sin x}$ (5)
9. What do you mean by linear differential equations? Solve the following differential equation (1+4)

$$x\frac{dy}{dx} + y = e^x \quad x > 0$$

10. Define integral test & absolute convergence test. Does the following series converge? (2+5)

$$\sum_{n=1}^{\infty} \frac{1}{n^2}$$

11. If $f(x,y) = x\cos y + ye^x$ then find the, (5)

$$\frac{\partial^2 f}{\partial x^2}, \frac{\partial^2 f}{\partial y \partial x}, \frac{\partial^2 f}{\partial y^2} \text{ \& } \frac{\partial^2 f}{\partial x \partial y}$$

12. Determine the concavity and find the point of inflection of $f(x) = x^3-3x^2+2$ (5)