Syllabus for the Position of Chief Technical Assistant

(*Computer Engineering*)

S.N.	Paper	Question Format	Full Marks	Number of Questions	Exam Time
1.	**Paper I**	Aptitude Test + Core Course (Objective)	20 +30	50	50 minutes
2.	**Paper II**	Core Course (Theory + Practical)	40 + 10	40	1 ½ hrs
Total Written Exam Full Marks:			**100**		

Detail Syllabus

Paper I:	Objective (Core Course + Aptitude Test)	Marks: 1 × 50 = 50

Unit	Area of Questions	Number Questions
1.	Basic Computer Concept	3
2.	Basic Electric and Electronic Circuit	2
3.	Digital Logic	2
4.	Programming	3
5.	Microprocessor and Computer Architecture	2
6.	Data Structure and Algorithm	2
7.	Software Engineering	2
8.	Database Management System	3
9.	Computer Graphics	2
10	Operating System	2
11.	Computer Networks and Data Communications	3
12.	Internet and Web	2
13.	Computer Repair and Maintenance	2
14.	TU Laws 2049, TU Teacher and Officers Service laws (2050) (Section 5,6,9, and 10), TU Economic Management and Procurement laws (2050) (Section 12, 13 and 14)	10
15.	General ICT Knowledge and Recent Trends, Nepal Constitution (Section 2, 3, 7,8,9,11,13,14,17,18 and 20)	5
16.	Meaning of voltage, current, resistance, capacitance, inductance and power, Use of volt-meter, ammeter, watt-meter, and multi-meter, Concept of	5

	conductors and insulators, working of switches, fuse, MCB, earthing, Working and installation of basic electrical household appliances and wiring	

1. **Basic Computer Concept**
   1. Kinds of Computers in respect of size and function,
   2. Generation of Computers,
   3. Components of computer
   4. Orientation to personal computers, System unit, Starting the computers
   5. Input Devices: keyboard, mouse, other input devices
   6. Processing: CPU, Memory
   7. Storage devices: Overview of Storage Devices, Floppy Disk Drive, Hard Drive, Universal Serial Bus (USB) Devices and Other Storage Devices
   8. Output devices: Monitors, Printers, Modems, Soundboards
   9. Using Command Prompt, Creating and using AUTOEXEC.BAT and CONFIG.SYS
   10. Windows Desktop, Program Manager, Organizing the Desktop, File Manager
   11. Using Application Software (word processor, spread sheet, presentation)
   12. Windows Explorer, E-mails, Internet, Intranet, Extranets, Ethernet, HTTP
   13. Computer Viruses, Antivirus
2. **Basic Electric and Electronic Circuit**
   1. Basic Electric System
   2. DC Circuits and Network Theorems
   3. AC system
   4. Single – Phase AC Circuits
   5. Power in AC Circuits
   6. Diode
   7. Transistor
   8. MOSFET
   9. The Operational Amplifier
3. **Digital Logic**
   1. Digital and Analog Signals
   2. Number Systems and Conversion
   3. Arithmetic Logic Operations
   4. Logic Gates and Boolean Function
   5. Logic Simplification
   6. Combinational Logic Circuits
   7. Sequential Logic Circuits
4. **Programming**
   1. Programming Language Fundamentals
   2. Input /Output
   3. Operators and Expressions
   4. Control Structure/Statement
   5. Array, Pointer and Functions
   6. Structure and Data Files
   7. Introduction to Object Oriented Programming
   8. Class and Object
   9. Data Hiding
   10. Inheritance and Abstraction

    11. Operator Overloading
    12. Exception Handling

5. **Microprocessor and Computer Architecture**
   1. Stored Program Concept
   2. Instruction Cycle and Timing Diagram
   3. 8085 Instruction set
   4. Basic Computer Architecture
   5. Design of Microprogrammed Control Unit
   6. RISC and CISC
   7. Pipeline and Vector processing
   8. Computer Arithmetic
   9. Serial and Parallel Input/Output

6. **Data Structure and Algorithm**
   1. Algorithm and its types
   2. Data structure and its types
   3. Stack and Queue
   4. List and Trees
   5. Sorting and Searching
   6. Graph

7. **Software Engineering**
   1. Program Vs software
   2. Software components
   3. Software Development Life Cycle Models
   4. Software Project Management
   5. Software Requirement Analysis & Specification
   6. Software Design
   7. Software Metrics
   8. Software Reliability
   9. Quality Management and Testing
   10. Software Maintenance

8. **Database Management System**
   1. History, Database and its applications
   2. Characteristics of Database
   3. Schemas and Instances
   4. Data Models
   5. Normalization
   6. Relational Language
   7. Query Processing
   8. Transaction and Concurrency Control

9. **Computer Graphics**
   1. Application of Computer Graphics
   2. CAD and CAM
   3. Graphics Hardware
   4. Two Dimensional Algorithms and Transformations
   5. Three-Dimensional Graphics
   6. Web Graphics Designs
   7. Virtual Reality

10. Operating System
1. Operating system and its functions
2. Types of Operating System
3. Process Management
4. Memory Management
5. Deadlock Management
6. File and Input/output Management
7. Security

11. Computer Networks and Data Communications
1. Analog and digital Communication
2. Network Architecture and Hardware/Software
3. OSI and TCP/IP model
4. Repeater, Hub, NIC, Bridge, Switch, Router, Gateway
5. Physical Layer
6. Data link Layer
7. LAN Architectures/standards
8. Network Layer
9. Transport Layer
10. Application Layer
11. Network Security

12. Internet and Web
1. Hypertext Markup Language
2. HTML 5 and Features
3. HTML Editors and Tools
4. Cascading Style Sheet (CSS)
5. XML
6. JavaScript and AJAX
7. Web Server
8. PHP and MySQL

13. Computer Repair and Maintenance
1. Computer Repair and Maintenance
2. Hardware maintenance
3. Software Based maintenance
4. System Case
5. Power Supply
6. Mother Board and System Devices
7. Processor, UPS
8. Input Devices, Storage devices
9. Output devices, System Care

Paper II:	Core Course	Marks: $10 \times 4 = 40$

Subjective Knowledge

S.N.	Area of Questions	No of Questions
1.	**Unit 1 :** Basic Computer Concept **Unit 2 :** Basic Electric and Electronic Circuit **Unit 3 :** Digital Logic **Unit 4 :** Programming	1
2.	**Unit 5 :** Microprocessor and Computer Architecture **Unit 6:** Data Structure and Algorithm **Unit 7 :** Software Engineering **Unit 8:** Database Management System	1
3.	**Unit 9:** Computer Graphics **Unit10:** Operating System **Unit11:** Computer Networks and Data Communications **Unit12:** Internet and Web	1
7.	**Unit13:** Computer Repair and Maintenance	
8.	TU Laws 2049, TU Teacher and Officers Service laws (2050) (Section 5,6,9, and 10), TU Economic Management and Procurement laws (2050) (Section 12, 13 and 14)	1
9.	**Practical (10 Marks)**	

In subjective knowledge questions, each question carrying 10 marks may be subdivided into two parts: (a) and (b).

द्रष्टव्य :

1. लिखित परीक्षाको लागि ४० पूर्णाङ्कको एक पत्र हुनेछ ।

2. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नको विकल्प छनौट गर्दा गलत विकल्प छानेमा ऋणात्मक मूल्याङ्कन (Negative Marking) गरिने छ । अर्थात् यसरी मूल्याङ्कन गर्दा प्रत्येक गलत उत्तरको लागि २० प्रतिशत अङ्ककट्टा गरिनेछ । बहुबैकल्पिक प्रश्नको २० प्रतिशत अङ्क प्राप्ताङ्कबाट घटाइने छ । (उदाहरणका लागि परीक्षार्थीले २० अङ्कको बहुबैकल्पिक प्रश्नमा १५ प्रश्नको सही उत्तर र ५ प्रश्नको गलत उत्तर दिएमा निजको प्राप्ताङ्क (०.२० × ५=१.००) अर्थात् १५–१= १४ अङ्क हुनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

3. विषयगत प्रश्नको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिने छ ।

4. प्रत्येक पत्रको उत्तीर्णाङ्क पूर्णाङ्कको ४० प्रतिशत हुनेछ ।

5. भाषा विषयबाहेक अन्य विषयका लागि उत्तरको माध्यम अंग्रेजी वा नेपाली हुनेछ ।