

शहीद धर्मभक्त राष्ट्रिय प्रत्यारोपण केन्द्र
मानव अङ्ग प्रत्यारोपण विकास समिति, प्रविधिक सेवा, आई.टी. टेक्नोलोजी समुह, पाँचौ तह, आई.टी.टेक्निसियन पदको
खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम
एवं परीक्षा योजना

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :- लिखित परीक्षा (Written Examination)

पूर्णाङ्क :- २००

द्वितीय चरण :- अन्तर्वार्ता (Interview)

पूर्णाङ्क :- ३०

प्रथम चरण (First Phase): लिखित परीक्षा योजना (Written Examination Scheme)

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न (MCQ)	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत	छोटो उत्तर आउने प्रश्न	१२ प्रश्न x ५ अङ्क	२ घण्टा ३० मिनेट
					लामो उत्तर आउने प्रश्न	४ प्रश्न x १० अङ्क	

द्वितीय चरण (Second Phase) : अन्तर्वार्ता (Interview)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
- प्रथम र द्वितीय पत्रको पाठ्यक्रम एउटै हुनेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- लिखित परीक्षामा सोधिने प्रश्नसंख्या र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा दिईए अनुसार हुनेछ ।
- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A,B,C,D मा लेख्नुपर्नेछ । सानो अक्षर (Small letter) a,b,c,d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।
- बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- विषयगत प्रश्नहरूको हकमा एउटा लामो प्रश्न वा 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 ।
- विषयगत प्रश्न हुने पत्रमा प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन् । परीक्षार्थीले प्रत्येक खण्डको प्रश्नको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जुनसुकै कुरा लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- पाठ्यक्रम स्वीकृत मिति :- २०८१/०८/०४

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खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम
प्रथम र द्वितीय पत्र (Paper I & II)
Technical subject

Section A (50%)

1. Computer Fundamentals (20%)

- 1.1. Computers, Kinds of Computers in respect of size and function
- 1.2. Generation of Computers
- 1.3. Components and Architecture of Computers, Connecting the Components
- 1.4. Input Devices: keyboard, mouse, other input devices
- 1.5. Processing: CPU, Memory
- 1.6. Storages devices: Overview of Storage Devices, Floppy Disk Drive, Hard Drive, Universal Serial Bus (USB) Devices and Other Storage Devices
- 1.7. Output devices: Monitors, Printers, Modems, Soundboards
- 1.8. Dos survival guide: Using Command Prompt, Creating and using AUTOEXEC.BAT and CONFIG.SYS
- 1.9. Windows survival guide: Windows Desktop, Program Manager, Organizing the Desktop, File Manager
- 1.10. Windows Explorer, E-mails, Internet, Intranet, Extranets, Ethernet, HTTP, Computer Viruses, Antivirus

2. System Analysis and Design (10%)

- 2.1. Introduction to System Analysis and Design (SAD):
- 2.2. Basic concepts of systems, system components, and characteristics.
- 2.3. System development life cycle (SDLC) phases: Planning, Analysis, Design, Implementation, and Maintenance.
- 2.4. Role of system analysts and their interaction with stakeholders.
- 2.5. Feasibility Study and Analysis:
- 2.6. Types of feasibility: technical, economic, and operational.
- 2.7. Tools for system requirements gathering (interviews, surveys, observation, and document analysis).
- 2.8. Data flow diagrams (DFDs), entity-relationship diagrams (ERD), and process modeling

3. System Design: (10%)

- 3.1. Design methodologies: structured and object-oriented analysis.
- 3.2. User interface design principles, system architecture, and database design.
- 3.3. Security, control, and ethical considerations in design.
- 3.4. Software Engineering Concepts:
- 3.5. Overview of software development models: Waterfall, Agile, and Spiral.
- 3.6. Introduction to project management in system development: time, cost, and resource management.
- 3.7. Testing techniques and maintenance strategies

4. Operating Systems (10%)

- 4.1. Introduction to Operating Systems:
- 4.2. Definition and functionalities of an operating system (OS). Types of operating systems: Batch, Time-Sharing, Distributed, Real-Time, and Embedded OS.
- 4.3. Process Management: Concepts of processes, threads, and multitasking. CPU scheduling algorithms (FCFS, SJF, Round Robin, Priority Scheduling). Process synchronization, inter-process communication, and deadlocks (detection, prevention, avoidance).
- 4.4. Memory Management: Types of memory: primary and secondary. Memory allocation strategies: contiguous, non-contiguous, paging, segmentation, virtual memory. Concepts of memory management units (MMUs) and page replacement algorithms.
- 4.5. File and disk management tools. Security and Protection: User authentication techniques, permissions, and access control lists (ACLs). Threats to OS security: viruses, worms, and malware. Techniques for OS protection: firewalls, encryption, and auditing.
- 4.6. Networking in OS: Basics of networking in OS, protocols (TCP/IP). Network file systems and distributed operating systems.
- 4.7. Case Studies: Specific study of operating systems like Windows, Linux, and macOS, focusing on architecture and functionalities

Section B (50%)

5. Database Management System and Design (10%)

- 5.1. Introduction to DBMS: Definition and Features: Basic concepts, characteristics of DBMS, comparison with file-based systems. Components: DBMS architecture, database schema, and instances.
- 5.2. Database Models: Relational Model: Tables (relations), keys (primary, foreign), and relational algebra.
- 5.3. Normalization: Concepts of functional dependency, 1NF, 2NF, 3NF, BCNF, and denormalization.
- 5.4. SQL (Structured Query Language):
- 5.5. Basic SQL Commands: DDL (Data Definition Language), DML (Data Manipulation Language), and DCL (Data Control Language).
- 5.6. Queries: SELECT, INSERT, UPDATE, DELETE, and complex queries with JOIN, GROUP BY, HAVING, etc.
- 5.7. Transactions and Concurrency Control: ACID properties, transaction management, and isolation levels.
- 5.8. Indexing and Hashing: Indexing Techniques: Single-level and multi-level indexing, B-tree, and B+ tree structures. Hashing: Static and dynamic hashing methods, collision resolution techniques.
- 5.9. Distributed Databases: Concepts: Characteristics, advantages, and challenges of distributed databases.
- 5.10. Data Fragmentation, Replication, and Allocation: Ensuring consistency and availability across different nodes.

5.11. Implementation using popular database systems like MySQL, Oracle, or PostgreSQL

6. Networking (10%)

- 6.1. Introduction to Networking: Definition: Basic concepts of networking, and the need for networks.
- 6.2. Types of Networks: Local Area Network (LAN), Wide Area Network (WAN), Metropolitan Area Network (MAN), and Personal Area Network (PAN). Network Topologies: Star, Ring, Bus, Mesh, and Hybrid topologies.
- 6.3. Networking Models: OSI Model: The seven layers (Physical, Data Link, Network, Transport, Session, Presentation, and Application) with functions of each layer. TCP/IP Model: Internet protocol suite (four layers – Link, Internet, Transport, and Application) and how it maps to the OSI model.
- 6.4. Networking Devices: Types of Devices: Routers, switches, hubs, repeaters, gateways, modems, and bridges. Functions: Their role in managing traffic and ensuring network connectivity.
- 6.5. Protocols: Core Networking Protocols: TCP, UDP, ICMP, and HTTP/S. Routing Protocols: Static routing vs dynamic routing, RIP, OSPF, BGP. DNS (Domain Name System): Concepts and working of DNS, its role in resolving domain names to IP addresses. DHCP (Dynamic Host Configuration Protocol): Automatic IP address assignment in networks.
- 6.6. Wireless Network Security: WPA, WPA2, and the concept of encryption keys in securing wireless networks.
- 6.7. Network Management: Monitoring and Troubleshooting: Common network monitoring tools (Wireshark, PING, TRACERT), SNMP (Simple Network Management Protocol), and network diagnostics. QoS (Quality of Service): Managing and prioritizing network traffic to ensure performance of critical applications.
- 6.8. Wireless Networking: Wi-Fi Standards: Overview of IEEE 802.11 protocols. Bluetooth, NFC, and Infrared: Short-range wireless communication technologies and their applications.
- 6.9. Network Applications: Web Services: Concepts of HTTP, HTTPS, FTP, and email protocols (SMTP, IMAP, POP3).
- 6.10. Cloud-based Networking: Overview of cloud services (e.g., SaaS, PaaS, IaaS) and how they integrate with networking

7. E-Commerce Technology (20%)

- 7.1. Introduction to E-Commerce
- 7.2. Electronic Commerce Strategies
- 7.3. Electronic Commerce Security Issues
- 7.4. Success Models of E-Governance
- 7.5. E-Business: b2b, b2c, b2e, c2c, g2g, g2c
- 7.6. Principles of Electronic Payment, Strategies & Systems
- 7.7. E-marketing, Reverse Engineering
- 7.8. Encryption and Decryption Methods, XML, Layout Managers, Event Model

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खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

8. Human Organ Transplant Act and Regulations (10%)

- 8.1. Human Organ Transplantation (Regulation and Prohibition) Act, 2055 with amendment.
- 8.2. Human Organ Transplantation Regulations, 2073
- 8.3. Guidelines on medical treatment of deprived citizens program, 2080
- 8.4. Human Organ Transplant Development Committee Personnel Administration Rules, 2069
(मानव अंग प्रत्यारोपण विकास समिति कर्मचारी प्रशासन नियमवाली, २०६९)
- 8.5. Human Organ Transplant Development Committee Formation Order, 2068 (मानव अंग प्रत्यारोपण विकास समिति गठन आदेश, २०६८)
- 8.6. General knowledge about Shahid Dharmabhakta National Transplant Center
- 8.7. Brain death donation: Brain death Declaration Criteria

प्रथम र द्वितीय पत्रको लागि यथासम्भव निम्नानुसार प्रश्नहरू सोधिनेछ ।

प्रथम पत्र (वस्तुगत)								
खण्ड	A				B			
इकाई	1	2	3	4	5	6	7	8
प्रश्न संख्या	10	5	5	5	5	5	10	5

द्वितीय पत्र (विषयगत)					
पत्र	विषय	खण्ड	अङ्कभार	छोटो उत्तर	लामो उत्तर
द्वितीय	Technical subject	A	५०	६ प्रश्न × ५ अङ्क = ३०	२ प्रश्न × १० अङ्क = २०
		B	५०	६ प्रश्न × ५ अङ्क = ३०	२ प्रश्न × १० अङ्क = २०