

त्रिभुवन विश्वविद्यालय

सेवा आयोग

प्राविधिक, अधिकृत तृतीय, प्राविधिक अधिकृत (सूचना प्रविधि) पदको खुला प्रतियोगितात्मक लिखित परीक्षा
२०८२/०५/११

KEY [A]

पत्र : प्रथम

समय : १ घण्टा ३० मिनेट

पूर्णाङ्क : १००

विषय : सेवा सम्बन्धी

उत्तरपुस्तिकामा प्रश्नपत्रको KEY अनिवार्य रूपले उल्लेख गर्नुपर्नेछ । उल्लेख नगरेमा उत्तरपुस्तिका रद्द हुनेछ । परीक्षामा calculator, mobile प्रयोग गर्न पाइनेछैन ।

Multiple Choice

100x1 = 100 Marks

- CPU registers are used for.....
A) Permanent data storage
 B) Temporary data storage during processing
C) Installing software
D) Displaying output to the screen
- What is the main function of cache memory?
A) Store user files
B) Connect peripherals
C) Store system BIOS
 D) Provide high speed data access to CPU
- Which of the following is an input device?
A) Speaker
B) Microphone
C) Scanner
D) Monitor
- Which of the following best describes application software?
A) Controls the overall operation of the computer
B) Manages memory and processes
 C) Helps the user perform specific tasks
D) Maintains the power supply of the computer
- Which of the following is not a type of computer virus?
A) Trojan Horse
 B) Assembler
C) Worm
D) Boot sector virus
- Which Excel feature should be used when a manager wants to analyze monthly sales totals across multiple branches with dynamic data grouping and filtering?
A) Data Verification
B) Conditional Formatting
C) VLOOKUP
 D) Pivot Table
- If a printer failed to print documents even if it's powered and connected properly, what needs to be done first?
A) Restart the computer operating system
B) Replace the cartridge
 C) Verify the printer status in operating system's print queue
D) Uninstall and install the printer driver
- Why is Unicode considered essential for official Nepali document processing over legacy fonts like Preeti especially in public service sectors?
 A) Unicode enables cross-platform support and standard compatibility
B) Legacy fonts require no software to run
C) Unicode fonts are easier to memorize
D) Preeti fonts are more attractive visually
- Which feature of procedural programming ensures code reusability without affecting global states?
A) Pass-by-reference function calls
B) Pass-by-value function calls
C) Global variable referencing
D) Virtual functions

Contd...

10. What will be the output of following code?

```
#include<stdio.h>

int mystery (int n) {
    if (n <= 0)
        return 0;
    else
        return n + mystery (n - 2);
}

int main () {
    int result = mystery (6);
    printf("%d\n",result);
    return 0;
}
```

$$6 + 4 = 10$$

$$6 + \boxed{4} + 2 = 12$$

$$6 + 4 + 2 +$$

- A) 8 B) 10 C) 12 D) 14
11. Which of the following is not a valid data type in c?
 A) string B) short int C) long int D) unsigned int
12. Which of the following is a unary operator in c?
 A) + B) * C) ++ D) &&
13. What will happen if the condition in an if-else statement is false?
 A) The if block executes B) The else block executes
 C) The program terminates D) Nothing happens
14. Which access specifier allows members of a class to be accessed only within the class?
 A) Private B) Static C) Protected D) Public
15. Which of the following best describes objects and class in OOP?
 A) Class is physical entity stored in memory and objects are abstract ideas derived from it
 B) Class defines the structure and behavior while the objects are concrete instances that hold specific data based on that definition
 C) Objects are blueprints that define properties and behaviors while classes are instances created at run time
 D) Class and objects are identical concepts
16. What is the primary advantage of function overloading?
 A) Code readability and reusability B) Reduced program size
 C) Faster execution D) Prevent errors
17. What is encapsulation in OOP?
 A) Hiding internal details of an object
 B) Deriving new classes from existing classes
 C) Using the same method name with different implementation
 D) Creating multiple objects
18. How exception handling is done in object-oriented programming?
 A) Exceptions are ignored because objects automatically fix error
 B) Exceptions handling is not required in OOP as it has built in error prevention mechanisms
 C) By using try, catch and finally blocks to handle run time error
 D) From the error code returned by the functions
19. Which data structure is used in function called management?
 A) Queue B) Stack C) Linked list D) Tree

A - 3, प्राविधिक, अधिकृत तृतीय, प्राविधिक अधिकृत (सूचना प्रविधि)

20. In a doubly linked list, what is the worst-case time complexity to delete last node given only its reference? (n)
A) $O(1)$ B) $O(n)$ C) $O(\log n)$ D) $O(n^2)$
21. Which abstract data type is typically used to implement recursion?
A) Queue B) Stack C) Linked List D) Array
22. Which of the following is not divide and conquer algorithm?
A) Merge Sort B) Binary Search C) Quick Sort D) Bubble Sort
23. What is the average-case time complexity of Quick Sort algorithm?
A) $O(n \log n)$ B) $O(\log n)$ C) $O(n)$ D) $O(n^2)$
24. The main objective of using hashing in data structure is.....
A) To keep the elements in sorted order
B) To allow direct access to elements reducing search time
C) To store data sequentially
D) To compress data storage
25. Which searching algorithm is best for small or unsorted datasets?
A) Binary Search B) Linear search C) Jump search D) Interpolation search
26. Which graph algorithm uses a greedy approach but does not guarantee optimality for all inputs?
A) Prim's MST B) Kruskal's MST
C) Dijkstra's Shortest Path D) Bellman-Ford
27. In a microprocessor-based system, which statement about the bus system is true?
A) The address bus is usually unidirectional, while the data bus can be a bidirectional
B) The data bus is unidirectional and the address bus is bidirectional
C) Both address and data buses are always unidirectional
D) The control bus only carries clock signals
28. Which of the following is true in microprocessor regarding instruction set?
A) It is a collection of registers used by CPU
B) It is memory area where all programs are stored
C) It is a set of all operations that a processor can execute as defined by its architecture ✓
D) It is the set of commands used only by high-level programming languages
29. What is the function of the INTR interrupt?
A) Maskable interrupt with highest priority
B) Non-maskable interrupt
C) General-purpose interrupt with lowest priority
D) Software interrupt
30. In 8085 microprocessor, which register holds the address of the next instruction to be fetched?
A) Accumulator B) Program Counter
C) Instruction Register D) Stack Pointer
31. Which register pair is used for multiplication/division in 8086?
A) AX and BX B) AX and DX C) BX and CX D) SI and DI
32. Which memory type is the fastest and smallest in a typical computer system?
A) Main Memory (RAM) B) Cache Memory
C) Secondary Storage D) Register
33. What happens in an inclusive cache hierarchy, when a line is evicted from L1 but not L3?
A) L3 keeps the data B) L3 invalidates it C) CPU fault D) Data error

A - 4, प्राविधिक, अधिकृत तृतीय, प्राविधिक अधिकृत (सूचना प्रविधि)

34. Which architecture is more suited for compiler optimization and parallelism?
A) CISC B) RISC C) VLIW D) DISC
35. What triggers a DMA request (DRQ)?
A) CPU interrupt ~~B) Peripheral device ready for transfer~~
C) Cache miss D) Page fault
36. What does multicore processor mean?
A) Multiple ALUs in one core B) Multiple clock speeds
C) Multiple cache levels ~~D) Multiple CPUs on one chip~~
37. An operating system that supports multiple programs running at a once is called
A) Multi-user OS B) Time-sharing OS
~~C) Multiprocessing OS~~ D) Multitasking OS
38. Why is mutual exclusion important in concurrent programming?
A) It prevents deadlock by scheduling all processes sequentially
~~B) It ensures that only one process can access a critical section at a time, avoiding data inconsistency~~
C) It allows multiple processes to access the same critical section simultaneously
D) It removes the need for inter-process communication
39. Which of the following scheduling algorithm is most prone to starvation?
A) First Come First Serve ~~B) Priority Scheduling~~
C) Round Robin D) Multi Level Queue Scheduling
40. What causes a page fault in demand paging?
~~A) Accessing a page not in RAM~~ B) Writing to a read-only page
C) Dereferencing a null pointer D) Exceeding the page table size
41. Which file system structure maintains a list of pointers that points to data blocks belonging to a file?
~~A) Linked Allocation~~ B) FAT Allocation
C) Indexed Allocation D) Contiguous Allocation
42. Which I/O technique uses the CPU to constantly check device status?
A) DMA B) Interrupt C) Buffering ~~D) Polling~~
43. Which of the following is not a method of user authentication in Operating System?
~~A) Memory segmentation~~ B) Token based authentication
C) Biometrics D) Password
44. What is the shell in Linux?
A) A graphical interface ~~B) A command interpreter~~
C) A hardware component D) A networking protocol
45. What does diamond in an E-R diagram represent?
A) Entities B) Attributes ~~C) Relationships~~ D) Foreign Keys
46. Which relational algebra operation removes duplicate tuples?
A) Selection (σ) B) Union (U) C) Projection (π) D) Rename (ρ)
47. What is a primary key in a relational model?
A) A key that can be left blank B) A key used to encrypt data
~~C) A unique identifier for tuples in a table~~ D) A foreign key from another table
48. Which normal form eliminates transitive dependencies?
A) 1NF B) 2NF ~~C) 3NF~~ D) BCNF
49. Which of the following ensures that once a transaction is committed, it remains so, even in case of crash?
A) Atomicity B) Consistency C) Isolation ~~D) Durability~~

A - 5, प्राविधिक, अधिकृत तृतीय, प्राविधिक अधिकृत (सूचना प्रविधि)

50. What is the default port for Oracle Database listeners?
A) 1433 ~~B) 3306~~ C) 1521 ~~D) 8080~~
51. What is the first step in query processing by a DBMS?
A) Execution of the query
B) Optimization of the query
~~C) Parsing and translation of the query into an internal form~~
D) Displaying the query results
52. What is the main challenge of horizontal fragmentation in distributed database?
~~A) Joins across fragments require network transfer~~
B) Schema changes are difficult to coordinate
C) Indexes cannot be partitioned
D) Transactions auto-commit
53. Which of the following is not a layer in the TCP/IP model?
A) Network B) Transport ~~C) Presentation~~ D) Application
54. Which of the following devices operates only at the physical layer?
A) Router B) Switch ~~C) Hub~~ D) Firewall
55. How does CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance) differ from CSMA/CD?
A) CSMA/CA detects collisions after they occur, CSMA/CD avoids collisions before they occur
B) CSMA/CA avoids collisions by using acknowledgements and waiting, while CSMA/CD detects and handles collisions after they happen
C) CSMA/CA is used only for wired networks, CSMA/CD for wireless
D) CSMA/CA does not use carrier sensing
56. Which protocol provides secure file transfer but doesn't work with IPv6 due to its packet structure?
A) FTP B) TFTP C) SFTP D) SCP
57. Which of the following is a valid subnet ID for 192.168.1.32/27?
~~A) 192.168.1.0~~ ~~B) 192.168.1.32~~ C) 192.168.1.64 ~~D) 192.168.1.96~~
58. Which DNS record maps a domain name to an IPv4 address?
A) NS B) MX ~~C) A~~ D) CNAME
59. Which of the following best describes a Storage Area Network (SAN)?
~~A) A high-speed network that provides block-level access to storage device~~
B) A local hard drive inside a server
C) A type of RAID configuration
D) A backup solution using cloud storage
60. is an example of passive attack.
A) Man-in-the-middle attack ~~B) Eavesdropping~~
C) Denial of Service (DoS) attack D) Data modification
61. What is the key characteristic of symmetric key cryptography?
A) Different keys for encryption and decryption
~~B) Same key used for both encryption and decryption~~
C) Uses public key infrastructure
D) Uses hash functions
62. Which key does the receiver use to verify a digital signature?
A) Sender's private key B) Receiver's public key
C) Receiver's private key ~~D) Sender's public key~~

63. What is a VPN tunnel?
A) A physical cable
 B) An encrypted connection that encapsulates data packets for secure transmission
C) A data compression method
D) A type of firewall
64. Which tool would help diagnose a DNS resolution issue?
 A) nslookup B) ping C) tracert D) netstat
65. What is the primary goal of Software Engineering?
A) To write code as quickly as possible
 B) To systematically develop high-quality software within budget and time constraints
C) To use the latest programming languages
D) To minimize the number of programmers needed
66. Which software process model is known for its sequential, linear flow with distinct phases like requirements, design, implementation, testing and deployment?
A) Agile B) RAD C) Spiral D) Waterfall
67. Which of the following is not a type of software requirement?
A) Functional requirements B) Non-functional requirements
 C) Business requirements D) Design requirements
68. In Critical Path Method (CPM) analysis, what does a "slack time" of zero indicate?
A) The task can be delayed without affecting the project deadline
B) The task is not critical
C) The task is on the critical path
D) The task has no dependencies
69. Which metric is used for software size estimation in Function Point Analysis (FPA)?
A) Lines of Code B) Cyclomatic complexity
 C) Number of user inputs/outputs D) Halstead's difficulty measure
70. What is the primary concern of architectural design?
A) Defining the overall structure and organization of the system
B) Designing user interfaces
C) Writing detailed code
D) Testing individual components
71. Which of the following is not a black box testing technique?
A) Boundary value testing B) Cause-effect (Decision Table) testing
C) Combinatorial testing D) Basic condition testing
72. What do you mean by "Defect Density" in quality management of software?
A) The number of defects found per module
B) The number of defects found per line of code
C) The number of defects found per functional requirements
D) The number of defects found per technical requirements
73. In HTML5, which semantic element should be used to define self-contained content that could be distributed independently (e.g., a blog post)?
A) <section> B) <article> C) <div> D) <aside>
74. In client-server architecture, where is business logic executed in a "thin client" model?
 A) Server-side only B) Client-side only
C) Both client and server D) Middleware

A - 7, प्राविधिक, अधिकृत तृतीय, प्राविधिक अधिकृत (सूचना प्रविधि)

75. What is the primary purpose of JavaScript in web development?
A) Server-side database management
B) Client-side interactivity and dynamic content
C) Web server configuration
D) Network security
76. What is the main purpose of a firewall in information security?
A) To encrypt data that will be transmitted
B) To protect against malware infections
C) To control network traffic and block unauthorized access
D) To store sensitive information securely
77. What is the first step in knowledge management strategy?
A) Training all the staffs
B) Implementing knowledge management software
C) Identifying and assessing knowledge assets
D) Archiving the knowledge and using for all the staffs
78. In reinforcement learning, what is the primary purpose of the "exploration Vs exploitation" trade-off?
A) To balance between trying new actions and using known rewarding actions
B) To reduce neural network overfitting
C) To optimize GPU utilization
D) To prevent gradient vanishing in RNNs
79. What distinguishes edge computing from cloud computing?
A) Centralized data processing
B) Processing data near the source
C) Higher latency
D) Dependency on internet connectivity
80. Which component is essential for IoT devices to communicate?
A) High-resolution display
B) Sensors and connectivity modules
C) Powerful processors
D) Large storage capacity
81. What is the primary application of convolutional neural networks (CNNs) in computer vision?
A) Image classification and object detection
B) Image verification and clustering
C) Object verification and clustering
D) Clustering
82. What is a key characteristic of blockchain technology?
A) Centralized data storage
B) Distributed and immutable ledger
C) Requires constant internet connection
D) Only works with cryptocurrencies
83. Which constitutional Article guarantees the Right to Privacy as a fundamental right in Nepal?
A) 16
B) 28
C) 32
D) 42
84. Under the Copyright Act, 2059, what is the default duration of copyright protection?
A) 25 years after the author's death
B) 50 years after publication
C) Life of the author + 70 years
D) Life of the author + 50 years
85. What is the main goal of the Digital Nepal Framework, 2076?
A) To establish more internet cafes
B) To transform Nepal into a digitally empowered society and knowledge-based economy
C) To increase mobile phone usage
D) To promote social media usage

86. Which institution is responsible for overseeing the implementation of the ICT Policy, 2072?
- A) Ministry of Communication and Information Technology
 - B) Ministry of Education, Science and Technology
 - C) Ministry of Finance
 - D) Nepal Telecommunications Authority
87. When was the IBM 1401 mainframe computer first brought to Nepal?
- A) 2027 BS
 - B) 2028 BS
 - C) 2029 BS
 - D) 2030 BS
88. Which body regulates ISP licenses in Nepal?
- A) Nepal Telecommunications Authority
 - B) Ministry of Communication and Information Technology
 - C) Department of Information Technology
 - D) Nepal Rastra Bank
89. Which agency oversees e-bidding in Nepal?
- A) Nepal Rastra Bank
 - B) Public Procurement Monitoring Office
 - C) Department of Information Technology
 - D) Nepal Telecommunications Authority
90. Which Section of the Electronic Transactions Act criminalizes unauthorized access to computer systems?
- A) 43
 - B) 44
 - C) 45
 - D) 47
91. Which objective is not true for University Grants Commission, Nepal?
- A) Advise the Government of Nepal to establish new universities
 - B) Disburse grants to universities
 - C) Determine and maintain the standards of higher education
 - D) Compete with the universities in Nepal
92. Which of the following programs was launched between UGC and TU to promote higher education quality with World Bank support?
- A) PHEP
 - B) SEP
 - C) NEHEP
 - D) HEQEP
93. Which was the first technical campus established under TU?
- A) Institute of Engineering
 - B) Institute of Medicine
 - C) Institute of Agriculture and Animal Science
 - D) Institute of Forestry
94. Which ministry primarily coordinates with UGC for higher education policies in Nepal?
- A) Ministry of Education, Science and Technology
 - B) Ministry of Finance
 - C) Ministry of Communication and Information Technology
 - D) Ministry of Federal Affairs and General Administration
95. Which aspect is typically covered under TU Rules and Regulations for teacher service?
- A) Political party membership requirements
 - B) Promotion criteria, leave policies and disciplinary procedures
 - C) Personal lifestyle choices
 - D) Family background verification
96. What is a major financial challenge faced by TU?
- A) Surplus funding
 - B) Over-reliance on student fees
 - C) Excessive research grants
 - D) International partnerships

A - 9, प्राविधिक, अधिकृत तृतीय, प्राविधिक अधिकृत (सूचना प्रविधि)

97. What is the main function of TU Executive Council?
A) Curriculum development
B) Research promotions only
C) Student discipline
D) Execution of senate decisions, appointment of officials, grants and affiliations
98. Which financial model does UGC use to fund universities?
A) Block grant system
B) Student fee-based ✓
C) Corporate sponsorship ✓
D) Foreign aid-dependent ✗
99. Which TU entity handles faculty requirements?
A) Executive Council
B) Service Commission
C) Academic Council ✓
D) Examination Control Division
100. Who chairs the TU Executive Council?
A) Prime Minister of Nepal
B) Minister of Education, Science and Technology
C) TU Vice-Chancellor ✓
D) UGC Chairman

- The End -

उत्तरपुस्तिकामा KEY अनिवार्य रूपमा लेख्नुहोला ।