

लोक सेवा आयोग
राष्ट्रिय बीमा संस्थान, अधिकृत स्तर, छैठौं, सहायक व्यवस्थापक (कम्प्युटर ईञ्जिनियर) पदको
प्रतियोगितात्मक लिखित परीक्षा
२०७४।९।१७

KEY [A]

पत्र : प्रथम
समय : १ घण्टा ३० मिनेट

पूर्णाङ्क : १००

विषय : कम्प्युटर ईञ्जिनियरिङ्ग सम्बन्धी

उत्तरपुस्तिकामा प्रश्नपत्रको KEY अनिवार्य रूपले उल्लेख गर्नुपर्नेछ । उल्लेख नगरेमा उत्तरपुस्तिका रद्द हुनेछ । परीक्षामा calculator, mobile प्रयोग गर्न पाइनेछैन । प्रत्येक Section को उत्तर छुट्टाछुट्टै उत्तरपुस्तिकामा लेख्नुपर्नेछ । अन्यथा उत्तरपुस्तिका रद्द हुनेछ ।

Section A : Objective

Multiple Choice

80×1=80 Marks

1. Which of the following devices takes data sent from one network device and forwards it to all devices on the network regardless of the intended recipient?
A) DNS server B) Switch C) Hub D) Gateway
2. The physical layer concerns with
A) bit-by-bit delivery B) process to process delivery
C) application to application delivery D) none of the above
3. Full form of CRC is
A) Code Redundancy Check B) Cyclic Redundancy Check
C) Code Repeat Check D) Cyclic Repeat Check
4. Multiple objects can be sent over a TCP connection between client and server in
A) persistent HTTP B) nonpersistent HTTP
C) both A and B D) none of the above
5. Which of the following depends on the microprocessor speed?
A) clock B) data bus width
C) address bus width D) size of register
6. Which protocol is used for email transfer?
A) SFTP B) SMTP C) SNMP D) DHCP
7. The two phases of executing an instruction are
A) instruction decoding and storage
B) instruction fetch and instruction execution
C) instruction execution and storage
D) instruction fetch and instruction processing
8. What is meant by Pseudo Instructions?
A) instructions that are ignored by microprocessor
B) assembler directives
C) instructions that are treated like comment
D) false instruction
9. During the execution of a program, which register is initialized first?
A) MDR B) MAR C) PC D) MBR

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10. The condition flag Z is set to 1 to indicate
A) the operation has resulted in an error B) the operation requires an interrupt call
C) the result is zero D) there is no empty register available
11. Voltage is measured
A) in parallel B) in series
C) after breaking the circuit D) after checking resistance
12. In memory mapped IO
A) all IO address lines are used
B) all memory address lines are used
C) all memory and IO address lines are used
D) few memory address lines and few IO address lines are used
13. The decimal number 47 can be encoded in hexadecimal as
A) 2B B) 2H C) 2F D) 2G
14. A full adder logic circuit will have
A) two inputs and one output B) three inputs and three outputs
C) two inputs and two outputs D) three inputs and two outputs
15. During the nested subroutine call the return address is stored as
A) Random B) FIFO C) LIFO D) Priority queue
16. The number of full and half adders required to add 16-bit numbers is
A) 8 half-adders, 8 full-adders B) 1 half-adder, 15 full-adders
C) 16 half-adders, 0 full-adder D) 15 half-adders, 1 full-adder
17. How many flip flops are required to construct a decade counter?
A) 10 B) 4 C) 3 D) 2
18. Which of the following are universal gates?
A) NAND and NOR B) AND and OR C) XOR and XNOR D) NOT and buffer
19. If a 10k resistor is placed across a 10V supply, the current will be
A) 10 mA B) 1 mA C) 0.01 mA D) 0.1 mA
20. The ASCII
A) is a subset of 8-bit EBCDIC
B) is used only in western countries
C) is version II of the ASC standard
D) has 128 characters, including 32 control characters
21. Which of the following expressions is in the product-of-sums form?
A) (AB)(CD) B) (A+B)(C+D) C) AB+CD D) AB(CD)
22. The feedback factor of a Wien bridge oscillator using Op-Amp is
A) 1/3 B) 1/4 C) 1/2 D) 1
23. are electronic circuits which give constant DC output voltage, irrespective of variations in input voltage V, current drawn by the load I from output terminals.
A) Rectifier B) Filter C) Regulator D) None of the above

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24. Kirchhoff's law specifies that
A) a node can store energy B) charge accumulation is possible in a node
C) a node cannot accumulate charge D) a node may or may not store energy
25. The pulse code modulation (PCM) is a technique which transforms an analogue signal into a digital signal, and involved three consecutive process of
A) sampling, coding and filtering B) sampling, quantization and encoding
C) quantization, encoding and conversion D) sampling, quantization and smoothing
26. Operator overloading -
A) creates new operator
B) extends the meaning of existing operators
C) redefines the existing operators
D) none of the above
27. The actual source code for implementing a template function is created when
A) the declaration of function appears B) the function is invoked
C) the definition of the function appears D) none of the above
28. Using the wardrobe structure within the ShopList structure is an example of a good programming principle, known as
A) reusability B) polymorphism C) redundancy D) recursion
29. Representation of data structure in memory is known as
A) recursive B) abstract data type
C) storage structure D) file structure
30. Which of the following appropriately explains the desirable characteristic of good system design?
A) modular approach B) proper documentation
C) conversion D) none of the above
31. The make-or-buy decision is associated with the step in the SDLC.
A) problem/opportunity identification B) design
C) analysis D) development and documentation
32. The final step of the system analysis phase in the SDLC is to
A) gather data B) write system analysis report
C) propose changes D) analyze data
33. Which one of the following is not a step of requirement engineering?
A) elicitation B) design C) analysis D) documentation
34. Which is not true about Beta testing?
A) is conducted by the end-users
B) developer is generally present
C) is conducted at the customer site
D) customer reports about problems at regular intervals

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35. System study involves
A) study of an existing system
B) documenting the existing system
C) both A and B
D) none of the above
36. The data structure required for Breadth First Traversal on a graph is
A) stack
B) array
C) queue
D) tree
37. Insert into instructor values (10211, 'Smith', 'Biology', 66000); what type of statement is this?
A) Query
B) DML
C) Relational
D) DDL
38. A is an outline of a process that keeps develop successful information systems.
A) System Development Life Cycle
B) CASE Tool
C) Phased Conversion
D) Success Factors
39. Which of the following sorting algorithm is of divide-and-conquer type?
A) bubble
B) insertion
C) quick
D) merge
40. Which of the following standard algorithms is not a Greedy algorithm?
A) Dijkstra's shortest path algorithm
B) Kruskal algorithm
C) Huffman coding
D) Bellmen Ford Shortest path algorithm
41. Barrier voltage for silicon junction is
A) 0.3V
B) 0.5V
C) 0.7V
D) 1.5V
42. What is the specialty about the inorder traversal of a binary search tree?
A) it traverses in a non increasing order
B) it traverses in an increasing order
C) it traverses in a random fashion
D) none of the above
43. The primary tool used in structured design is a
A) data-flow diagram
B) module
C) structure chart
D) program flowchart
44. A character of the data that binary search uses but the linear search ignores, is
A) order of the list
B) length of the list
C) maximum value in the list
D) minimum value in list
45. What type of software testing is generally used in software maintenance?
A) regression testing
B) system testing
C) integration testing
D) unit testing
46. During function call the value of passed argument is not changed if
A) argument is passed by value
B) argument is passed by reference
C) argument is passed as array
D) argument is passed as structure
47. What is the size of an int data type?
A) 2 byte
B) 4 byte
C) 8 byte
D) Both A and B

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48. Which of the following statements is correct?
- A) base class pointer cannot point to derived class
 - B) derived class pointer cannot point to base class
 - C) pointer to derived class cannot be created
 - D) pointer to base class cannot be created
49. Which of the following is not a maturity level in CMM?
- A) defined
 - B) repeatable
 - C) controlled
 - D) optimizing
50. A database management system
- A) allows simultaneous access to multiple files
 - B) can do more than a record management system
 - C) is a collection of programs for managing data in a single file
 - D) both A and B
51. If a process is executing in its critical section, then no other processes can be executing in their critical section. This condition is called
- A) mutual exclusion
 - B) critical exclusion
 - C) synchronous exclusion
 - D) asynchronous exclusion
52. SSL divides data into blocks of
- A) 2^6
 - B) 2^{14}
 - C) 2^{20}
 - D) 2^{24}
53. Which of these classes are used by Byte streams for input and output operation in Java?
- A) InputStream
 - B) InputOutputStream
 - C) Reader
 - D) All of the above
54. Time quantum is defined in
- A) shortest job scheduling algorithm
 - B) round robin scheduling algorithm
 - C) priority scheduling algorithm
 - D) multilevel queue scheduling algorithm
55. In the client invokes the request, continues processing while the request is dispatched, and later collects the response.
- A) Deferred Synchronous Invocation
 - B) One way Invocation
 - C) Synchronous Invocation
 - D) Two way Invocation
56. Which of the following approach is adapted by C++?
- A) top-down
 - B) bottom-up
 - C) right-left
 - D) left-right
57. Which of the following is not a component of a data warehouse?
- A) metadata
 - B) current detail data
 - C) lightly summarized data
 - D) component key
58. Post method of HTML form sends data
- A) through html text
 - B) encrypted in url
 - C) through http header
 - D) along the html body
59. In computer security, means that computer system assets can be modified only by authorized parties.
- A) confidentiality
 - B) integrity
 - C) availability
 - D) authenticity

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60. Three-tier architecture includes which of the following?
A) three server layers B) a client layer and two server layers
C) two client layers and one server layer D) three client layers
61. The components of IP security includes
A) Authentication Header (AH) B) Encapsulating Security Payload (ESP)
C) Internet Key Exchange (IKE) D) All of the above
62. In distributed system the disadvantage of single coordinator approach is
A) bottleneck B) slow response C) deadlock D) one request per second
63. Which of the following is not an approach for development of MIS?
A) Hierarchical approach B) Integrative approach
C) Modular approach D) Elective approach
64. The transaction log includes which of the following?
A) the before-image of a record B) the after-image of a record
C) the before and after-image of a record D) the essential data of the record
65. Which of these keywords can be used to prevent Method overriding?
A) static B) constant C) protected D) final
66. The permitted set of values for each attribute of a relation is called
A) Domain of that attribute B) Relation of that attribute
C) Set of that attribute D) Schema of that attribute
67. Which one of the following algorithm is not used in asymmetric-key cryptography?
A) RSA algorithm B) Diffie-hellman algorithm
C) Electronic code book algorithm D) None of the above
68. Which of the following is not project management goal?
A) Keeping overall costs within budget
B) Delivering the software to the customer at the agreed time
C) Maintaining a happy and well functioning development team
D) Avoiding costumer complaints
69. What will be the output of the following PHP code?

```
<?php
    $color="maroon";
    $var=$color[2];
    echo"$var";
?>
```


A) a B) error C) \$var D) r
70. Compound statement is
A) group of statements in function B) group of statements inside braces
C) if statement D) for statement

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A - 7, अधिकृत स्तर, छैठौं, सहायक व्यवस्थापक (कम्प्युटर इंजिनियर)

71. The Banker's algorithm is used to
A) detect deadlock in operating systems B) prevent deadlock in operating systems
C) rectify a deadlock state D) manage memory and I/O
72. A program that performs a useful task while simultaneously allowing destructive acts is
A) Worm B) Trojan Horse C) Virus D) Macro Virus
73. Attempting to acquire sensitive information by redirecting the user to a fake website is usually called
A) Spoofing B) Phishing C) URL redirection D) URL hijacking
74. When was the Electronic Transaction Act of Nepal promulgated?
A) 2061 BS B) 2063 BS C) 2065 BS D) 2057 BS
75. HDFS can be accessed over HTTP using
A) viewfs URI scheme B) webhdfs URI scheme
C) wasb URI scheme D) HDFS ftp
76. Which of the following is open cloud storage management standard by SNIA?
A) CDMI B) OCCI
C) CEA D) Adequate bandwidth
77. Which of the following social networking site is used for business and professional networking?
A) LiveJournal B) LinkedIn C) Mix D) All of the above
78. Which of the following is essential concept related to Cloud?
A) Reliability B) Productivity C) Abstraction D) All of the above
79. How many types of dimensions exists in Cloud Cube Model?
A) 1 B) 2 C) 3 D) 4
80. as a service is a cloud computing infrastructure that creates a development environment upon which applications may be build.
A) Infrastructure B) Service C) Platform D) All of the above

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Section B : Subjective

20 Marks

1. Explain what you know about the current role and status of computer engineers and IT manpower in government organizations of Nepal, and describe your views about the current situation. What do you think should be the ideal situation regarding the position and strength of IT manpower in every government agency so that the government can optimally progress in development works in all areas? Write a technical proposal to the government conceiving how IT manpower should be positioned in different levels of the organization chart of every government department/agency, what type of positions should be introduced and in what proportion or quantity, along with justifications. Propose what should be the Terms of Reference (ToR) of the roles and functions for each such IT position. Along with the ToR, explain how IT teams can be formed to perform IT functions and project works of the government department/agency so that they can produce maximum output in optimal time and resources. 10
2. Suppose you are assigned to design a database system in a public library. To use the books in the library you should become the member of the library by paying some amount. The database should consist of records of various books under different categories. Each book may have one or more authors. Members can lend up to five books at a time and should return in specified deadline otherwise they have to pay fine of some amount per day. Analyze the system and design the database schema for this system. You can also add additional feature in the system apart from specified to make the system practical. 10

- THE END -

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प्रतियोगितात्मक लिखित परीक्षा

२०७४/१/१८

पत्र : द्वितीय
समय : ३ घण्टा

पूर्णाङ्क : १००

विषय : कम्प्युटर ईंजिनियरिङ्ग सम्बन्धी

प्रत्येक Section को उत्तर छुट्टाछुट्टै उत्तरपुस्तिकामा लेख्नुपर्नेछ । अन्यथा उत्तरपुस्तिका रद्द हुनेछ ।

Section : A

50 Marks

1. What do you understand by IPv6? Describe its addressing format. 5
2. a) Describe with example which type of addressing formats is used if the CPU is organized in stack CPU organization. 2
b) An instruction is stored at location 300 with its address field at location 301. The address field has the value 400. A processor register R1 contains the number 200. Evaluate the effective address if the addressing mode of the instruction is 3
i) Immediate ii) Register indirect iii) Relative
3. Design a full adder diagram with truth table. 5
4. a) List four different applications of operational amplifiers. 2
b) Explain the working principle of single phase voltage transformer. 3
5. Define modulation. Describe the importance of pulse code modulation (PCM). 5
6. a) What do you understand by identifiers and keywords in programming language? 2
b) Describe four different characteristics of object oriented programming with example. 3
7. Describe the working mechanism of binary search tree with example. 5
8. What are the various types of software maintenance? What is software re-engineering? state. 3+2=5
9. Define transaction in database system. Explain concurrency control techniques. 5
10. Describe the essential properties of real time and distributed operating systems. 5

Section : B

50 Marks

11. Compare and contrast static and dynamic IP addresses and briefly explain when each is appropriate. 5
12. a) Describe how fault tolerance can be achieved in distributed system. 2

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- b) Describe the responsibilities of Transaction Processing Monitors. 3
13. a) In symmetric key cryptography, if every person in a group of 10 people needs to communicate with every other person in the group, how many secret keys are needed? 2
- b) Describe how can a bank prevent PIN guessing if someone has found or stolen a bank card and tried to use it. 3
14. Give an introduction of Online Analytical Processing (OLAP) tools with example. 5
15. Explain different components of cloud computing with diagram. 5
16. What is machine learning? Define overfitting and underfitting. 5
17. a) Write an essay on "Importance of free and open source software in developing countries". 7
- b) You as a computer Engineer of Rastriya Beema Sansthan, how would you inspire the top level executive to implement free and open source software within your organization? 3
18. As you know that any university consists of many components like Exam, Account, Human Resources, Physical Facility, Library, School/Faculty/Department, Student, Course/Program and so on. Draw an ER-diagram for university management system which should contain at least four entities mentioning the type of relationship and keys (Primary/Foreign Key). 10

- THE END -