A. Multiple Choice (78%)

1. Which of the following is not true about locks?
   (A) Locks with small granularity cause fewer conflicts.
   (B) Locks with large granularity are more difficult for the DBMS to administer.
   (C) Locks with large granularity produce fewer details for the DBMS to track.
   (D) Locks may have a field-level granularity.
   (E) Locks may have a row-level granularity.

2. To represent a one-to-many relationship in a relational database design
   (A) the key of the child is placed as a foreign key into the parent
   (B) the key of the parent is placed as a foreign key into the child
   (C) an intersection table must be created
   (D) the key of the table on the "many" side is placed in the table on the "one" side
   (E) the keys of both tables are joined into a composite key

3. Which of the following statements is incorrect about "referential integrity constraints"?
   (A) A referential integrity constraint is a rule that restricts certain actions on the database data.
   (B) A referential integrity constraint is used to ensure that the values in a field in one table have matching values in a corresponding field in another table.
   (C) These constraints are enforced by the DBMS, which will not allow changes to the values of the database that would result in violations of this rule.
   (D) If a foreign key exists in a table, the foreign key value must match a candidate or primary key value of some record in another table.
   (E) The foreign key value cannot be null.

4. Consider the following ER diagram.

What would be the relations when the above ER diagram is mapped into a relational model?
   i. Lecturer(NIC, LName, DOB, Address)
   ii. Lecturer(NIC, LName, DOB, Address, CourseID)
   iii. Teach(NIC, CourseID, Hours)
   iv. Course(CourseID, CName, Room)
   v. Course(CourseID, CName, Room, Hours, NIC)
   (A) i, iii, iv (B) i, iii, v (C) ii, iii, iv (D) ii, iii, v (E) i, iv

5. The in order traversal of a binary tree is FGAEBDC, and the post order traversal of the binary tree is FGEABDC. Find out the pre order traversal of the binary tree.
   (A) CDBAGFE (B) AGFEDCB (C) CAGFEDB (D) CAGDEFB (E) FGAECDB

6. The depth of the root node in a binary tree is 0. Which of the following statements is incorrect?
7. Which of the following statements is not the required conditions or characteristics for binary search algorithm?
(A) The list must be sorted.
(B) There should be the direct access to the middle element in any sub-list.
(C) It is not a good data structure for the list whose data items are needed to be frequently inserted or removed.
(D) The time complexity for finding a datum in a list with n data is O(log n).
(E) All of above are the required conditions and characteristics.

8. Which of the following data structure is used in visiting all the nodes of a tree in breadth first traversal order?
(A) Stack  (B) Queue  (C) Tree  (D) Array  (E) Linked list

9. Which of the following statements about Recycle Bin is incorrect?
(A) Recycle Bin allows users to recover files that have been deleted in Windows.
(B) As the Recycle Bin is filled up, older files are permanently removed from your hard drive to make space for newly deleted ones.
(C) Files deleted from the Windows command line (MS-DOS prompt) are also sent to the Windows Recycle Bin.
(D) Recycle Bin Manager is a software that gives you the possibility to store and recover unwanted files whenever you want.
(E) Recycle Bin Manager makes you see the file types, their names and location to make the deleted file recovery faster and easier.

10. Which of the following statements is incorrect?
(A) Memory Address Register (MAR) is a CPU register storing the memory address from which data will be fetched to the CPU and MAR stores the memory address to which data will be sent and stored.
(B) For 64-bit CPU, the size of the MDR is usually a multiple of 64.
(C) Program counter holds the address of the instruction that should be executed next.
(D) Instruction register holds the actual instruction to be executed.
(E) Flag register contain status bits that indicates various status about the result generated.

11. A feasibility document should contain all of the following items except:
(A) Projected schedule for undertaking the project  (B) Project Scope  (C) Current Analysis  (D) Problem descriptions  (E) Recommended solutions

12. Which of the following items is not an appropriate behavior for a good interviewer?
(A) Showing good listening skills  (B) Objectivity  (C) Using a balance of open-ended and closed-ended questions  (D) Restating responses of interviewee  (E) Marketing - being able to sell the new system to its future users

13. Which of the following statements is incorrect?
14. Which of the following statements is incorrect?
(A) DMA is the hardware mechanism that allows peripheral components to transfer their I/O data directly to and from main memory without the need to involve the system processor.
(B) Use of DMA can greatly increase throughput to and from a device, because a great deal of computational overhead is eliminated.
(C) For Memory mapped I/O, the entire address bus must be fully decoded for every device.
(D) From a software perspective, for Memory-mapped I/O method more instructions are required to accomplish the same task.
(E) Port mapped I/O uses a separate, dedicated address space and is accessed via a dedicated set of microprocessor instructions.

15. Which of the following statements is incorrect?
(A) DMA is the hardware mechanism that allows peripheral components to transfer their I/O data directly to and from main memory without the need to involve the system processor.
(B) Use of DMA can greatly increase throughput to and from a device, because a great deal of computational overhead is eliminated.
(C) For Memory mapped I/O, the entire address bus must be fully decoded for every device.
(D) From a software perspective, Memory-mapped I/O method requires more instructions to accomplish the same task than Memory mapped I/O method does.
(E) Memory mapped I/O is mapped into the same address space as program memory and/or user memory, and is accessed in the same way.

16. What is result of the following c codes?
```c
#define Add(a, b) a+b;
void main()
{
    int v;
    v = Add(5, 3) * Add(5, 3) * Add(5, 3);
    printf("%d", v);
}
```
(A) print out 512  (B) print out 37  (C) print out 38  (D) print out 45  (E) syntax error

17. What will be output if you will compile and execute the following c code?
```c
void main()
{
    int i=256;
    Char *c=(char *)&i;
    printf("%d", *c);
}
```
(A) 256  (B) 0  (C) 1  (D) 127  (E) syntax error
18. Let A and B be two integers. What will be returned for calling the following function F(1500, 24)?

```c
(int) Function F(A, B)
{
    if A = 0 then return B;
    if B = 0 then return A;
    R = the remainder of A/B;
    return R * F(B, R);
}
```

(A) 1 (B) 3 (C) 4 (D) 12 (E) 24

19. What will be output for calling the following procedure P(10)?

```c
int P(int n)
{
    int k, f1, f2, f;
    if (n < 2) return n;
    else
    {
        f1 = f2 = 1;
        for(k=2; k<n; k++)
        {
            f = f1 + f2;
            f2 = f1;
            f1 = f;
        }
    }
    print f1, f2, f;
}
```

(A) 13 8 13 (B) 21 13 21 (C) 55 34 55 (D) 89 55 89 (E) 233 144 233

20. When using FTP, which of the following operations cannot be performed?
(A) Connect to a remote host
(B) Select a directory
(C) List files available for transfer
(D) Copy files to or from the remote host
(E) All above operations can be performed

21. Which of the following statements is incorrect?
(A) Bits per second is the commonly used unit for measuring the speed of data transmission.
(B) Simple Mail Transfer Protocol (SMTP) is based on end-to-end message delivery.
(C) Adaptive routing scheme is designed to enable switches to react to changing traffic patterns on the network.
(D) NFS allows a user to access and change remote files without actual transfer.
(E) Telnet provides virtual terminal in TCP/IP model is.

22. Which of the following statements is incorrect?
(A) TDM is a multiplexing technique for transmitting digital signals.
(B) In TDM, the transmission rate of the multiplexed path is usually not related to the sum of the transmission rates of the signal sources.
23. Which of the following statements is incorrect?
(A) Privacy and anti-jamming can be achieved by using multiplexing; efficiency can be achieved by using spreading.
(B) FDM is a multiplexing technique shifts each signal to a different carrier frequency.
(C) The DSSS technique expands the bandwidth of a signal by replacing each data bit with n bits.
(D) In spread spectrum, we combine signals from different sources to fit into a larger bandwidth.
(E) WDM is a multiplexing technique involves signals composed of light beams.

24. Which SQL keyword is used to delete a table's structure?
(A) DELETE (B) DROP (C) KILL (D) TRUNCATE (E) REMOVE

25. The statement form \((p \Leftrightarrow r) \Rightarrow (q \Leftrightarrow r)\) is equivalent to
(A) \([\neg p \lor (p \land q)] \lor [(\neg q \lor r) \land (q \land r)]\)
(B) \([\neg (p \lor r) \land (p \land q)] \land [(\neg q \lor r) \land (q \land r)]\)
(C) \([\neg p \lor (p \land q)] \land [(\neg q \lor r) \land (q \land r)]\)
(D) \([\neg p \lor (p \land q)] \lor [(\neg q \lor r) \land (q \land r)]\)
(E) \([\neg (p \lor r) \land (p \land q)] \lor [(\neg q \lor r) \land (q \land r)]\)

26. Which of the following statements is TRUE?
(A) For all sets \(A, B,\) and \(C, (A-B) \cap (C-B) = (A \cap C)-B.\)
(B) For all sets \(A, B,\) and \(C, (A-B)-C = (A-B)-C.\)
(C) For all sets \(A, B,\) and \(C, (A-B) \cap (C-B) = A-(B \cup C).\)
(D) For all sets \(A, B,\) and \(C, \text{ if } A \cap C = B \cap C \text{ then } A = B.\)
(E) For all sets \(A, B,\) and \(C, \text{ if } A \cup C = B \cup C \text{ then } A = B.\)

27. A pair of dice is rolled. A possible event is rolling a multiple of 5. What is the probability of this event?
(A) \(2/36\) (B) \(7/36\) (C) \(8/36\) (D) \(29/36\) (E) \(32/36\)

B. Write program-like pseudo codes for multiplying two matrices \(A\) and \(B\) where matrix \(A\) has \(p\) rows and \(q\) columns, and matrix \(B\) has \(q\) rows and \(r\) columns. (10%)