Faculty level questions

1. An example of an early alphanumeric technology milestone in history is:
   A. Wireless telegraph
   B. Digital photography
   C. Cable television
   D. Radio broadcasts
   E. MP3

2. Which of the following technologies is designed to reduce file sizes?
   A. Compression
   B. Nanotechnology
   C. Wireless
   D. Mobile telephony
   E. Multimedia

3. Alphanumeric technologies represent information through:
   A. Images and video
   B. Images and text
   C. Images, text, numbers, and video
   D. Sound
   E. Numbers and text

4. Which of the following was the first type of switch used within computers?
   A. Transistor
   B. Vacuum Tube
   C. Integrated circuit
   D. None of the above

5. Which type of signal varies smoothly and continuously over time?
   A. Digital signal
   B. Analog signal
   C. All of the above
   D. None of the above

6. Which of the following is a device that can capture analog sound and generate an analogous electrical signal?
   A. Speaker
   B. Microphone
   C. Human ear
   D. All of the above

7. Which of the following is a measure of electricity?
   A. Degrees Celcius
   B. Volts
   C. Seconds
   D. All of the above

8. Calculate how many Megabytes there are in 41,943,040 bits.
   A. 3 MB
   B. 4 MB
   C. 5 MB
   D. 25 MB

9. Which of the following are classified as optical storage media?
   A. Hard disk
   B. CD
   C. DVD
   D. Both b and c

10. Unicode can represent at least how many unique characters?
   A. 65,000
   B. 26
   C. 16
   D. 24,000

11. Hexadecimal is called which of the following?
   A. Base 2
   B. Base 8
   C. Base 16
   D. Base 10

12. The binary numbering system uses how many numbers?
   A. 1
   B. 0
   C. 2
   D. 8

13. The decimal number 16 is equal to what in binary?
   A. 10001
   B. 100001
   C. 10000
   D. 01000

14. Convert 23 into binary coded decimal. Which of the following is the answer?
   A. 0001 1000
   B. 1000 1001
   C. 1100 1101
   D. 0010 0011

15. The hexadecimal number F1B converted into binary is ____.
   A. 0100 0101 0101
   B. 1100 1010 0011
   C. 0011 1001 0100
   D. 1111 0001 1011

16. Which of the following properties of a wave is measure in terms of Hertz?
    A. Frequency
    B. Period
    C. Phase
    D. Amplitude
    E. All of the above

17. How many frequency components are found within a pure sound?
    A. 1
    B. 2
    C. 3
    D. 5
    E. 6

18. Which of the following are compressed audio file formats?
    A. MC8
    B. MP3
    C. AAC
    D. Both b and c
    E. All of the above

19. A black and white digital image is also called which of the following?
    A. A color picture
    B. A mosaic
    C. A true color photo
    D. Grayscale
    E. Sepia tone

20. Each pixel in a digital image can contain how many different colors?
    A. 256
    B. Two
    C. One
    D. Sixteen
    E. Zero

21. The type of image representation in which each binary code corresponds to a pixel, which can be mapped onto a specific part of the image, is called ____.
    A. Vector graphics
    B. Analog imaging
    C. Grayscale
    D. Bitmap image
    E. None of the above

22. In the RGB additive color model, yellow light can be created by combining red and ____.
    A. green light
    B. blue light
    C. brown light
    D. orange light

E. white light

23. If each color component (red, green, and blue) is represented by 8 bits, how many intensity levels are there for each color component?
    A. 8
    B. 16
    C. Infinite number
    D. 256
    E. 16.7 million

24. Human eyes can typically process ____ images per second before losing the ability to distinguish the transition from one image to the next.
    A. 1
    B. 20
    C. 10 million
    D. 8
    E. none of the above

25. The motion picture industry uses a standard of ____ frames per second to create perfect continuous motion.
    A. 1
    B. 20
    C. 10 million
    D. 24
    E. 8

26. Which of the following is not a digital image file format?
    A. TIFF
    B. BMP
    C. PNG
    D. MPEG
    E. JPEG

27. Which of the following is a video file format?
    A. MPEG
    B. AVI
    C. WMV
    D. MOV
    E. All of the above are video file formats.

28. Calculate the data rate for a communication system that employs 4-ary signaling if the signal transmission rate is 1000 signals per seconD.
    A. 1000 bps
    B. 2000 bps
    C. 3000 bps
    D. 4000 bps
    E. 8000 bps

29. Who was the first person to demonstrate long distance radio wave communication?
    A. Charles Babbage
    B. Bill Gates
    C. Augusta Ada Byron
    D. Alexander Graham Bell
    E. Guglielmo Marconi

30. Information can be conveyed using ____.
    A. Text
    B. Numbers
    C. Images
    D. Sound
    E. All of the above

31. Which of the following jobs involves work as part of a team on limited-term engagements for large corporations, governments, and other institutions?
    A. IT consultant
    B. Computer forensics
    C. IT sales
    D. Database management
    E. None of the above

32. Which of the following is the alternative name for an integrated circuit?
    A. Transistor
    B. Vacuum Tube
    C. Binary device
    D. Chip

33. The power of a modern computer is essentially governed by the number of ____.
    A. Transistors
    B. Interconnections
    C. Keyboards
    D. Vacuum tubes

34. Calculate how many bits there are stored in a 4 KB digital audio filE.
    A. 4,000 bits
    B. 32,000 bits
    C. 32,768 bits
    D. 4,096 bits

35. Calculate how many Megabytes there are in 41,943,040 bits.
    A. 3 MB
    B. 4 MB
    C. 5 MB
    D. 25 MB

36. Which of the following are classified as optical storage media?
    A. Hard disk
    B. CD
    C. DVD
    D. Both b and c

37. Which of the following are advantages of the digital domain?
    A. Ability for noise removal
    B. Vulnerability to the addition of noise
    C. Ability for compression
    D. Both a and c

38. Which of the following is a technique that may be used to manage errors within digital communication systems?
    A. Compression algorithms
    B. Enryption algorithms
    C. Error control schemes
    D. Both b and c

39. Which of the following is a standard for representing alphanumeric text?
    A. Binary coded decimal
    B. EBCDIC
    C. Octal
    D. Hexadecimal

40. Which type of system usually requires more extensive validation and testing?
    A. Stand-alone system
    B. Web-based system
    C. Information system
    D. Real-time system

41. All the following statements are TRUE about testing, EXCEPT:
    A. Testing can only detect the presences of errors, not their absence.
    B. Large system is recommended to invest on high-quality CASE tool support for testing.
    C. Large system should only concerns on development rather than testing.
    D. Off-the-shelf testing tools may not be available due to the system that requires

42. In a use case model the actor can be:
    A. External system, users , device
    B. Programmers, System Analyst
    C. Functional Requirement
    D. System models

43. What is the result of requirements documentation activity?
    A. Requirements document
    B. Test cases
    C. Complete
    D. System models

44. Virtual reality is used for:
A. Creating models of molecules, organisms, and other structures for students to examine.
B. Showcasing company products or creating advertisements
C. Creating architectural models to show clients how a completed project will look.
D. All of the above.

45. Which one is the most practical way to design and develop graphical user interfaces for software systems?
A. Modeling technique
B. Evolutionary prototype with end-user involvement
C. Textual description
D. Evolutionary prototype with stake holder involvement

46. _____ is concerned with modifying existing software systems to meet new
A. Software design and implementation
B. Software validation
C. Software specification
D. Software evolution

47. Traditional methods of collecting systems requirements include:
A. individual interviews
B. observing workers
C. group interviews
D. all of the above

48. Which statement best describe a meaning of "waterfall" life cycle model.
A. When a phase in the lifecycle is executed continuously without stop.
B. When a phase in the lifecycle iterates like a ring on the spiral, moving outward from the center.
C. When a phase in the lifecycle overlapping with each others.
D. When a phase in the lifecycle is completed, the results fall down to the next phase and there is no going back.

49. Project risk factor is considered in ?
A. Iterative enhancement model
B. Prototyping model
C. Spiral model
D. Waterfall model

50. Techniques developed to keep the analysis effort minimal, yet still effective include:
A. JAD
B. interviewing
C. observations
D. quiz sessions

51. Prototyping is most useful for requirements determination when:
A. user requirements are well understood
B. communication problems have existed in the past between users and analysts
C. possible designs are simple and require an abstract form to fully evaluate
D. multiple stakeholders are involved with the system

52. System design includes some of these activities:
A. Architecture design and requirement analysis
B. Data presentation design
C. Module and unit test plan
D. All of the above.

53. The way a system actually works is referred to as a(n):
A. unofficial system
B. informal system
C. actual system
D. formal system

54. After implementing a user interface, evaluating its usability can be done by:
A. Static verification
B. Acceptance test
C. White-box test
D. Defect test

55. Black box testing is also known as
A. Path testing
B. Interface testing
C. Structural testing
D. Functional testing

56. System approval criteria are specified when the final specifications are drawn up.
A. TRUE
B. FALSE

57. Which project planning and scheduling tool has a critical path component?
A. Gantt chart
B. Pert diagram
C. Time boxing
D. PIM

58. Anything external to an organization's boundaries is considered to be:
A. Irrelevant
B. An external entity.
C. An environment
D. an associative entity

59. If the entire program is written in FORTRAN , the percentage increase in the execution time , compared to writing the entire program in FORTRAN and rewriting the 1% in assembly language is ?
A. 0.9
B. 0.8
C. 8
D. 9

60. The line code 1110 1010 1101 1111 01101 is written in a computer language of:
A. Fourth generation
B. Third generation
C. First generation
D. Second generation

61. Hardware and software that perform data processing tasks is are described as:
A. System software
B. Application software
C. Computer architecture
D. Information technology

62. Set of related and organized files accessed via software is called :
A. Hardware
B. System Software
C. Database
D. Web page

63. Website development can be done using
A. Visual basic
B. Asp.net
C. Html
D. B+C

64. To input data for the following statement cin>>x>>y>>z;
A. Three values must be separated by spaces
B. First and second values only must be separated by space
C. No matter if the values are separated by spaces or not
D. None of the above

65. The output of the following code is

```
public class test{
public static void main(String b[]) {
int a[];
a=new int[10];
for(int i=0;i<a.length;i++) {
a[i]=i+1*2;
System.out.print(a[i]+", ");
 }
```

```
int result=0;
for(int i=0;i<a.length;i++) result+=a[i];
System.out.println(result);}}
```

A. 1,2,3,4,5,6,7,8,9,10,55
B. 2,3,4,5,6,7,8,9,10,11,65
C. 0,1,1,1,1,1,1,1,1,1,10
D. 2,2,2,2,2,2,2,2,2,2,20

66. What the output of the following program

```
enum week{ sunday, monday, tuesday, Wednesday, thursday, friday, saturday};
int main(){
enum week today;
today=wednesday;
printf("%d day",today+1);
return 0; }
```

A. Wednesday day
B. Sunday day
C. 4 day
D. 5 day

67. Given a black box of a logic circuit Where x2 the MSB and y =1 if the input is 1,4,5 or 6 Otherwise y=0 The logic expression for this circuit is
A. X0x1'+x2x0'
B. X0x1+x2x0'
C. X0'x2'+x1'x0
D. X2+x1+x0+x1

68. Compression programs are used to
A. reduce the size of files
B. increase the performance of the computer
C. to uninstall programs
D. to troubleshooting the system

Systems

69. Suppose that x and y are int variables, z is a double variable, and the input is: 28 32.6 12. Choose the values of x, y, and z after the following statement executes: cin>>x>>y>>z;.
a. X=25, y=32 , z=0.6
b. X=28,y=32 , z=12.0
c. X=28 ,y=12 , z= 32.6
d. X=28, y=12 ,z=0.6

70. Suppose that x and y are int variables. Which of the following is a valid input statement?

a.	cin>>x>>cin>>y;	c.	cin<<x<<y;
b.	cin>>x>>y;	d.	cout<<x<<y;

71. This type of software works with end users, application software, and computer hardware to handle the majority of technical details.
    a)communications software
    b)application software
    c)utility software
    d)system software

72. Software that enables you to perform specific information-processing tasks is referred to as
    a)communications software
    b)application software
    c)utility software
    d)system software

73. This type of software is designed to help you be more productive in performing tasks, and is widely used in nearly every discipline and occupation.
    a)communications software
    b)utility software
    c)basic applications software
    d)system software

74. Which of the following would not be considered an end-user of an information system?
    A. A student who accesses information on a website.
    B. A programmer who writes code for a software module.
    C. A customer who uses a credit card in an EFTPOS machine.
    D. A sales assistant in a video shop who searches a database for a specific title.

75. A transaction processing system is concerned with
    a) Operational day-to-day activities.
    b) Strategic decision-making support.
    c) A large database of specialised knowledge.
    d) Support for an organisation's management needs.

76. Which of the following could not be considered an organisational goal?
    A. Increase company profit margin.
    B. Expand customer base.
    C. Provide quality service.
    D. Complete backups every Friday.

77. Which of the following would improve the effectiveness of a system?

A. Install a barcode reader to reduce the time needed to enter data.

B. Make it easier for employees to access information by developing a database.

C. Allow management to make timely decisions by providing up-to-date information in a spreadsheet.

D. Automate a manual process to reduce salaries.

78. Analyze, design, develop, test, document, implement, evaluate are correct steps to solve a problem

True **false**

79. *Anonymous Data Types:* Values directly specified in variable declaration with no type name such as enum {auto, truck, motorcycle, snowmobile, boat} myVehicle, yourVehicle;

True false

80. X=10+rand()%(100-10+1) produces random numbers from 10 to 100

True false

81. Y = rand()%n produces random numbers between 0 to n-1

True false

82. Z=low + rand()%(high-low+1) produces random numbers between low to high inclusive

True false

83. To input data for the following statement cin>>x>>y>>z;

a. Three values must be separated by spaces
b. First and second values only must be separated by space
c. No matter if the values are separated by spaces or not
d. None of the above

84. The output of the following code is

```
public class test{
public static void main(String b[])
{int a[];
a=new int[10];
for(int i=0;i<a.length;i++)
{a[i]=i+1*2;
```

```
System.out.print(a[i]+", ");
}
int result=0;
for(int i=0;i<a.length;i++)
result+=a[i];
System.out.println(result);
}}
```

a. 1,2,3,4,5,6,7,8,9,10,55
b. 2,3,4,5,6,7,8,9,10,11,65
c. 0,1,1,1,1,1,1,1,1,1,10
d. 2,2,2,2,2,2,2,2,2,2,20

85. Global variable and local variable of a method can't be with the same name

True **false**

86. When local variable declared in a method with the same name of a globule variable the method used the global variable but not local variable

True **false**

87. Using a local variable in a method with the same name of a global variable will hide the global variable

True **false**

88. In nested if statements the inner if and its statements considered as one statement for the outer statement

True **false**

89. What the output of the following program

```
enum week{sunday,monday,tuesday, Wednesday,thursday,friday,saturday};
int main(){
enum week today;
today=wednesday;
printf("%d day",today+1);
return0;
}
```

a. Wednesday day
b. Sunday day
c. 4 day
d. 5 day

90. In c/c++ to return multi values from a function we use the operator & with the variable declaration at the function header like this void f (int& x, int& y) to return values for x and y.

True false

91. When calling a function with the header void f (inta,int b, int& x, int& y) is described as call by value

True false

92. When calling a function with the header void f (inta,int b, int& x, int& y) is described as call by reference

True false

93. in the e-mail address justincase@usource.org what is the domain name?
    a. The whole address is called the domain name.
    b. Org
    c. usource.org
    d. justincase

94. The most widely used binary code for microcomputers is
    a) ASCII
    b) EBCDIC
    c) Unicode
    d) CISC

95. This binary coding scheme was developed by IBM and is primarily used for large computers.
    a) EBCDIC
    b) Unicode
    c) ASCII
    d) RISC
    Answer: A

96. This coding system is designed to support international languages like Chinese and Japanese.
    a) ASCII
    b) Unicode
    c) EBCDIC
    d) ANSI
    Answer: B

97. The expression –(XvY) is equivalent to:
    a.(-Xv-Y)
    b.(-XΛ-Y).

c.(-XvY).
d.(Xv-Y).

98. ----------is a type of transmission impairment in which the signal loses strength due to the resistance of the transmission medium.

a. noise
b. attenuation
c. decibel
d. distortion

99. **Given two waves A and B ,if the frequency of A is twice that of B ,then the period of B is ----------that of A.**

a. twice
b. the same as
c. indeterminate from
d. one –half

100. Which of the following statements is true of CRC (cyclic redundancy code)?

A. CRC is a method of calculating the Hamming distance between codes
B. CRC is used in Forward Error Correction
C. CRC uses polynomial division to calculate check bits
D. CRC calculates both horizontal and vertical check bits.

101. In optical fiber ,the inner core is -------the cladding

a.another name for
b.less dense than
c.more dense than
d.the same density as

102. which layer of OSI model determines the interface of the system with the user?

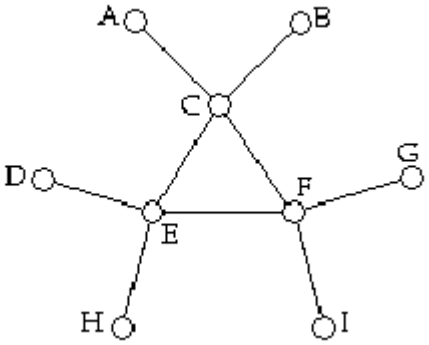
a.application
b.data-link
c. network
d.session

103. At which OSI layer a hub operates :

a.layer 1
b. layer 2
c.layer 3
d.none of the above

Algorithms

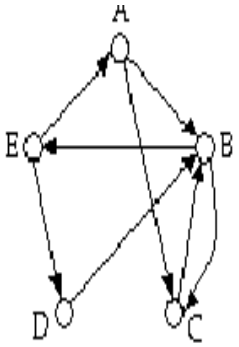
1. How many spanning trees does the following graph have?



a. 3
b. 2
c. 1
d. None of the above

2. Which of the following is not a path from vertex A to vertex E in the digraph?

a. A, B, D, E
b. A, B, E
c. A, C, B, E
d. A, B, C, B, E



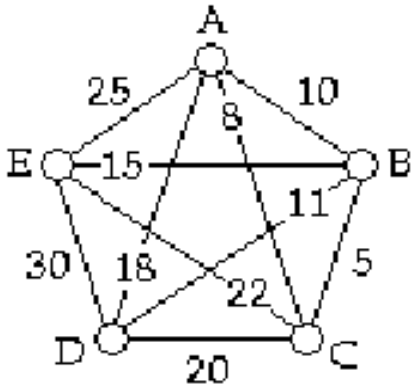
3. Let *k* be an integer greater than 1. Which of the following represents the order of growth of the

$$\sum_{i=1}^{n} k^i$$

as a function of *n* ?

a. $\theta(k^n)$
b. $\theta(k^n \log n)$
c. $\theta(k^{n \log n})$
d. $\theta(k^{2kn})$

4. Using Kruskal's algorithm, which edge should we choose second?



a. CD
b. AB
c. AC
d. None of the above

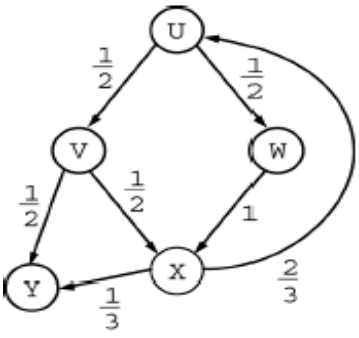
5. **The big Oh for the following Algorithm segment is**

```
A= 0
for i=1 to n
{ for j=1 to I A= A+1 }
```

a. O(n)
b. O(n^3)
c. O(n^2)
d. non

6. For the following code, the bias of each conditional branch in the code is labeled on the control flow graph to the right. For example, the Boolean expression if_condition evaluates to true on one-half of the executions of that expression.

```
do
{
  U;
  if (if_condition)
 {
   V;
   if (break_condition)
     break;
 }
else
   W;
X;
} while (loop_condition);
Y;
```



What is the expected number of times that `U` executes?

(A) 1
(B) 1.5
(C) 2
(D) More than 10

7. An undirected graph G consists of "4" vertices with equal degrees If the number of edges = 4, then the degree of each vertex =

a) 16
b) 8
c) 2
d) 1

8. The number of the edges of a tree with 10 vertices is equal to:

a) 7
b) 9
c) 11
d) 13

9. Which of the following formulas in big-O notation best represent the expression

$n^2+35n+6$?

a. $O(n^3)$
b. $O(n^2)$
c. O(n)
d. O(42)

10. What is the worst-case time for serial search finding a single item in an array?

a. O(1)
b. O(n log n)
c. O(n)
d. $O(n^3)$

11. Which of the following algorithms runs in N log N average time but quadratic worst-case time?

a. insertion sort
b. merge sort
c. quicksort
d. shellsort

12. What is the running time of the Heapsort on an array of length *n* that is *already sorted* in increasing or decreasing order?

a. Increasing order is $\theta(n \lg n)$, while decreasing order is $\theta(n^2)$
b. Both are $\theta(n \lg n)$
c. Increasing order is $\theta(n^2)$, while decreasing order is $\theta(n \lg n)$
d. Both are $\theta(n^2)$

13. Suppose the input to Partition algorithm of Quicksort is a set of equal integers. The worst-case time of **Partition** will be:

a. O(1)

b. O(*n*)
c. O(*n* lg *n*)
d. None of the above

14. Suppose the input to Partition algorithm of Quicksort is a set of equal integers. The recurrence equation will be:
a T(n) = T(n-1) + n
b T(n) = T(n-1) + n log n
c. T(n) = 2T(n/2) + n
d. T(n) = T(n/2) + n

Data Structures

1. In a linked list implementation of a queue, which of these pointers will change during an insertion into an empty queue ?

a. Only front-pointer changes.
b. Only rear-pointer changes.
c. Nither front-pointer nor rear-pointer chanhes.
d. Both pointers change.

2. One difference between a queue and a stack is :
a. A queue requires dynamic memory, but a stack does not.
b. A stack requires dynamic memory, but a queue does not.
c. A queue uses two ends of the linear structure, while a stack uses only one.
d. A stack uses two ends of the linear structure, while a queue uses only one.

3. A linked stack is full when :
a. count == max_stack_size
b. Dynamic memory is full.
c. new' operator fails to allocate new memory.
d. count > max_stack size

4. A linked queue contains exactly one element when :
a. rear == NULL;
b. front == NULL;
c. rear == front;
d. count == 1;

5. Which of the following is not a part of a definition of any ADT :
a. List of operations that work with objects of a given data type
b. Name of the operation
c. Time and memory limits for each operation
d. Description of the operation parameters and the type of these parameters

6. Which of the following is not an operation in class queue :

a. PUSH
b. RETRIEVE
c. APPEND
d. none of the above

7. The average number of comparisons required to insert an element in a dynamic stack of size n is:
a.O(log log n)
b.O(n)
c.O(n log n)
d. O(1)

8. The height of the binary search tree is:
a. The number of nodes in the left subtree
b. The number of nodes in the right subtree
c. The total number of nodes in the tree
d. The number of nodes on the longest path in the tree

9. The circular queue design is used in implementing:
a. An array stack
b. A linked stack
c. A linked queue
d. An array queue

Java Language

1. What is the result of attempting to compile and run the program?

```
class A {

  String s1 = "A.s1"; String s2 = "A.s2";
}
class B extends A {
  String s1 = "B.s1";
  public static void main(String args[]) {
    B x = new B(); A y = (A)x;
    System.out.println(x.s1+" "+x.s2+" "+y.s1+" "+y.s2);
}}
```

a. Prints: B.s1 A.s2 B.s1 A.s2
b. Prints: B.s1 A.s2 A.s1 A.s2
c. Prints: A.s1 A.s2 B.s1 A.s2
d. Prints: A.s1 A.s2 A.s1 A.s2

2. A compile-time error is generated at which line?

```
class MCZ31 {
```

```
  public static void main (String[] args) {
    char a = '\t';  // 1
    char b = '\\';  // 2
    char c = '\"';  // 3
    char d = '\'';  // 4
    char e = '\?';  // 5
  }}
```

a. 1
b. 2
c. 3
d. 4

3. What is the result of attempting to compile and run the program?

```
 class MCZ13 {
  public static void main (String[] args) {
    String s = null;
    System.out.print(s);
  }}
```

a. Prints nothing.
b. Prints: null
c. Compile-time error
d. Run-time error

4. A compile-time error is generated at which line?

```
class MCZ15 {
  public static void main (String[] args) {
    float a = 1.1e1f;  // 1
    float b = 1e-1F;   // 2
    float c = .1e1f;   // 3
    double d = .1d;    // 4
    double e = 1D;     // 5
  }}
```

a. 1
b. 2
c. 4
d. none of the above.

5. A class can not be called "tightly encapsulated" unless which of the following is true?

a. The class is declared final.
b. All local variables are declared private.
c. All method parameters are declared final.

d. None of the above

6. Which class declaration results in a compile-time error?

```
class Z {
  abstract class A {}     // 1
  final class B {}        // 2
  private class C {}      // 3
  protected class D {}    // 4
  public class E {}       // 5
}
```

a. 1
b. 2
c. 3
d. None of the above

7. Which of the following is a true statement?

a. An anonymous class can extend only the Object class.
b. An anonymous class can not implement an interface.
c. An anonymous class declaration can not have an implements clause.
d. An anonymous class declaration can name more than one interface in the implements clause

8. Which variable can not be substituted for ??? without causing a compile-time error?

```
class A {
  private static String s1 = "s1";
  final String s2 = "s2";
  A () { new Z("s5","s6");}
  class Z {
    final String s3 = "s3";
    String s4 = "s4";
    Z (final String s5, String s6) {
      System.out.print(???);
  }}
  public static void main(String args[]) {new A();}
}
```

a. s1
b. s2
c. s3
d. None of the above

9.In a linked list implementation of a queue, which of these pointers will change during an insertion into an empty queue ?

e. Only front-pointer changes.
f. Only rear-pointer changes.
g. Nither front-pointer nor rear-pointer chanhes.
h. Both pointers change.

10.

```
class MWC201 {
  public static void main(String[] args) {
    int[][] a1 = {{1,2,3},{4,5,6},{7,8,9,10}};
    System.out.print(a1[0][2]+","+a1[1][0]+","+a1[2][1]);
} }
```

What is the result of attempting to compile and run the program?

a. Prints: 3,4,8
b. Prints: 7,2,6
c. Compile-time error
d. Run-time error

11. package com.dan.chisholm;

```
public class A {
  public void m1() {System.out.print("A.m1, ");}
  protected void m2() {System.out.print("A.m2, ");}
  private void m3() {System.out.print("A.m3, ");}
  void m4() {System.out.print("A.m4, ");}
}
class B {
  public static void main(String[] args) {
    A a = new A();
    a.m1();  // 1
    a.m2();  // 2
    a.m3();  // 3
    a.m4();  // 4
}}
```

Assume that the code appears in a single file named A.java. What is the result of attempting to compile and run the program?

a. Prints: A.m1, A.m2, A.m3, A.m4,
b. Compile-time error at 1.
c. Compile-time error at 2.
d. Compile-time error at 3.

Operating Systems

1.What is operating system?

a) collection of programs that manages hardware resources
b) system service provider to the application programs

c) link to interface the hardware and application programs
d) all of the mentioned

2. Which one of the following is not true?
a) kernel is the program that constitutes the central core of the operating system
b) kernel is the first part of operating system to load into memory during booting
c) kernel is made of various modules which can not be loaded in running operating system
d) kernel remains in the memory during the entire computer session

3. In operating system, each process has its own
a) address space and global variables
b) open files
c) pending alarms, signals and signal handlers
d) all of the mentioned

4. A process can be terminated due to
a) normal exit
b) fatal error
c) killed by another process
d) all of the mentioned

5. Which process can be affected by other processes executing in the system?
a) cooperating process
b) child process
c) parent process
d) init process

6. Which one of the following is a synchronization tool?
a) thread
b) pipe
c) semaphore
d) socket

7. The number of processes completed per unit time is known as _____.
a) Output
b) Throughput
c) Efficiency
d) Capacity

8. When the process issues an I/O request :
a) It is placed in an I/O queue
b) It is placed in a waiting queue
c) It is placed in the ready queue
d) It is placed in the Job queue

9. If all processes I/O bound, the ready queue will almost always be _____, and the Short term Scheduler will have a _____ to do.
a) full,little

b) full,lot
c) empty,little
d) empty,lot

10. Restricting the child process to a subset of the parent's resources prevents any process from :
a) overloading the system by using a lot of secondary storage
b) under-loading the system by very less CPU utilization
c) overloading the system by creating a lot of sub-processes
d) crashing the system by utilizing multiple resources

11. The main disadvantages of Operating system regarding the batch systems is

a. It has leak in memory
b. Its electronic devices is slower than its mechanical devices
c. It uses card reader
d. It does one task at a time

12 . In Operating Systems the system calls mainly task

a. Handling all the deadlock problems
b. Give the priority for routing algorithms
c. Creation any sub-process
d. Provide the interface between currently running processes and the OS

13. Which of the following scheduler controls the degree of multiprogramming?
a. CPU scheduler.
b. Short-term scheduler.
c. Job scheduler. "Long Tem-Scheduler"
d. Medium-term scheduler

Data Base

1. Which schema level hides the details of physical storage structures and concentrates on describing entities, relationships and constraints of the whole database?

a. Conceptual (logical) level
b. internal (physical) level
c. external (view) level
d. sea level

2. Physical data independence can be defined as

a. the capacity to change the physical representation and access techniques without having to change application programs.
b.the capacity to change the logical level without having to change application programs.
c. the capacity to change the view level without having to change application programs.

d. all the above.

3. A weak entity type
a. must have total participation in an identifying relationship
b. does not have a key attribute(s)
c. both (a) and (b)
d. none of the above

4. A multivalued attribute A, of an entity E, should be mapped to the relational model by

a. including a column for A in the relation corresponding to entity type E
b. defining a new table with a single column A
c. defining a new table with two columns, one for a and one for the key of E
d. none of the above

5. Concurrency in DBMS means

a) The restoration of the databases after any type of failure
b) More than one user can access the same data items at the same time.
c) More than one user can change the same data item at the same time.
d) No more than one user can access the same data items at the same time.

6. On an entity-relationship diagram, a diamond represents a(n):

a. repeating group.
b. multivalued attribute.
c. entity.
d. relationship.

7. A person, place, object, event, or concept in the user environment about which the organization wishes to maintain data refers to a(n):

a. attribute.
b. data element.
c. relationship.
d. entity.

Internet programming

1) Which of the following is not an attribute of the **TABLE** element?
(a) **WIDTH**
(b) **BORDER**
(c) **CAPTION**
(d) **ALIGN**

2) **METHOD = "get"** should be used when
(a) updating a database.
(b) the form data must be sent as an environment variable.

(c) special characters must be submitted.
(d) making a database request.

3) What attribute is always required by the **INPUT** element?
(a) **TYPE**
(b) **VALUE**
(c) **SIZE**
(d) **MAXLENGTH**

4) Which of the following attributes should always be included in an input element?
(a) **SIZE**
(b) **VALUE**
(c) **MAXLENGTH**
(d) **NAME**

5) Which of the following is not a valid input type?
(a) **select**
(b) **radio**
(c) **checkbox**
(d) **password**

6) _____ was originally created by _____.
a) JScript, Netscape
b) JScript, ECMA
c) JavaScript, Microsoft
d) JavaScript, Netscape

7) Consider the following script. What is wrong with the following code?

```
1 <SCRIPT LANGUAGE = "JavaScript">
2 var firstNumber,
3 secondNumber;
4 thirdNumber;
5
6 thirdNumber =
7 parseInt( window.prompt( "Enter an integer", 0 ) );
8 document.write( thirdNumber );
9 </SCRIPT>
```

a) **thirdNumber** in line 8 must be in quotes.
b) The words **Enter an integer** in line 7 should not be in quotes.
c) The word **var** must be placed before **secondNumber** in line 3.
d) The word **var** must be placed before **thirdNumber** in line 4.

8) A **META** element with **NAME = "description"**
(a) should contain a list of keywords.
(b) is not used by search engines.
(c) should contain a few sentences about the Web site.
(d) is displayed by the browser.

9) Microsoft's version of scripting that uses the Java syntax is called _____.
a) JavaScript
b) JScript
c) ECMAScript
d) J++

10) Which of the following are declared correctly?
a) **for (var i=0;i<100;i++) [**
statement;
]
b) **for (var i=0;i<100;++I) [**
statement;
}
c) **for (var i=0;i<100;+++i) {**
statement;
}
d) **for (var i=0;i<100;++i;) {**
statement;
}

Technical Writing

1.Editing for consistency and accuracy is performed during:

a. Planning phase
b. Drafting phase
c. Finalizing phase
d. None

2. The three elements in problem statement are:

a. Planning, organization, and managing
b. The problem, the method of solving, and the purpose
c. Audience, scope, solving methodology
d. None is correct

3. Audience considerations when writing a document:

a. Audience type and expertise
b. Audience purpose in using the document
c. Audience attitude
d. All are correct

4. The rate of information presented to the reader is:

a. Document density
b. Document details
c. Document complexity

d. All are correct

5. The part of memos which is used to outline the message in a very accessible and transparent way is:

a. Heading
b. Body
c. Detail
d. None is correct

Logic Design

1- The simplified expression of full adder carry is

A. c=xy+xz+yz
B. c=xy+xz
C. c=xy+yz
D. c=x+y+z

2- Full adder performs addition on

A. 2 bits
B. 3 bits
C. 4 bits
D. 5 bits

3-The SR latch consists of

A. 1 input
B. 2 inputs
C. 3 inputs
D. 4 inputs

4-The outputs of SR latch are

A. x and y
B. a and b
C. s and r
D. q and q'

5-The inputs of SR latch are

A. x and y
B. a and b
C. s and r
D. j and k

6-Enable input of the shift register is called a

A. load
B. store
C. reset
D. strobe

7-A circuit that converts n inputs to 2^n outputs is called

A. encoder
B. decoder
C. comparator
D. carry look ahead

8-Encoders are made by

A. AND gate
B. OR gate
C. NAND gate
D. XOR gate

9-Decoder is a

A. combinational circuit
B. sequential circuit
C. complex circuit
D. gate

10-The subtraction of two binary numbers is done by taking complementing

A. output
B. subtractor
C. subtrahend
D. remainder

11-Subtraction with subtract or is same as done with

A. adder
B. adder subtractor
C. multiplier
D. divider

12-When the mode of adder/subtractor is 1 it

A. adds
B. subtracts

C. divides
D. multiplies

13-When the mode of adder/subtractor is 0 it

A. adds
B. subtracts
C. divides
D. multiplies

Oral Communications

1. Oral communication is the interchange of _____ between the sender and receiver

a) verbal messages
b) signs and gestures
c) cues and clues
d) written messages

2. Body talk is also known as:

a) physical communication
b) noise
c) overflow
d) leakage

3. Oral communication is better than written communication for:

a) conveying facts and opinions
b) saving time
c) providing opportunity to refer back
d) conveying feelings and emotions

4. The limitation of oral communication is that:

a) it is irreversible—what is said cannot be taken back
b) it does not require on-the-spot thinking
c) it is easy to be aware of our body language
d) it is not affected by the speaker's feelings or stress or excitement levels

Calculus (1)

Q1- The center and radius of the circle $(x-3)^2+(y+5)^2=16$ are:

(a) $(-3,5)$, 4
(b) $(3,-5)$, -4
(c) $(-3,5)$, -4
(d) $(3,-5)$, 4

Q2- The domain of the function $f(x)$ is $(1,5]$, then the domain of $g(x)=f(x+3)$ is :

(a) $(-2\ ,\ 2]$

(b) $(1\ ,\ 5]$

(c) $[-2,\ 2)$

(d) $[2\ ,\ -2)$

Q3- The range of the function $f(x)=\frac{1}{(x-3)^2}+5$ is:

(a) $(-\infty\ ,\infty)$

(b) $(-\infty\ ,\infty)-\{3\}$

(c) $(5,\infty)$

(d) $[5,\infty)$

Q4- The value of $\lim_{x\to 3}\frac{\sin(x^2-9)}{(x-3)}$ is:

(a) 6

(b) 1

(c) 0

(d) -6

Q5- The $\lim_{x\to 0}\frac{\left(\sqrt{2x+1}\ -1\right)}{3x}$

(a) 0

(b) $\frac{1}{3}$

(c) $\frac{2}{3}$

(d) $\frac{1}{6}$

Q6- If the domain of the function $f(x)$ is $(1,5]$, then the domain of $g(x)=f(2x-3)$ is :

(a) $(-\infty\ ,\infty)$

(b) $(2,\ 4]$

(c) $(2\ ,4)$

(d) $[2,4)$

Q7- The range of the function $f(x)=\frac{1}{(x+3)^2}-5$ is :

(a) $(-\infty, \infty)$

(b) $(5, \infty)$

(c) $(-5, \infty)$

(d) $(-\infty, \infty) - \{-5\}$

Q8- Let $f(5) = 3$, $g(2) = 5$, then $(f \circ g)(2)$ is equal to :

(a) 6

(b) 2

(c) 15

(d) 3

Q9- Let $f(x) = |\tan x| + 2$, then

(a) $f(x)$ even and symmetric about $y-$ axis

(b) $f(x)$ even and symmetric about origin $(0,0)$

(c) $f(x)$ odd and symmetric about $y-$ axis

(d) $f(x)$ odd and symmetric about origin $(0,0)$

Q10- $Let\ f(x) = 2x^3 - 3x^2 + 5$, $Find:\ \lim_{t \to 0} \frac{f'(2+t) - f'(2)}{t} =$

(a) 12

(b) 18

(c) 6

(d) -18

Statistics

Problem 1

On a test, a sample of five students has a mean score of 78. The scores of four students of them are: 87, 81, 76, 53. Find the test score of the fifth student.

(a) 93

(b) 83

(c) 78

(d) 98

Problem 2

John looks at the price of a computer game in 5 different shops. The prices he sees are:

$29.99 $25.00 $34.99 $29.00 $24.99.

The mean and median are:

(a) Mean = 26.00, Median = 25.00

(b) Mean = 30.00, Median = 27.00

(c) Mean = 28.79, Median = 29.00

(d) Mean = 38.79, Median = 30.00

Problem 3

A set of exam results have a mean of 36 and a standard deviation of 8. They are to be coded by the formula y = 1.25 x + 5. The new mean and standard deviation are:

(a) Mean = 50, Standard deviation = 15

(b) Mean = 50, Standard deviation = 10

(c) Mean = 45, Standard deviation = 10

(d) Mean = 45, Standard deviation = 15

Problem 4

How many ways can a basketball team of 5 players be selected from a squad of 12 players?

(a) 352

(b) 216

(c) 250

(d) 252

Problem 5

Let A and B be two independent events such that $P(A) = 0.3, P(B) = 0.4$.

Compute $P(A \cup B)$.

(a) 0.05

(b) 0.58

(c) 0.006

(d) 0.1

Problem 6

A random variable X has the following distribution:

X	-1	0	1	2
P(X)	3C	2C	0.4	0.1

The value of the constant C is:

(a) 0.10

(b) 0.15

(c) 0.20

(d) 025

Problem 7

If 0.2 of memory chips made in a certain plant are defective, and X represent the number of defectives of a random sample of 10 memory chips chosen for inspection. The distribution of X is:

(a) Binomial distribution: n=10, p=0.2.

(b) Binomial distribution: n=10, p=0.8.

(c) Poisson distribution.

(d) Normal distribution.

Problem 8

The time required to complete a final examination in a particular college course is normally distributed, with mean of 80 minutes and a standard deviation of 10 minutes. What is the probability of completing the exam in one hour or less?

(a) 0.0338

(b) 0.2228

(c) 0.9772

(d) 0.0228

Discrete Math

1- A theorem $A \Rightarrow B$ is :

(a) a contradiction statement that can be proved

(b) a tautological statement that can be proved

(c) a contingency statement that can be proved

(d) a contingency statement that cannot be proved

2 - Let $X = \{1, 5, \pi, \sqrt{3}, e, 11\}$ and τ is a partition of X defined by :

$\tau = \{\{5, \pi, 11\}, \{1, e\}, \{\sqrt{3}\}\}$ then the equivalence relation R in X produced by τ is

(a) $R = I_X$

(b) $R = I_X \cup \{(5,11),(11,5),(5,\pi),(\pi,5),(\pi,11),(1,e),(e,1)\}$

(c) $R = I_X \cup \{(5,11),(11,5),(5,\pi),(\pi,5),(\pi,11),(11,\pi),(1,e),(e,1)\}$

(d) $R = I_X \cup \{(5,11),(11,5),(\pi,5),(\pi,11),(11,\pi),(1,e)\}$

3 - Let $X = \{a, b, c, d, e, f\}$ and τ is a partition of X defined by :

$\tau = \{\{a, b, c\}, \{d, f\}, \{e\}\}$ then the equivalence relation produced by R on X is

(a) $R = I_X = \{(a,a),(b,b),(c,c),(d,d),(e,e),(f,f)\}$

(b) $R = I_X \cup \{(a,b),(b,a),(c,b),(b,c),(c,a),(a,c),(d,f),(f,d)\}$

(c) $R = I_X \cup \{(a,b),(b,a),(c,d),(d,c),(c,e),(e,c),(d,b),(b,d)\}$

(d) $R = I_X \cup \{(a,b),(b,a),(c,d),(d,c),(c,f),(f,c),(d,e),(e,d)\}$

4– Let (A, R) be a partially ordered set , let $a \in A$ then a is greatest element of A if

(a) $x > a \Rightarrow x = a$

(b) $a \leq x \ , \ \forall x \in A$

(c) $x \leq a \ , \ \forall x \in A$

(d) $x < a \Rightarrow x = a$

5- Assume that A is a set and $R \subseteq A \times A$ then R is an equivalence relation in A If and only if :

(a) $I_A \subseteq R$

(b) $R^{-1} = R$

(c) $R \circ R \subseteq R$

(d) $I_A \subseteq R \wedge R^{-1} = R \wedge R \circ R \subseteq R$

6- Assume that (A , R) totally ordered set ,then (A , R) is well ordered set if and only if :

(a) $\forall X \subseteq A , X \neq \phi , \exists a \in A : a \leq x , \forall x \in X$

(b) $\forall X \subseteq A , X \neq \phi , \exists a \in X : a \leq x , \forall x \in X$

(c) $\forall X \subseteq A , X \neq \phi , \exists a \in A : a \geq x , \forall x \in X$

(d) $\forall X \subseteq A , X \neq \phi , \exists a \in A : x > a \Rightarrow x = a$

7- If a graph G has $n = 21$ vertices 5 of them each has degree 6 and the remaining vertices each has degree 2 then the number of edges of G is :

(a) There is no graph G with those properties because sum of degrees of all vertices of G is even

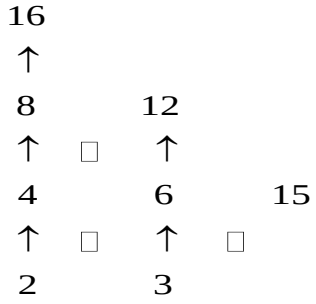
(b) 62

(c) 21

(d) 31

8- Let $A = \{ 2, 3, 4 , 6 , 12 , 15 , 16 \}$ and

$R = \{ (x , y) , x , y \in A \wedge x | y \}$, consider Hasse diagram of the partially ordered set (A , R) :



Let $B = \{ 2, 4, 6 , 12 \} \subseteq A$,then

(a) $Inf\ B \wedge Sup\ B$ are $3 , 16$

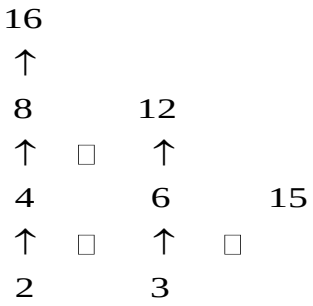
(b) $Inf\ B \wedge Sup\ B$ are $2 , 12$

(c) $Inf\ B \wedge Sup\ B$ are $12 , 15$

(d) $Inf\ B \wedge Sup\ B$ is 20

9- Let $A = \{ 2, 3, 4 , 6 , 12 , 15 , 16 \}$ and

$R = \{ (x , y) , x , y \in A \wedge x | y \}$, consider Hasse diagram of the partially ordered set (A , R) :



Let $B=\{2,3,4,6,12,15\}\subseteq A$,then

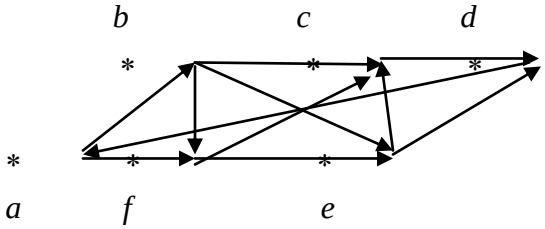
(a) B has greatest element 15

(b) Least elements of B are 2 , 3

(c) Minimal elements of B are 2 , 3

(d) Least element of B is 2

10- Consider the directed graph $G=(V,E)$,



then $\deg^+ a$, $\deg^- d$ are:

(a) 2 , 0

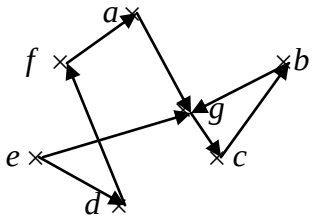
(b) 3 , 2

(c) 2 , 2

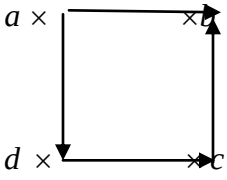
(d) 1 , 3

11- Strongly connected graph is :

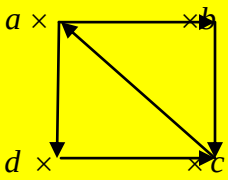
(a)



(b)



(c)



(d)