

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO

T.B.C. : JBCP-O-CPS

Test Booklet Series

Serial No.

0006868

TEST BOOKLET

COMPUTER PROGRAMMING SKILLS

D

Time Allowed : Two Hours

Maximum Marks : 300

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET **DOES NOT** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. PLEASE NOTE THAT IT IS THE CANDIDATE'S RESPONSIBILITY TO ENCODE AND FILL IN THE ROLL NUMBER AND TEST BOOKLET SERIES CODE A, B, C OR D CAREFULLY AND WITHOUT ANY OMISSION OR DISCREPANCY AT THE APPROPRIATE PLACES IN THE *OMR ANSWER SHEET*. ANY OMISSION/DISCREPANCY WILL RENDER THE ANSWER SHEET LIABLE FOR REJECTION.
3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. **DO NOT** write *anything else* on the Test Booklet. 1103236
4. This Test Booklet contains 100 items (questions). Each item comprises four responses (answers). You will select the response which you want to mark on the Answer Sheet. In case, you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each item.
5. You have to mark your responses **ONLY** on the separate Answer Sheet provided. See directions in the Answer Sheet.
6. All items carry equal marks.
7. Before you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.
8. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to the Invigilator **only the Answer Sheet**. You are permitted to take away with you the Test Booklet.
9. Sheets for rough work are appended in the Test Booklet at the end.
10. **Penalty for wrong Answers :**

THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE.

- (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third** of the marks assigned to that question will be deducted as penalty.
- (ii) If a candidate gives more than one answer, it will be treated as **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to that question.
- (iii) If a question is left blank i.e. no answer is given by the candidate, there will be **no penalty** for that question.

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO

1. Which one of the following type of encryptions uses a 26-character key with all possible permutations as the key space ?

 - (a) AES
 - (b) DES
 - (c) Substitution codes
 - (d) RSA
2. Which of the following key size is used in triple Data Encryption Standard (3DES) ?

 - (a) 56-bit
 - (b) 128-bit
 - (c) 168-bit
 - (d) 256-bit
3. What is the number of mono alphabetic permutation ciphers over n elements ?

 - (a) 312
 - (b) 256
 - (c) 32
 - (d) 64
4. Which of the following best describes "diffusion" in encryption ?

 - (a) It aims to make each ciphertext digit depend on one plaintext digit
 - (b) It makes the statistical structure of the plaintext spread out across many ciphertext digits
 - (c) It simplifies the key discovery process for attackers
 - (d) It focuses on minimizing the size of the ciphertext
5. Feistel's block cipher approach uses a block length of n bits and a key length of k bits. What is the total number of possible transformations in Feistel's system ?

 - (a) $2n!$
 - (b) 2^k
 - (c) $n * k$
 - (d) $2n$
6. How many alternative keys are required for the Average Time Required for Exhaustive Key Search of Triple Data Encryption Standard (3DES) ?

 - (a) 2^{168}
 - (b) 2^{128}
 - (c) 2^{56}
 - (d) 2^{32}

7. How many different key sizes are approved for the Advanced Encryption Standard (AES) ?
- (a) 128 bits
(b) 256 bits
(c) 516 bits
(d) 32 bits
8. What is the maximum period obtainable from the following generator ?
- $$X_{n+1} = (aX_n) \bmod 2^4$$
- (a) 3
(b) 4
(c) 5
(d) 11
9. What RC4 key value will leave S unchanged during initialization ? That is, after the initial permutation of S, the entries of S will be equal to the values from 0 through 255 in ascending order.
- (a) 32
(b) 16
10. In an RSA system, the public key of a given user is $e = 65$, $n = 2881$. What will be the private key of this user ? First use trial and error to determine p and q; then use the extended Euclidean algorithm to find the multiplicative inverse of 31 modulo $f(n)$.
- (a) 4031
(b) 3031
(c) 1031
(d) 6031
11. Which one of the following is a fundamental similarity between the OSI and TCP/IP reference models ?
- (a) Both models have identical transport protocols
(b) Both models define protocols only for data transmission
(c) Both models define a stack of independent layers that serve similar purposes
(d) Both models are designed exclusively for network security

12. A client-server system uses a satellite network, with the satellite at a height of 40,000 km. What is the best-case delay in response to a request ?

(a) 533 msec
(b) 233 msec
(c) 733 msec
(d) 1033 msec

13. Five routers are to be connected in a point-to-point subnet. Between each pair of routers, the designers may put a high-speed line, a medium-speed line, a low-speed line, or no line. If it takes 100 ms of computer time to generate and inspect each topology, how long will it take to inspect all of them ?

(a) 101,857.6 sec
(b) 104,857.6 sec
(c) 120,857.6 sec
(d) 100,857.6 sec

14. Consider a scenario where a user desires to send a sequence of computer screen images over an optical fiber. The screen resolution is 2560×1600 pixels, with each pixel being 24 bits. There are 60 screen images per second. How many microns of wavelength are needed for this band at 1.30 microns ?

(a) 2.5×10^2 microns
(b) 4.5×10^{-5} microns
(c) 1.5×10^{-2} microns
(d) 3.3×10^{-5} microns

15. If a binary signal is sent over a 3-kHz channel whose signal-to-noise ratio is 20 dB, what is the maximum achievable data rate ?

(a) 6 kbps
(b) 16 kbps
(c) 26 kbps
(d) 36 kbps

16. Consider a group of N stations share a 56-kbps pure ALOHA channel. Each station sends a 1000-bit frame on average once every 100 seconds, regardless of whether the previous frame has been transmitted (i.e., the stations can buffer outgoing frames). What is the maximum value of N ?

(a) 130 stations
(b) 1030 stations
(c) 2010 stations
(d) 1230 stations

22. Which one of the following methods is used to abstract syntax for each flavor of XHTML 1.0 defined by a set of text files ?

- (a) XML document type definition
- (b) Hypertext Mark-up Language
- (c) Cascading Style Sheets
- (d) Data definition language

23. What is the output if the following JavaScript program is executed by a typical web browser ?

```
// LocalScope.js
var j=6; // global variable declaration
and initialization
function test()
{
    var j;
    j=7;
    return;
}
test();
window.alert(j);
```

- (a) 7
- (b) 6
- (c) 8
- (d) 13

24. Which one of the following networks is used to connect the new regional supercomputing centers ?

- (a) Computer Science Network
- (b) ARPANET
- (c) TCP/IP (Transmission Control Protocol/Internet Protocol)
- (d) NSFNET

25. Consider the following statements regarding TRACE Standard HTTP/1.1 Method :

- 1. Return the resource specified by the Request-URI as the body of a response message.
- 2. Pass the body of this request message on as data to be processed by the resource specified by the Request-URI.
- 3. Return a copy of the complete HTTP request message, including start line, header fields, and body, received by the server. Used primarily for test purposes.

Which of the above statements is/are correct ?

- (a) 1 only
- (b) 2 only
- (c) 3 only
- (d) 1, 2 and 3

26. Which one of the following statements is/are NOT relevant to server feature ?

- (a) The server calls on TCP software and waits for connection requests to one or more ports
- (b) The virtual host software maps the Request-URI field of the HTTP request start line to a resource on the server
- (c) If the resource is a file, the host software determines the MIME type of the file (usually by a mapping from the file-name extension portion of the Request-URI), and creates an HTTP response that contains the file in the body of the response message
- (d) If the user has entered a URL in the Location bar and begins to type it again (within the next several days), the URL will be completed automatically by the browser

27. What is the output of the following HTML code ?

```
<!DOCTYPE html
PUBLIC "-//W3C//DTD XHTML
1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/
xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/
1999/xhtml">
<head><title>
JSHelloWorld</title>
<script type="text/javascript" src=
"JSHelloWorld">
</script></head>
<body><body></html>
```

- (a) Hello world
- (b) JSHelloWorld
- (c) Hello World!
- (d) Compilation error

28. Which one of the following HttpServletResponse Methods is used to cause HTTP response with status code 307 to be sent to the client, causing the client to send a new HTTP request to the given url. Client will behave as if it had sent request to the specified url ?

- (a) void encodeRedirectURL(String url)
- (b) void sendRedirect(String url)
- (c) void sendError(int statusCode, String msg)
- (d) void setStatus(int statusCode)

29. What is the output of the following JavaScript program ?

```
function objArgs(param1, param2) {
param1.data = "changed";
param2 = param1;
window.alert("param1 is " +
param1.data + "\t" + "param2 is " );
return;
}
var o1 = new Object();o1.data =
"original";
var o2 = new Object();o2.data =
"original";
objArgs(o1, o2);
window.alert(" o1 is " + o1.data +
"\t" + "o2 is " + o2.data);
```

- (a) param1 changed param2 changed
- (b) param1 changed
- (c) o1 is changed o2 is original
- (d) Compilation error

30. Which one of the following statements correctly describes the difference between the DOM and SAX approaches to XML processing ?

- (a) DOM reads and processes an XML document by interacting with the application as it reads the document, while SAX creates a tree representation of the entire document before processing
- (b) DOM processes an XML document by creating a tree representation of the entire document, while SAX processes the document as it reads it
- (c) SAX creates a tree representation of the entire document before processing, while DOM processes the document as it reads it
- (d) Both DOM and SAX approaches read and process XML documents in the same way, using a tree structure for communication

31. Consider the following java code :

```
var Quo = function (string) {
this.status = string;
};
Quo.prototype.get_status = function () {
return this.status;
};
var myQuo = new Quo("confused");
document.writeln(myQuo.get_status());
// confused
```

Which of the patterns is followed in the above code ?

- (a) Method Invocation Pattern
- (b) Function Invocation Pattern
- (c) Constructor Invocation Pattern
- (d) Apply Invocation Pattern

32. What is the output of the following java code ?

```
// Demonstrate block scope.
class Scope {
public static void main(String args[]) {
int x=10;
if(x == 10) {
int y = 20;
System.out.println("x and y: " + x + " " + y);
x = y * 2;
}
y = 100;
System.out.println("x is " + x);
} }
```

- (a) 40
- (b) 11
- (c) 30
- (d) Compile time error

33. What is the output of the following java code ?

```
class TwoDAgain {
public static void main(String args[]) {
int twoD[][] = new int[3][];
twoD[0] = new int[1];
twoD[1] = new int[2];
twoD[2] = new int[3];
int i, j, k = 0;
for(i=0; i<3; i++) {
for(j=0; j<i+1; j++) {
k++;
}
for(i=0; i<3; i++) {
for(j=0; j<i+1; j++)
System.out.println();
} } }
```

- (a) 1 2
- (b) 3 4 5
- (c) Compile time error
- (d) Syntax error

34. What is the output of the following java code ?

```
class ForEach3 {  
    public static void main(String args[]) {  
        int sum = 0;  
        int nums[][] = new int[3][5];  
        for(int i = 0; i < 3; i++)  
            for(int j = 0; j < 5; j++)  
                nums[i][j] = (i+1)*(j+1);  
        for(int x[] : nums) {  
            for(int y : x) {  
                sum += y;  
            }  
        }  
        System.out.println("Summation: " +  
                           sum);  
    }  
}
```

(a) 90
(b) 75
(c) 15
(d) Compilation Error

35. Which one of the following methods is used to support polymorphism in java ?

- (a) Call by value
(b) Call by reference
(c) Overloading
(d) Inheritance

36. Which one of the following is related to Throwable getCause() runtime exception subclass defined in java language ?

- (a) Attempt to clone an object that does not implement the Cloneable interface

- (b) Returns the exception that underlies the current exception. If there is no underlying exception, null is returned

(c) Requested operation not compatible with current thread state

(d) Environment or application is in incorrect state

37. What is the output of the following java code ?

```
class BitLogic {  
    public static void main(String args[]) {  
        String binary[] = {  
            "0000", "0001", "0010", "0011",  
            "0100", "0101", "0110", "0111",  
            "1000", "1001", "1010", "1011",  
            "1100", "1101", "1110", "1111"  
        };  
        int a = 3, b=6;  
        int c = a | b;  
        int d = a & b;  
        int e = (~a & b) | (a & ~b);  
        System.out.println("~a&b|a&~b = " +  
                           binary[e]);  
    }  
}
```

- b | 3
(a) 0111
(b) 0010
(c) Compilation Error
(d) 0101

38. Which one of the following data structures is used to store the code during the execution of the programs on JVM by the operating system in java ?

- (a) Stack
- (b) Queue
- (c) Linked list
- (d) Tree

39. What is the output of the following java code ?

```
class NoBody {  
    public static void main(String args[]) {  
        int i=100, j=200;  
        while(++i < --j);  
        System.out.println("point is " + i);  
    } }
```

- (a) 102
- (b) 198
- (c) 150
- (d) Compiler error

40. Which one of the following is not relevant extendable superclass in java ?

- (a) Subclass creators save development time because much of the code needed for the class already has been written

(b) When you will not create a new subclass in Java, neither the superclass source code nor the superclass bytecode is changed. The superclass maintains its security

(c) Subclass creators save testing time because the superclass code already has been tested and probably used in a variety of situations. In other words, the superclass code is reliable

(d) When you create a new subclass in Java, neither the superclass source code nor the superclass bytecode is changed. The superclass maintains its integrity

41. Which one of the following describes the process of Weak Robust Equivalence Class Testing ?

- (a) Selecting test cases where all inputs are valid, focusing solely on valid equivalence classes
- (b) Creating test cases where all inputs are invalid, ensuring that a single failure causes the test case to fail
- (c) Selecting test cases where one input is invalid, and the remaining inputs are valid, ensuring that a single failure causes the test case to fail
- (d) Choosing test cases where each equivalence class is represented, with a focus on both valid and invalid inputs

- 42.** Which of the following formulae is used to calculate the cyclomatic complexity of a program ?
- $M=E-N+P$
 - $M=E+N+P$
 - $M=E-N+2P$
 - $M=E+N-P$
- 43.** Which one of the following statements is one of the limitations of *Waterfall Model* ?
- The phases have clearly defined end products (exit criteria), which in turn are convenient for project management
 - The detailed design phase marks the starting point where individuals responsible for unit scan work in parallel, thereby shortening the overall project development interval
 - Perfect foresight is required because any faults or omissions at the requirements level will penetrate through the remaining life cycle phases
 - The framework fits well with hierarchical management structures
- 44.** According to Hartman, what is the primary limitation of modeling tools like IBM's Rational Rose and Telelogic's Rhapsody ?
- 45.** Which one of the following statements is used to handle technology-related risk factors in the spiral model ?
- It avoids technology-related risk factors entirely
 - It subjects builds to a go/no-go decision based on these risk factors
 - It focuses solely on customer-driven requirements
 - It does not consider risk factors in the decision-making process
- 46.** Which of the following two new approaches to integration testing are mentioned in the text based on the call graph ?
- Modular testing and boundary testing
 - Top-down and bottom-up integration
 - Functional testing and structural testing
 - Pairwise integration and neighborhood integration

47. What issue arises when a fault is found in a node that appears in several neighborhoods in call graph-based testing?

- (a) The fault will not be detectable in other neighborhoods
- (b) Retesting is unnecessary for neighborhoods already tested
- (c) The change in one neighborhood requires retesting all previously tested neighborhoods that contain the changed node
- (d) All neighborhoods must be re-evaluated from the start

48. Which of the following software development models is/are path-based integration testing compatible with?

- (a) Only traditional waterfall models
- (b) Only agile models
- (c) Only object-oriented models
- (d) Both traditional waterfall processes and composition-based alternative life cycle models

49. Which one of the following examples is *not* an Atomic System Function (ASF) in the SATM system?

- (a) PIN entry

(b) Cash dispensing

(c) Card entry

(d) Digit entry

50. Which one of the following occurs when no transition is enabled in a traditional Petri net?

- (a) Deadlock
- (b) System reset
- (c) Event initialization
- (d) Input-output synchronization

51. Consider the following C++ code:

```
for (i = 0 ; i < n ; i++)  
    for (j = 0 ; j < n ; j* = 2)  
        printf("hello world");
```

The efficiency of the above loop in terms of number of iterations can be defined as

- (a) n^2 ✓
- (b) $\log(n)$
- (c) $n \log(n)$
- (d) $n/2$

52. The Postfix expression for the following Infix expression is

$$((((A+B)*C)+D)+(E*F)) \\ - G$$

- (a) $A B + C * D + E * F - G +$
- (b) $A B + C * D + E F * + G -$
- (c) $A B + C * D + E F G * + -$
- (d) $E F * A B + C * D ++ G -$

53. What is the minimum value of n such that an algorithm whose running time is $200n^2$ runs faster than an algorithm whose running time is 2^n on the very same machine?

- (a) 16
- (b) 04
- (c) 13
- (d) 07

54. Consider the following statements regarding quicksort:

1. Time complexity of Quicksort is $\Theta(\log n)$, when all elements in the list are same
2. Average case running time of Randomized Quicksort is $n \log n$
3. In Quicksort, running time of PARTITION on the subarray $A[p, r]$ is $\Theta(n^2)$

Which of the above statements is/are correct?

- (a) 2 only
- (b) 3 only
- (c) 1 and 3
- (d) 1 and 2

55. Consider the following statements regarding counting sort:

1. Counting sort runs in $\Theta(n)$ time to sort n integers between 0 to k , when $k = O(n^2)$
2. Counting sort is often used as a subroutine in radix sort
3. Counting sort is unstable

Which of the above statements is/are NOT correct?

- (a) 2 only
- (b) 3 only
- (c) 1 and 2
- (d) 1 and 3

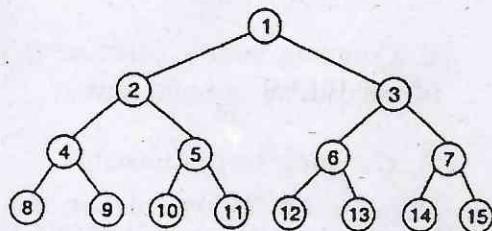
56. The load factor α for a given hash table T with 5 slots that stores 20 elements is

- (a) 0.25
- (b) 2
- (c) 4
- (d) 5

57. The running time of TREE-SUCCESSOR procedure to find the successor of a node in a Binary Search Tree of height h and Number of nodes n is defined as

- (a) $O(h)$
- (b) $O(h + n)$
- (c) $O(n^h)$
- (d) $O(nh)$

58. Consider the following TREE :



- 1. The Tree is a Binary Tree with height 4
- 2. The Tree is a Complete Binary Tree
- 3. The maximum number of nodes possible (*without altering its height*) in this tree are 31.

Which of the above statements is/are NOT correct ?

- (a) 1 only
- (b) 3 only
- (c) 1 and 2
- (d) 2 and 3

59. The maximum and minimum size of an array needed to store a binary tree with 15 nodes are

- (a) maximum : 32767, minimum : 15
- (b) maximum : 16384, minimum : 16
- (c) maximum : 32767, minimum : 32
- (d) maximum : 16384, minimum : 15

60. Consider the following statements regarding Binary Search Tree :

- 1. A height balanced tree is always a Binary Search Tree
- 2. A complete Binary Search Tree may not be height balanced
- 3. A height balanced tree is always a complete binary search tree

Which of the above statements is/are correct ?

- (a) 1 only
- (b) 2 only
- (c) 1 and 3
- (d) 2 and 3

- 61.** What is the main problem caused by mixing asynchronous script loading with the CDN fallback feature ?
- (a) It speeds up the process but causes the browser to skip script execution
 - (b) It may lead to the fallback test being performed before the browser retrieves the CDN file, causing unnecessary fallback requests
 - (c) It leads to an automatic retry of the CDN file even if it's available
 - (d) It causes script execution to be ignored by the browser altogether
- 62.** What is the output of the following PHP code ?
- ```
function print_parsed_backtrace() {
 $backtrace = debug_backtrace();
 for ($i = 1, $j = 0; $i < $j; $i++) {
 $frame = $backtrace[$i];
 if (isset($frame['class'])) {
 $function = $frame['class'];
 } else {
 $function = $frame['function'];
 }
 print $function . '()' . "\n";
 if ($i != ($j - 1)) {
 print ',';
 }
 }
}
```
- (a) woo woo woo!
  - (b) Compilation error
  - (c) 1
  - (d) Exception handling
- 63.** Which one of the following Superglobal variables used to Items uploaded to the current script via the HTTP POST method ?
- (a) \$\_REQUEST
  - (b) \$\_COOKIE
  - (c) \$GLOBALS
  - (d) \$\_FILES
- 64.** What is the output of the following PHP code ?
- ```
<?php
$j = 10;
while ($j>-10)
{
    $j--;
    if ($j == 0) continue;
    echo (10 . "<br>");
}
?>
```
- (a) -10
 - (b) 10
 - (c) 0
 - (d) Compilation error

65. What is the output of the following PHP code ?

```
<?php
$object = new User;
print_r($object); echo "<br>";
$object->name = "Joe";
$object->password = "mypass";
print_r($object); echo "<br>";
$object->save_user();
class User
{
    public $name, $password;
    function save_user()
    {
        echo "Save User code goes here";
    }
?>

(a) Joe
(b) Mypass
(c) Compilation error
(d) 0
```

66. What is the output of the following PHP code ?

```
<?php
$object = new Tiger();
echo "Tigers have..<br>";
echo "Fur: " . $object->fur .
"<br>";echo "Stripes: " . $object->
stripes;
class Wildcat
{public $fur;
function __construct()
{$this->fur = "TRUE";}
class Tiger extends Wildcat
{public $stripes;
function __construct()
{parent::__construct();
$this->stripes = "TRUE";}
?>
```

(a) Tigers have.. Fur: TRUE Stripes: TRUE

(b) Tigers have..

(c) 0

(d) Compilation error

67. What is the output of the following java code ?

```
public class BitwiseDemo {
    public static void main(String... args) {
        byte b1 = 117;
        byte b2 = 95;
        byte result = (byte) (b1 ^ b2);
        String str = String.format("%8s",
            Integer.toBinaryString
            (result & 0xFF))
            .replace(' ', '0');
        System.out.println("binary result: " + str);
    } }
```

(a) 00101010

(b) 01110101

(c) 01011111

(d) Compiler error

68. Which one of the following methods is another way that Java implements the "one interface, multiple methods" aspect of polymorphism ?

(a) Run-time polymorphism method

(b) Overridden method

(c) Inheritance method

(d) Overloading method

69. What is the output of the following java code ?

```
Class X implements Runnable
{ public void run() {
    for (int i=1; i<10; i++)
    { system.out.println ("\tThreadX :" +i);
    }
    system.out.println (" End of Thread X");
}
}
Class Runnabletest
{ public static void main(String args[])
{
    Thread threadX = new
        Thread (% runnable); threadX.start();
    system.out.println (" End of main
        Thread");
}
}
```

- (a) ThreadX : 8
- (b) ThreadX : 9
- (c) ThreadX : 10
- (d) Compilation error

70. Which one of the following is related to `int compareTo(Object obj)` in java ?

- (a) It compares the numerical value of the invoking object with that of f. Returns 0 if the values are equal. Returns a negative value if the invoking object has a lower value. Returns a positive value if the invoking object has a greater value
- (b) It returns true if the invoking `Float` object is equivalent to `FloatObj`. Otherwise, it returns false

(c) It returns the value of the invoking object as a byte

(d) It operates identically to `compareTo(Float)` if `obj` is of class `Float`. Otherwise, throws a `ClassCastException`

71. Consider the following statements regarding weak entity sets :

1. The discriminator of a weak entity set is also called the foreign key of the entity set
2. Weak entity set is said to be existence dependent on the identifying entity set
3. The use of doubly outlined diamond in ER Diagram is to indicate total participation
4. In E-R diagrams, a doubly outlined box indicates a weak entity set, and double lines indicate the corresponding simple relationship

Which of the above statements is/are correct ?

- (a) 1 only
- (b) 2 only
- (c) 1, 2 and 4
- (d) 2, 3 and 4

72. Consider the following statements regarding string operations in SQL :

1. 'UPSC%' matches any string ending with "UPSC"
2. The character underscore (_) matches any character
3. '___' matches any string of at least three characters
4. '___%' matches any string of at most three characters

Which of the above statements is/are NOT correct ?

- (a) 1 only
- (b) 2 only
- (c) 1 and 3
- (d) 1, 3 and 4

73. Consider the following statements regarding SQL transactions :

1. A transaction consists of a sequence of update statements
2. The SQL standard specifies that a transaction begins implicitly when an SQL statement is executed
3. Once a transaction has executed commit work, its effects can no longer be undone by rollback workers
4. Every SQL transaction must end with either commit or rollback

Which of the above statements is/are correct ?

- (a) 1 only
- (b) 4 only

(c) 2 and 3 only

(d) 1, 2, 3 and 4

74. Which state does a transaction enter after the transaction has been rolled back and the database has been restored to its state prior to the start of the transaction ?

- (a) Aborted
- (b) Partially committed
- (c) Failed
- (d) Ready

75. Consider the following statements regarding transactions in SQL :

1. Transactions are required to have at least two of the ACID properties
2. Concurrent execution of transactions improves their throughput but negatively effects waiting time of transactions
3. A transaction Schedule may or may not be recoverable
4. Schedules should preferably be cascadeless so that the abort of a transaction does not result in cascading aborts of other transactions

Which of the above statements is/are NOT correct ?

- (a) 1 only
- (b) 1 and 3
- (c) 1 and 4
- (d) 2 and 3

76. Consider the following statements regarding ORACLE triggers :

1. Oracle supports both row triggers as well as statement triggers
2. A trigger can be defined as either a *before* or *after* trigger
3. Oracle allows the creation of instead of triggers for views that are subject to DML operations
4. Oracle also has triggers that execute on database startup or shutdown

Which of the above statements is/are NOT correct ?

- (a) 3 only
- (b) 4 only
- (c) 1 and 3
- (d) 1, 2 and 4

77. Which one of the following statements is primary purpose of the HTTP Strict Transport Security (HSTS) protocol ?

- (a) To prevent users from accessing websites that are not using SSL/TLS encryption
- (b) To mitigate the risk of users making initial HTTP requests before being redirected to HTTPS

(c) To allow browsers to use a secure connection even when the website doesn't support SSL/TLS

(d) To improve the performance of HTTPS redirection by reducing latency

78. What is the output of the following ASP.NET code on web browser ?

```
"profiles": {  
  "Platform": {  
    "commandName": "Project",  
    "dotnetRunMessages": true,  
    "launchBrowser": true,  
    "applicationUrl":  
      "http://localhost:5000;  
      https://localhost:5500",  
    "environmentVariables": {  
      "ASPNETCORE_ENVIRONMENT":  
        "Production"  
    }},  
  "IIS Express": {  
    "commandName": "IISExpress",  
    "launchBrowser": true,  
    "environmentVariables": {  
      "ASPNETCORE_ENVIRONMENT":  
        "Development"  
    }  
  }  
}
```

- (a) Production
- (b) Development
- (c) Production and Development
- (d) Compilation error

79. Which one of the following is one of the main drawbacks of the web forms model that MVC helped to address ?

- (a) Web forms applications were more secure
- (b) Web forms hid the details of HTTP requests and responses from the developer, making the applications difficult to manage
- (c) Web forms applications were less scalable
- (d) Web forms required more advanced knowledge of the HTTP protocol

80. Which one of the following specifications does the Swashbuckle package implement in ASP.NET core ?

- (a) HTTP/2
- (b) OpenAPI
- (c) WebSocket
- (d) SOAP

81. What is the output of the following PHP code ?

```
foreach ([5, '5', '05', 12.3, '16.7', 'five',
0xDECAFBAD, '10e200']
as $maybeNumber)
$IsItNumeric =
    is_numeric($maybeNumber);
$actualType =
    gettype($maybeNumber);
if (is_numeric($maybeNumber)) {
    print "yes";
} else {
    print "no";
}
print "\n";
```

(a) Yes

(b) No

(c) 5

(d) Compilation error

82. Which one of the following is the default visibility for properties and methods in PHP 5 ?

- (a) Private
- (b) Protected
- (c) Public
- (d) Prohibited

83. What is the output of the following PHP code ?

```
<?php
$temp = new Test();
echo "Test A: ";
    Test::$static_property . "<br>";
echo "Test B: ";
    $temp->get_sp() . "<br>";
echo "Test C: ";
    $temp->static_property . "<br>";
class Test
{static $static_property = "I'm static";
function get_sp()
?>
```

- (a) I'm static
- (b) static_property
- (c) 0
- (d) Compilation error

84. What is the output of the following PHP code ?

```
define('pi', 10);
class Circle {
const pi = 3.14159;
protected $radius;
public function __construct($radius) {
$this->radius = $radius;}
public function circumference() {
return 2 * pi * $this->radius;
}
$c = new circle(1);
print $c->circumference();
```

- (a) 10
- (b) 20

(c) 3.14159

(d) Compilation error

85. What is the output of the following PHP code ?

```
function is_valid_credit_card($s) {
$s = strrev(preg_replace('/[^\\d]/', '', $s));
$sum = 0;
for ($i = 0, $j = strlen($s); $i < $j; $i++) {
if (($i % 2) == 0) {
$val = $s[$i];
} else {
$sum += $val;}
}
return (($sum % 10) == 0);}
if (!is_valid_credit_card($_POST
['credit_card'])) {
print 'Sorry, that card number is invalid.';
```

- (a) Credit card
- (b) Drac tiderc
- (c) Compilation error
- (d) Syntax error

86. Which one of the following statements is correct about using PHP with different SQL databases ?

- (a) The SQL code must be completely identical across all databases
- (b) The PHP code remains the same, but the SQL syntax may vary across different databases
- (c) PDO does not support different database engines
- (d) PHP cannot be used with multiple database engines

- 87.** What is the output of the following PHP code ?

```
if($_SERVER["REQUEST_"
    METHOD"] == 'PUT') {
$body = file_get_contents('php://input');
switch(strtolower($_SERVER[HTTP_
    CONTENT_TYPE])) {
case "application/json":$job =
    json_decode($body);
break;case "text/xml":
break;
$request = explode('/', substr(
    $_SERVER['PATH_INFO'],
1));$resource = array_shift($request);
$id = update($job, $request[0]);
http_response_code(204); }
```

- (a) HTTP/1.1 204 No Content
- (b) 0
- (c) 1
- (d) Compilation error

- 88.** Which one of the following HTTP status codes is used for errors, i.e., when access to the resource is not allowed for reasons other than invalid authentication ?

- (a) 403 (Forbidden)
- (b) 429 (Too Many Requests)
- (c) 500 (Internal Server Error)
- (d) 503 (Service Unavailable)

- 89.** Which one of the following main security threat that htmlentities() helps to protect against ?

- (a) SQL Injection attacks
- (b) Cross-Site Request Forgery (CSRF)

- (c) Cross-Site Scripting (XSS) attacks
- (d) Denial of Service (DoS)

- 90.** Which one of the following reasons SHA1 algorithm is not recommended for password hashing, even though it is faster than Blowfish ?

- (a) SHA1 is less compatible with older versions of PHP
- (b) SHA1 is easier for attackers to crack since it is faster to compute
- (c) SHA1 can only be used for data encryption, not password hashing
- (d) SHA1 requires more computational resources than Blowfish

- 91.** What is the output of the following ASP.NET code ?

```
@{
Layout = null;
}
<!DOCTYPE html>
<html>
<head>
<meta name="" content="width=
    device-width" >
<title>RsvpForm</title>
</head>
<body>
<div>
Hello World!!!!
</div>
</body>
</html>
```

- (a) Hello World!!!!
- (b) RsvpForm
- (c) Hello World
- (d) Compilation error

- 92.** Which one of the following statements is the main feature of model binding in ASP.NET ?
- Incoming data is parsed and the key-value pairs in the HTTP request are used to populate properties of domain model types
 - Do not eliminate the grind of dealing with HTTP requests directly rather than dealing with individual data values sent by the browser
 - The GuestResponse object that is unparsed as the parameter to the action method is manually populated with the data from the form fields
 - Do not eliminate the grind of dealing with XML requests directly rather than dealing with individual data values sent by the browser
- 93.** What is the output if the following JavaScript program is executed by a typical web browser ?
- ```
namespace LanguageFeatures.
 Controllers {
 public class HomeController : Controller {
 public ViewResult Index() {
 object[] data = new object[] { 275M,
 29.95M, "apple", "orange", 100, 10 };
 decimal total = 0;
 for (int i = 0; i < data.Length; i++) {
 switch (data[i]) {
 case decimal decimalValue:
 total += decimalValue;
 break;
 case int intValue when intValue > 50:
 total += intValue;
 break;
 }
 }
 return View("Index", new string[]
 { $"Total: {total:C2}" });
 }
 }
 }
```
- (a) \$100.95  
 (b) \$404.95  
 (c) \$250.95  
 (d) Compilation error
- 94.** Consider the following statements regarding the Razor Page in ASP.NET:
- It will use the request form data to get the Product object from the database and use it to update the user's cart, which will be stored as session data for use by future requests
  - It defines handler methods that are invoked for different types of HTTP requests, which update state before rendering the view
  - The HTTP specification requires that GET requests be *idempotent*, meaning that they must not cause changes, and adding a product to a cart is definitely a change
- Which of the above statements are correct ?
- 1 and 2 only
  - 2 and 3 only
  - 1 and 3 only
  - 1, 2 and 3

**95.** Which one of the following methods is used in ASP.NET to create a section of pipeline that is used to process requests for specific URLs, creating a separate sequence of middleware components ?

- (a) Reduce method
- (b) Map method
- (c) Predicate method
- (d) Pipeline method

**96.** What is the process that occurs when a new HTTP request arrives in the ASP.NET core platform ?

- (a) The ASP.NET core platform sends a response immediately without creating any objects or using middleware
- (b) The ASP.NET core platform creates an object to describe the request and the response, then passes them through the middleware components in a chain for inspection and modification
- (c) The ASP.NET core platform only creates a response object and directly sends it back to the client
- (d) The ASP.NET core platform processes the request in isolation, without using middleware or modifying the response

**97.** Which one of the following statements is given preference when selecting routes in the middleware scoring system ?

- (a) Segment variables without constraints are given preference
- (b) Segment variables with constraints are always ignored
- (c) The most general route is always selected
- (d) Literal segments are given preference over segment variables

**98.** Which one of the following statements is relevant to  
`GetServiceOrCreateInstance<T>(services, args)`  
in the ASP.NET core platform ?

- (a) This method creates a new instance of the class specified by the type parameter, resolving dependencies using the services and additional (optional) arguments
- (b) This method returns a service of the specified type, if one is available, or creates a new instance if there is no service
- (c) It resolves the dependencies of an existing instance using the provided services
- (d) It creates a new instance of the specified class, resolving dependencies using the provided services and optional arguments

99. Which one of the following ASP.NET core objects is used for working with cookies in middleware components ?
- (a) IHttpContext and HttpRequest
  - (b) HttpRequest and HttpResponse
  - (c) ICookieService and IHttpCookieManager
  - (d) HttpRequest and IRequestHandler
100. Which one of the following statements is correct regarding Transport Layer Security (TLS) and Secure Sockets Layer (SSL) ?
- (a) SSL is the current and widely used protocol, while TLS is considered obsolete
  - (b) SSL and TLS are both outdated and no longer used in modern web security
  - (c) SSL was replaced by TLS, but the term SSL is still commonly used to refer to secure connections
  - (d) TLS and SSL work independently of each other for separate types of security