ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2021
EXAMINATION CATEGORY: <u>TECHNICAL</u>

PAPER II: GENERAL SUBJECT KNOWLEDGE PAPER FOR ICT

Date	: October 30, 2021
Total Marks	: 100
Writing Time	: 90 minutes (1.5 hours)
Reading Time	: 15 Minutes (prior to writing time)

GENERAL INSTRUCTIONS:

1. Write your Registration Number clearly and correctly on the Answer Booklet.

2. The first 15 minutes is to check the number of pages of Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.

3. This paper consists of **TWO Parts: Part I&Part II**

   Part I consists of 70 multiple choice questions of 1 (one) mark each, and

   Part II consists of 10 short answer questions of 3 (three) marks each.

4. All questions are COMPULSORY.

5. All answers should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.

6. All answers should be written with correct numbering of Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating the correct Part and Question Number will NOT be evaluated and no marks will be awarded.

7. Begin each Part in a fresh page of the Answer Booklet.

8. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.

9. Use of any other paper including paper for rough work is not permitted.

10. **You must hand over the Answer Booklet/s to the Invigilator before leaving the examination hall.**

11. This paper has **14 printed pages**, including this instruction page.

GOOD LUCK

Part I

Multiple Choice Questions [70 marks]

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 71 (a). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. HTML is considered as _____ language.
   a) Higher Level Language
   b) Markup Language
   c) Programming Language
   d) OOP Language

2. A car travels 150 km in 3 hours. Then it travels 150 km in 2 hours. Find the average speed of the car?
   a) 62.5 km/hour
   b) 125 km/hour
   c) 60 km/hour
   d) None of the above

3. What is the subnet mask for address 172.16.5.10/28?
   a) 255.255.255.192
   b) 255.255.255.240
   c) 255.255.255.248
   d) 255.255.255.224

4. The following C code can be rewritten as _____
   $$c = (n) \ ?a : b;$$

   a) If (!n) c = b;
      Else c = a;
   b) If (n < 0) c = b;
      Else c = a;
   c) If (n > 0) c = a;
      Else c = b;
   d) All of the above

5. Sonam chooses a marble at random from a bowl which contains 3 red, 2 black, and 5 green marbles. What is the probability that Sonam does not choose a black marble?
   a) $\frac{2}{10}$

   b) $\frac{3}{10}$

   c) $\frac{8}{10}$

   d) $\frac{5}{10}$

6. Solve: $\frac{1}{3} + 1\frac{1}{4} + \frac{1}{6}$

   a) $\frac{7}{6}$

   b) $\frac{7}{4}$

   c) $\frac{14}{12}$

   d) $\frac{14}{6}$

7. There is always a time delay in the sending of data packets over any network connection. The variation in the packet arrival time is called
   a) Random early detection
   b) Delay difference
   c) Jitter
   d) Load shedding

8. Identify the improper fraction.

   a) $\frac{11}{12}$

   b) $\frac{21}{12}$

   c) $1\frac{1}{12}$

   d) $\frac{0}{12}$

9. Given the mask 255.255.254.0, how many hosts per subnet does this create?
   a) 254
   b) 256
   c) 512
   d) 510

10. Find the simple interest on Nu 5200 for 2 years at 6% per annum.
    a) Nu 450
    b) Nu 524
    c) Nu 600
    d) Nu 624

11. How many /28 network can you build from a /24 IPv4 allocation?
    a) 16
    b) 4
    c) 2^6
    d) $2^{(4-2)}$

12. The sum of ages of 5 children born at the intervals of 3 years each is 50 years. What is the age of the youngest child?
    a) 4 years
    b) 8 years
    c) 10 years
    d) 12 years

13. When was the Internet introduced in Bhutan?
    a) 1996
    b) 1999
    c) 2003
    d) 2004

14. Which of the following are alternate representations of the decimal number 227?
    a) 0x227
    b) 0x143
    c) 11100110
    d) 11100011

15. What will be the output of the following program?

```c
void main()
{
        static int var = 5;
        printf("%d ", var--);
        if(var)
                main();
}
```

    a) 5 5 5 5 5
    b) 5 4 3 2 1
    c) Infinite Loop
    d) None of the above

16. The most common operation used in constructors is
    a) Addition
    b) Overloading
    c) Assignment
    d) Polymorphism

17. IPv6 address is made up of _____.
    a) 32 bytes
    b) 128 bytes
    c) 16 bytes
    d) 64 bits

18. Which one of the following uses UDP as the transport protocol?
    a) DNS
    b) HTTP
    c) Telnet
    d) HTTPS

19. All of the following are components of a database, EXCEPT
    a) User data
    b) Metadata
    c) Reports
    d) Indexes

20. The Layer 2 of the Internet protocol suite is concerned with _____ of data.
    a) bits
    b) packets
    c) bytes
    d) frames

21. Google Drive is a _____.
    a) file storage service
    b) instant messaging service
    c) web hosting service
    d) video hosting service

22. You have run an SQL statement that asked the DBMS to display data in a table named USER_TABLES. The results include columns of data labelled "TableName", "NumberOfColumns" and "PrimaryKey". You are looking at _____.

    a) user data
    b) metadata
    c) a report
    d) indexes

23. IEEE standard for *Wi-Fi 6* is
    a) 802.11ac
    b) 802.11az
    c) 802.11ax
    d) 802.11.a6

24. Which among the following is the least strong security encryption standard?
    a) WEP
    b) WPA
    c) WPA2
    d) WPA3

25. What will be the output of the following C code?

```
1.      #include <stdio.h>
2.      int main()
3.      {
4.          int y = 2;
5.          int z = y +(y = 10);
6.          printf("%d\n", z);
7.      }
```

   a) 12
   b) 20
   c) 4
   d) Compilation error

26. 'AS' clause is used in SQL for
   a) Selection operation
   b) Join operation
   c) Rename operation
   d) Projection operation

27. Which of the following is Cloud Platform by Amazon?
   a) Azure
   b) AWS
   c) Cloudera
   d) All of the above

28. Which of the following protocols is used to support clock synchronization?
   a) CTP
   b) NTP
   c) UTP
   d) TCP

29. Which of the following is the binary number for 255 in decimal?
   a) 11111111
   b) 10000110
   c) 10000100
   d) 10000101

30. What SQL command can be used to add columns to a table?
   a) ALTER TABLE TableName ADD COLUMN ColumnName
   b) MODIFY TABLE TableName ADD ColumnName
   c) ALTER TABLE TableName ADD ColumnName
   d) MODIFY TABLE TableName ADD COLUMN ColumnName

31. Which type of Hypervisor is shown in the following figure?
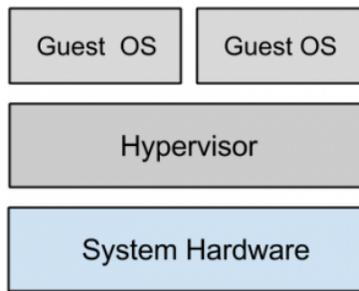
    a) Type 1
    b) Type 2
    c) Type 3
    d) Type 4

32. Which of the following is not known cloud service model?
    a) SaaS
    b) IaaS
    c) PaaS
    d) XaaS

33. GSM stands for:
    a) Global System for Monitoring
    b) Graphical System for Mobile Telecommunications
    c) Graphical System for Monitoring
    d) Global System for Mobile Communications

34. Which of the following SQL query is correct for selecting the name of staff from 'staffinfo' table where salary is 10,000 or 25,000?
    a) SELECT name FROM staffinfo WHERE salary BETWEEN 10000 AND 25000;
    b) SELECT name FROM staffinfo WHERE salary IN (10000, 25000);
    c) SELECT name FROM staffinfo WHERE salary = 10000 OR 25000;
    d) None of the above

35. What is the technique used to hide information inside a picture?
    a) Rootkits
    b) Bitmapping
    c) Steganography
    d) Image Rendering

36. Following question has four probable answers. Select the most appropriate alternative.
    At midnight you heard the voice of several persons shouting. "Fire, Fire,". You would
    a) ring to the Fire Brigade station and inform the officials there about the fire.
    b) rush out of the room with bucket of water to extinguish the fire.
    c) ensure where the fire had taken place and to what extent.
    d) continue to sleep, till you are called for.

37. The default port number of HTTPS is
    a) 80
    b) 443
    c) 440
    d) 81

38. What number will come at the place of question mark?
    1, 9, 25, 49, ?, 121
    a) 100
    b) 91
    c) 64
    d) 81

39. The total of the ages of Sonam, Pema and Tshering is 80 years. What was the total of their ages three years ago?
    a) 71 years
    b) 72 years
    c) 74 years
    d) 77 years

40. A is 3 years older than B and 3 years younger than C, while B and D are twins. How many years is C older than D?
    a) 2
    b) 3
    c) 6
    d) 12

41. What is the sequence of a TCP connection?
    a) SYN-ACK-FIN
    b) SYN-SYN ACK-ACK
    c) SYN-ACK
    d) SYN-SYN-ACK

42. In a garden, there are 10 rows and 12 columns of apple trees. The distance between the two trees is 2 metres and a distance of one metre is left from all sides of the boundary of the garden. The length of the garden is:
    a) 20 m
    b) 22 m
    c) 24 m
    d) 26 m

43. Phishing is a form of _____.
    a) Spamming
    b) Impersonation
    c) Identify Theft
    d) Scanning

44. In computing, one nibble is equal to
    a) 4 bits
    b) 8 bits
    c) 6 bits
    d) 16 bits

45. What is the decimal equivalent of the binary number 100011?
    a) 35
    b) 70
    c) 17
    d) 128

46. Keyloggers are a form of
    a) Shoulder surfing
    b) Trojan
    c) Spyware
    d) Social engineering

47. The brain of any computing system is
    a) ALU
    b) Memory
    c) CPU
    d) Control Unit

48. What is the encryption protocol used by the WiFi Protected Access (WPA)?
    a) Shared key
    b) LEAP
    c) AES
    d) TKIP

49. The diagram below shows an AND gate

  If the output wire is off (0), what are the possible states of the input wires?

      I = Input A is 0, input B is 1;
      II = Both inputs are 1;
      III = Input A is 1, Input B is 0;
      IV = Both inputs are 0;

    a) I and III only
    b) II only
    c) I, II and III only
    d) I, III and IV only

50. Modern Computers are very reliable but they are not
    a) Cheap
    b) Fast
    c) Powerful
    d) Infallible

51. Why is Requirement Elicitation a difficult task in Software Engineering?
    a) Problem of scope
    b) Problem of understanding
    c) Problem of volatility
    d) All of the above

52. What is the number of bits available for the network address if the number of bits available for the host address is 10?
    a) 32
    b) 2^{10}
    c) 22
    d) $2^{(32-10)}$

53. Which is valid C expression?
    a) intmy_num = 100,000;
    b) intmy_num = 100000;
    c) int my num = 10000;
    d) int $my_num = 10000;

54. Which of the following principle is violated if computer system is not accessible?
    a) Confidentiality
    b) Integrity
    c) Availability
    d) Authentication

55. Select the option that suits the Manifesto of Agile Software Development.
    a) Individuals and interactions
    b) Working software
    c) Customer collaboration
    d) All of the above mentioned

56. Find the mode of the following set of numbers: 1, 1, 1, 2, 4, 5, 5, 7, 8, 12
    a) 1
    b) 4.5
    c) 5
    d) 4.6

57. Which is the legal form of hacking based on which jobs are provided in IT industries and firms?
    a) Underground hacking
    b) Surface hacking
    c) Ethical hacking
    d) Whitebox hacking

58. Which of the following characteristic of big data is relatively more concerned to data science?
    a) Raw data is original source of data.
    b) Pre-processed data is original source of data.
    c) Raw data is the data obtained after processing steps.
    d) None of the above.

59. Which one is a superset that includes the rest?
    a) Data Analysis
    b) Data Science
    c) Business Analytics
    d) Model Creation

60. Which of the following technique is used to verify the integrity of the message?
    a) Message digest
    b) Digital signature
    c) Decryption algorithm
    d) AES

61. Write the output of the following code.

```
main()
{
        int i = abc(10);
        printf("%d", --i);
}

int abc(int i)
{
        return(i++);
}
```

    a) 10
    b) 9
    c) 11
    d) Error

62. A bootstrap is
    a) a memory device.
    b) a device to support the computer.
    c) a small initialisation program to start up a computer or program.
    d) an error correction technique.

63. In Software Development Life Cycle, requirements can be refined using the _____.
    a) prototyping model
    b) evolutionary model
    c) waterfall model
    d) spiral model

64. In relational database, an attribute is a
    a) key of a table
    b) two-dimensional table
    c) row of a table
    d) column of a table

65. Determine output of the following:

```
main()
{
        int i = 5;
        printf("%d%d%d%d%d", i++, i--, ++i, --i, i);
}
```

    a) 45545
    b) 54544
    c) 45445
    d) 54554

66. You are asked to participate in the survey. The question included in the survey questionnaire to record your response have set of alternatives. This type of question is classified as
    a) Open ended questions
    b) Closed ended questions
    c) Multiple choices
    d) Itemized question

67. How will you select all data from student table starting the name from letter 'r'?
    a) SELECT * FROM student WHERE name LIKE '%r%';
    b) SELECT * FROM student WHERE name LIKE '%r';
    c) SELECT * FROM student WHERE name LIKE 'r%';
    d) SELECT * FROM student WHERE name LIKE '_r%';

68. The Lowest Common Factor (LCM) of 9 and 6 is
    a) 3
    b) 6
    c) 9
    d) 18

69. The reason for software bugs and failures is due to _____.
    a) software companies
    b) software developers
    c) both software companies and developers
    d) None of the above

70. In a race of 1000 m, A can beat B by 100 m. In a race of 800 m, B can beat C by 100 m. By how many meters will A beat C in a race of 600 m?
    a) 57.5 m
    b) 127.5 m
    c) 150.7 m
    d) 98.6 m

PART II – Short Answer Questions [30 marks]

Answer ALL 10 short answer questions. Each question carries 3 marks.

1. Write a program to determine if a number given is ODD or EVEN. Accordingly print the output. (3 marks)

2. What is DNS? State atleast two types of DNS servers. (3 marks)

3. What does the following acronyms stand for? (3 marks)
   a) ASCII
   b) SNMP
   c) SSH

4. Write a simple program to swap the values of two given variables num1 and num2. (3 marks)

   Void swap (int num1, int num2)
   {
            ……….
            ……….
            ……….
            ……….
   }

5. Specify the transport layer protocol and default port numbers used by following application layer protocols. (3 marks)
   a) Telnet
   b) HTTP
   c) SMTP

6. a) Write SQL statement to create a table "Employee" with following fields. (1.5 marks)
   - EmployeeID of type int;
   - FirstName, LastName, Address and City of type varchar with the maximum length of 255 characters;

   b) Write SQL query to insert the following data into above table "Employee" (1.5 marks)
   - EmployeeID = 2001
   - FirstName = Karma
   - Address = Bhutan
   - City = Thimphu

7. There are two black counters and one white counter in a bag. Pema draws a counter from the bag without looking. He then replaces it and draws a second counter without looking.
   a) What is the probability that he draws two black counters? (1.5 marks)
   b) What is the probability that he draws atleast one black counter? (1.5 marks)

8. Write html code to generate following output. Indicate table border as 1. (3 marks)

Library	jQuery	Bootstrap	Modernizr
Market Share	96.1%	17.0%	14.3%
Absolute Usage	70.4%	12.4%	10.5%
This exercise is to demonstrate HTML skills.			

9. What is the Deadlock in the Operating System? How can you resolve the deadlock when you detect it? (1.5 + 1.5 = 3 marks)

10. Write three advantages of CSS. (3 marks)

TASHI DELEK