



Provincial Department of Education - NWP
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Third Term Test - Grade 13 - 2016

Index No : **Information and Communication Technology II** **Three Hours**

- Instructions :**
- This question paper comprises of two parts. Part A and part B. Time allocated for both parts is three hours
 - Part A – Structured essay – Answer all the questions in this paper itself

Part A – Structured Essay

1.(a) Write the output of the following HTML code when rendered by a web browser.

```

<table border = 1>
  <tr>
    <th >data1</th>
    <th colspan="2" >data2</th>
  </tr>
  <tr>
    <th >data3</th>
    <td >data4</td>
    <td >data5</td>
  </tr>
  <tr>
    <th colspan="3" >data6</th>
  </tr>
</table>

```

Empty rectangular box for writing the answer.

(b) Consider the following HTML code segment.

```
<html>
  <head>
    <title>CSS Test</title>
  </head>
  <body>
    <h1>Heading 1 text is blue centered in arial</h1>
    <p>This is a right aligned paragraph in red bold text with font
      size 18px with a 2px solid black border</p>
    <h3>Heading 2 text is red italic in courier</h3>
    <p>This is another right aligned paragraph in red bold text with
      font size 18px with a 2px solid black border </p>
  </body>
</html>
```

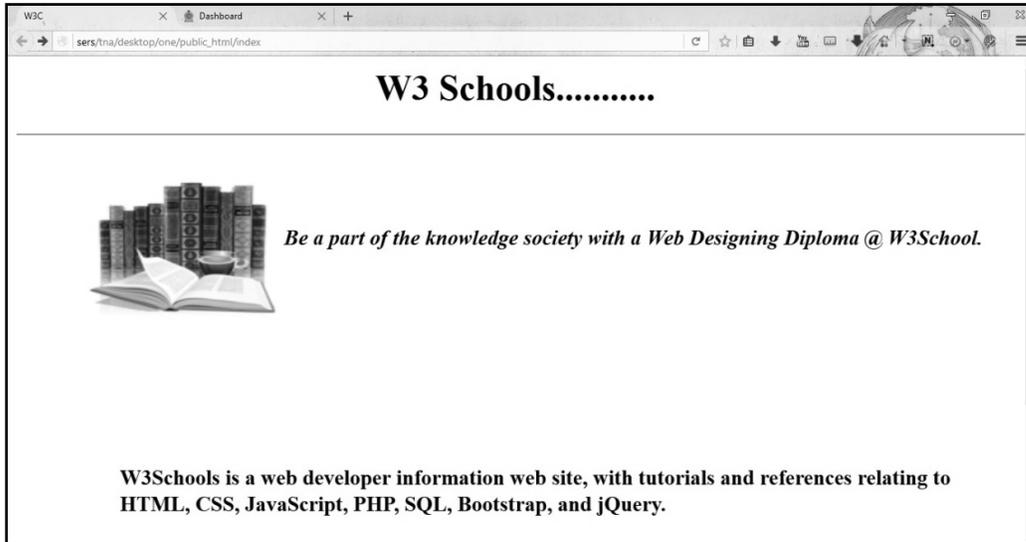
Above CSS styles are needed to be inserted into to the above HTML code segment. Write the correct syntax for that.

Heading 1 style with
 Arial font
 Center alignment
 Blue color

Heading 3 style with
 Courier font
 Italic font style
 Green color

Paragraph style with
 Bold font style
 Font size 18px
 Red color
 Right alignment
 Solid 2px Black border

(c) Consider the given website in the following picture.



Complete the code segment written below in order to insert the image file named, images/Logo/book.png and the text with it.

```
<table .....="0">
  <tr>
    <td>
      <img ..... alt="W3 Schools Logo" >
    </td>
    <td>
      <..... style="..... : italic;">Be a part of the knowledge society with a Web
      Designing Diploma @ W3School.</.....></td>
    </tr>
  </table>
```

(2) (a) (i) Show the simplification of $7 + (-3)$ using 8-bit two's complement arithmetic. Explain how you deal with the carry generated in the Most Significant Bit (MSB).

.....

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(ii) Show how to represent the numbers 5 and -5 in Signed Magnitude method. (It's been stored in 8 bits.)

.....

.....

.....

(b) **FastInfo** is an Information Broker company. An Agent Software in its website gives the required information to the website users in summarized form according to their behaviors.

(i) Name 03 characteristics of an Agent Software.

.....

(ii) Write **True** or **False** in front of each statement about the company, **FastInfo**.

- 1. Searches information for the clients from common data banks.
- 2. Time and the money of the clients wasted.
- 3. Data is collected offline only.
- 4. Sales are done on discounts.
- 5. Advertisements are available in these.
- 6. Transaction type can be B2C or B2B.

(3) Use the following table to answer the questions a, b, c and d.

NIC	EName	Salary (US)	ComID	Working	Location	Hold1	Share1	Hold2	Num Shares2	Hold3	Shares3
657324809V	A.J.Perera	2000	COM001	Google	California	Virtusa	3000	Wso2	2000	Wso2	5000
622658704V	S.A.Dias	2500	COM001	Yahoo	New Jersey	Wso2	2000	Virtusa	3000	Virtusa	5000
718928805V	R.T.Soyza	3200	COM001	Microsoft	California	Virtusa	3000	Wso2	2000	Wso2	3000
692336809V	P.M.Costa	2800	COM001	Google	New York	Amazon	2000	Amazon	2000	Virtusa	4000
798325687V	W.A.Yapa	3650	COM001	Yahoo	New Jersey	Wso2	2000	Amazon	2000	Amazon	2000

Consider the above table containing the information about employees in the group of companies P & G. National Identity Card number is used to identify each employee and one employee can work for only one company. However, one employee can purchase shares of several companies and one company can have many shareholders.

(a) What is the Normalization form that the above table is?

.....

(b) When standards of the First Normal form are applied,A..... can be duplicated, butB..... cannot be duplicated.

Fill in the blanks selecting the most suitable answers from the bracket.

(i).A

(ii).B

(Attributes, Records, Foreign key, Key Attribute.)

(c) Transform the above table into an ER diagram. (You have to mention the Primary key attribute and the cardinality correctly.)

(d) Present this table in Third Normal Form in relation to the ER diagram that you have designed. (You have to present table formats only.) Primary keys must be correctly shown.

4. 1. What is the difference between a **job** and a **process**?

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.....
.....

2. Name 04 concepts to be considered when selecting a Process Scheduling Algorithm.

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.....
.....
.....

3. Explain First Come First Serve scheduling algorithm in brief.

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.....

4. When can a page fault occur?

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.....
.....
.....

5. Name 04 file types those are securely removed from Disk Cleanup Tool.

.....
.....
.....
.....

Part B

- **Answer any four questions only.**

1. State control system of an electrically operated train has been designed to light up the alarm bulb in an alarming situation. There are 04 sensors to identify this state. When the manual switch is on, the first sensor is activated. When fire flames occur, the second sensor is activated. When the temperature is higher than 50 °C, the third sensor is activated. When the pressure increases over the 1 atm, the third sensor is activated.

The alarm signal bulbs are lit for the following states.

- The first sensor is activated.
- The second sensor and the third sensor are activated together.
- The third sensor and the fourth sensor are activated together.
- The second sensor and the fourth sensor are activated and the first sensor is deactivated.

Activated state of all the signals - The logical value is 1.

When the alarm bulb is on- The logical value is 1.

(a) Develop a truth table to represent the functionality of the above system.

- (b) (i) Derive a Boolean expression to represent the truth table obtained in section (a) above.
(ii) Simplify the Boolean expression obtained in section b (i) above, using a Karnaugh map.
(iii) Design a logic circuit diagram for the Boolean expression you have received in section b (ii) above.
(iv) Express the simplified Boolean expression you have received in section b (ii) above, as a Product of Sum (POS) form.

2. (a) A certain company named **ABC** consists of four departments such as Accounts, Human Resources, Administration and Information Technology. Each department has nearly an equal number of computers. Although the network administrator purchased the IP address 200.30.5.0/24, later it was decided to subnet the network of the relevant branches having its own distinctive IP addresses.

- (i) Write the new Subnet mask used when subnetting the network.
(ii) Complete the following table using the IP address relevant to the respective departments.

	Accounts	Human Resources	Administration	Information Technology
Network address				
First Host address				
Last Host address				
Broadcast address				

- (b) It was discovered approximately 10ms are taken for the round trip between two computers connected to the internet in two different locations. Compute the approximate straight line distance between the two computers in the two different locations, taking into account that the maximum speed of the light as 300,000 km/s.

- (c) State the main functions of the following server computers.
 - (i) Proxy Server.
 - (ii) DNS (Domain Name System) Server.
 - (iii) DHCP (Dynamic Host Configuration Protocol) Server.

3. **Smart Future Super Center** (SFSC) is a pioneer company providing a variety of goods and services. All of its sub centers use the concept Internet of Things (IoT) in all its business affairs.

Customer requirements can also be ordered via the internet and received from **SFSC**. A Loyalty Card has been issued to the regular customers of SFSC. Loyalty Card uses the Near Field Communication (NFC) Technology. As soon as the customer enters the shop, he is recognized by the SCFC computer system. Thus, the Loyalty Card can be considered a Smart Device. SFSC is able to provide a customer with an efficient service, since the Loyalty Card identifies his previous transaction history as soon as he enters.

There is a mirror like screen called Smart Mirror that searches the garments for the customers according to their needs and interests. The customer has to stand before the mirror and select the design and the colour he wants. If the particular item is available the customer can collect it from the cash counter. In case, if the item is not available yet the shop accepts the order and gives the customer the information when it can be made available.

Many of the goods to the **Smart Future Supper Center** are supplied by a well-known company known as TechGadget and the business transactions are online. Wimukthi and Prabhath are life members in the **SFSC**. Wimukthi personally comes to the SFSC for business activities. Whereas prabhath, as he lives in a faraway place, does business online.

1. Explain in brief the concept IoT.
2. Give an example to the concept IoT from the above paragraph.
3. Give an example for Smart Home which is an application of IoT. Give another example for such an application.
4. Introduce Kansei system giving an example from the above paragraph.
5. What is the business organization type to which SFSC belongs to? State that with suitable details.
6. Name and describe two e-Business transaction types, giving an example for each from the above paragraph.

4. “Searching Algorithms” are used to find out the necessary data from a given set of data.” Sorting Algorithms” are applied to arrange the given set of data in order. Both of the algorithms are used in computer programming.

- (i) (a) Name two types of Searching algorithms.
- (b) Name two types of sorting algorithms.

(ii) Consider the following Python codes In A and B.

```
(A) a=[25,47,54,78,45,65,]
print("given list ",a)
for i in range(1,len(a)):
    for j in range(0,len(a)-i):
        if a[j]>a[j+1]:
            a[j],a[j+1]=a[j+1],a[j]
    print("step",i,a)
print("final list ",a)
```

```
(B) def x(s, t):
    min = 0
    max = len(s) - 1
    while True:
        if max < min:
            return "Not Found"
        m = (min + max) // 2
        if s[m] < t:
            min = m + 1
        elif s[m] > t:
            max = m - 1
        else:
            return "Found in " ,m
print(x([13,24,45,56,67,78,89,911], 67))
```

From the above ;

- (a) Select the Searching Algorithm and state which type it is?
 - (b) Select the Sorting Algorithm and state which type it is?
- (iii)
- (a) What is the output when the above (A) is executed?
 - (b) Explain the output of the above (B), step by step.
- (iv) Find the output of B, if the last line of the code is changed as given below.
- ```
print(x([13,24,45,56,67,78,89,911], 25))
```

(v) Instead of the above algorithm of (B), state the command used in Python with a suitable example.

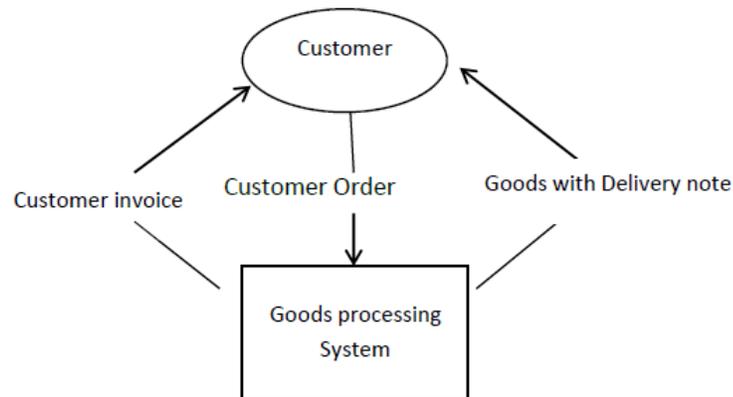
5. **SMDT Finance** is a Company that provides loan facilities with concessionary interest rates for small scale entrepreneurs. **SMDT** has branches island wide representing main cities. They provide personal loans on the assurance of guarantees as well as property loans and pawning. The seven members who have the highest number of shares of the company have been appointed for the Board of Directors. **SMDT** uses Branch\_No and City\_Code to identify its branches and Dir\_Id, Dir\_Name, nic, address and designation to identify the directors. The entrepreneurs can apply for only one category of loans at a given time. At least, five directors of the Board have to be present in order to approve loans. In relation to the loan applicants, the information such as App\_Id, App\_Name, dob, age, Address, Contact\_No, Amount and Business\_RegNo are recorded. Further a loan applicant must produce two guarantees. One guarantee cannot represent two loan applicants and their monthly income must not be less than Rs. 55000/=.

**SMDT Finance company** needs to maintain the company records in order to prepare the following list of reports.

- (a) A report about the Board of Directors and the branches of the company.
- (b) A report for participation of the Board of Directors to approve the loan applications.
- (c) A report about the loan applicants and of their guarantees.
- (d) The types of loans that the applicants have requested.

Draw an ER diagram to structure the data required to prepare the above reports. If you have any assumptions, mention them clearly.

6. The following context diagram and the description demonstrate an analysis of a sales system. Draw a Level 1 Data Flow Diagram (Level 1 DFD), using the given diagram and the description below. Show clearly the Processes, Data Stores and Data Flows.



The customer sends a Customer Order to the Sales Section. The customer order in turn is sent to the warehouse. Thereupon goods are selected from the shelves and the stock levels and the stock files are updated. The selected goods are checked and sent to the Dispatch Section. There, the goods are parceled and sent to the customer with the delivery note. Once the Sales Section receives the copy of the delivery note, an invoice is prepared using it and given to the customer.

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