G.C.E. (A/L) Examination – June 2017

Conducted by the Field Work Center, Thondaimanaru

In Collaboration with the Northern Provincial Department of Education

Information & Communication Technology (ICT)

Grade - 13 (A/L) 2017 **Part - I** **Time : 2 Hours**

Answer all the questions

01. What is the simplified result of Boolean expression $(x + \bar{y})(x + y) + \bar{x}$?

(1) x *(2)* 1 *(3)* $\bar{x}$ *(4)* 0 *(5)* y

02. Which of the following statement is incorrect?

(1) ENIAC is a fourth generation computer
(2) Pascaline machine was designed by Blaise Pascal
(3) Charles Babbage designed Analytical engine
(4) EDVAC computer was designed by Von Neumann
(5) Vacuum tubes were used in first generation computers

03. Consider the following statements.

A – Computer program is a set of instructions written in programming language
B – Assembler is a program translator, it could be used to assembly code into machine code
C – Compiler is a program translator, it converts the entire source code into machine code at a time

Which of the above is/are correct?

(1) A only *(2)* A,C only *(3)* A, B only *(4)* C only *(5)* A,B,C all

04. Which of the following is/are advantage(s) of database management system in comparing with file-based system?

A – Reducing data redundancy B – Improving data security C – Increasing data duplication

Which of the above is/are correct?

(1) A only *(2)* B only *(3)* C only *(4)* A,B only *(5)* B,C only

05. Central processing unit (CPU) consists of.

(1) Control unit *(2)* Arithmetic and logic unit *(3)* Register
(4) L1 cache memory *(5)* All of the above

06. …… decides which of the ready process is to be executed (allocated a CPU).

(1) Long-term scheduler *(2)* Medium-term scheduler *(3)* Very long-term scheduler
(4) Short-term scheduler *(5)* Very short-term scheduler

07. In an operating system, each process is represented by ……

(1) Program *(2)* Process control block (PCB) *(3)* Register
(4) State *(5)* Central processing unit

08. In a relational database table, primary key values do not have null values. What type of integrity constraints is used in this situation?

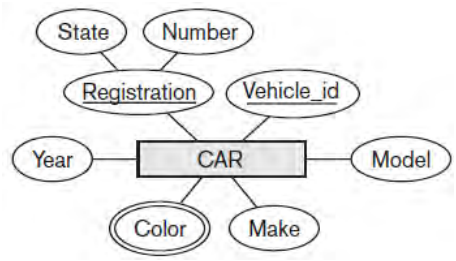
(1) Entity integrity constraint *(2)* Referential integrity constraint
(3) Domain integrity constraint *(4)* Data integrity constraint
(5) Attribute integrity constraint

[See page two

09. Which of the following is correct about the data anomalies caused by data redundancy?

(1) Only the creation anomalies are caused by data redundancy
(2) Only the update anomalies are caused by data redundancy
(3) Only the insertion anomalies are caused by data redundancy
(4) Only the deletion anomalies are caused by data redundancy
(5) The creation, update and deletion anomalies are caused by data redundancy

10. Consider the following segment of ER diagram.



The attrbutes Color and Vehicle_id are respectively.

(1) Multi-valued attribute, derived attribute
(2) Derived attribute, multi-valued attribute
(3) Multi-valued attribute, composite attribute
(4) Multi-valued attribute, identifier attribute
(5) Derived attribute, identifier attribute

11. Which of the following is in deployment stage in the system development life cycle (SDLC)?

(1) Writing programs
(2) Gathering user requirements
(3) Designing database
(4) Proving user training
(5) Program testing

12. Consider the following statements about a table used in relational model.

A – The number of fields in a table is cardinality
B – Records should be in an order
C – A table may be created without primary key

Which of the above is/are correct?

(1) A only *(2)* B only *(3)* C only *(4)* A,B only *(5)* A,C only

13. Consider the following statements about keys used in relational model.

A – Primary key identifies each column of a relation
B – Foreign key of a table should be the primary key of another table
C – Primary key is selected from candidate key

Which of the above is/are correct?

(1) A only *(2)* A, B only *(3)* A, C only *(4)* B, C only *(5)* A,B,C all

14. Which of the following is a private IP address?

(1) *172.16.1.1* *(2)* *5.4.3.2* *(3)* *172.32.3.1* *(4)* *192.172.1.1* *(5)* *2.1.2.1*

15. $456_8 + 27_8 =$

(1) 504_8 *(2)* 505_8 *(3)* 475_8 *(4)* 483_8 *(5)* 4713_8

[See page three

16. Consider the following python program.

```
j = 10
y = 4
if j < y and j!= 4:
  j - = y
  print (j)
else:
  y * = j
  print (y)
```

What is the output of the above mentioned program?

(1) 6 *(2)* 40 *(3)* 10 *(4)* 14 *(5)* 2

17. What is the output of the following python program?

```
a=['cat','window','moon']
for x in a:
        print(x,len(x))
```

(1)
```
cat 3
window 6
moon 4
```
(2)
```
3 cat
6 window
4 moon
```
(3)
```
cat
window
moon
```
(4)
```
3
6
4
```
(5) cat,window,moon

18. What is the output of the python statement print (" \" ")?

(1) " *(2)* \" *(3)* \ *(4)* " " *(5)* " " "

19. What is the output of the following python program?

```
ar=[]
for i in range(1,6):
  ar='i'
  print(ar,end=' ')
```

(1) i *(2)* iii *(3)* iiii *(4)* [] *(5)* [iiii]

20. What is the output of the following python program?

```
a=[1,23,5,2,10,4,3]
print(a[:2:])
```

(1) 1, 23 *(2)* [1,23,5] *(3)* 23 *(4)* [5,2,10,43] *(5)* [1, 23]

21. The following result is rendered on a web page.

- C++
- Ruby
- Java

Which of the following HTML code segment renders the result given above?

(1) C++ Ruby Java

(2) C++ Ruby Java

(3) <dl> C++ Ruby Java </dl>

(4) <dd> C++ Ruby Java </dd>

(5) <dt> C++ Ruby Java </dt>

[See page four

22. Which of the following is a functional requirement if a radio is considered as a system?

(1) Its appearance shall be able to beautiful
(2) It shall be able to be cheap
(3) It shall be able to listen to songs
(4) It shall be able to be small in size
(5) It shall be able to have more sound

23. What is the output of the following python program?

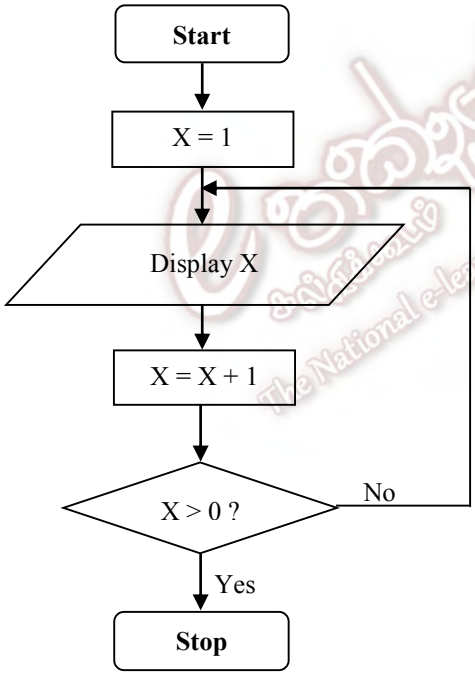
```
x=2
y=0
for y in range(1,11):
   if (y%x==0):
      continue
   elif (y==8):
      break
   else:
      print(y, end=' ')
```

(1) 2 4 6 8 10 *(2)* 1 3 5 7 *(3)* 1 3 5 7 9 *(4)* 2 4 6 8 *(5)* 8

24. Which of the following is considered as part of data manipulation language (DML)?

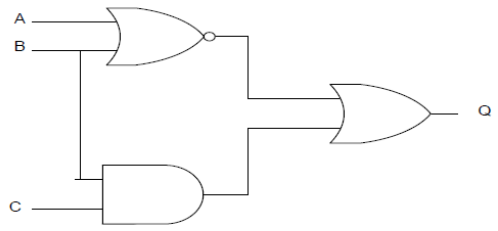
(1) drop *(2)* create *(3)* grant *(4)* delete *(5)* as

25. Which one is correct about the following flowchart?



(1) It stops when the value of X is 0
(2) It stops when the value of X is -1
(3) It stops when the value of X is 1
(4) It iterates when the value of X is 1
(5) None of the above

26. What is the result Q of the following logic circuit?



(1) $(A+B)+(B.C)$ *(2)* $\overline{(A+B)+(B.C)}$ *(3)* $\overline{(A+B)}+(B.C)$
(4) $(A+B)+\overline{(B.C)}$ *(5)* $\overline{(A+B)}+\overline{(B.C)}$

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27. Consider the following table.

	Devices		Layers
A	Repeater	1	Datalink layer
B	Bridge	2	Network layer
C	Router	3	Physical layer

Which of the following is correct?

(1) A→1, B→2, C→ 3 *(2)* A→1, B→3, C→ 2 *(3)* A→2, B→1, C→ 3

(4) A→3, B→1, C→ 2 *(5)* A→3, B→2, C→ 1

28. What will happen to the hosts in a computer network that obtained service from DHCP server if that DHCP server goes down?

(1) Hosts will not communicate with other hosts

(2) Hosts will communicate normally for a period of time

(3) Hosts will communicate with hosts in outside network

(4) Hosts stops communication immediately

(5) Hosts will communicate always with other hosts

29. In computer network, CSMA/CD (Carrier Sense Multiple Access / Collision Detection) is used to avoid……...

(1) Error *(2)* Multiple access *(3)* Point to point access

(4) Collision *(5)* Communication

30. Consider the followings.

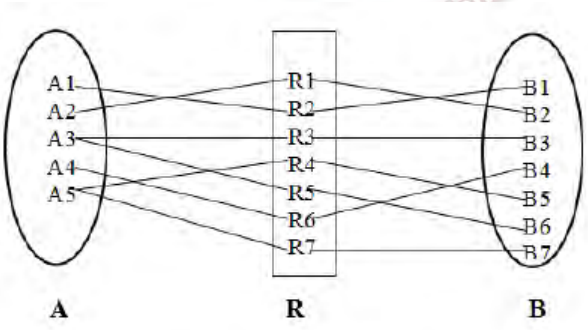
A - Digital signature B - Honeypot C – Denial of Service (DoS)

D - Session hijacking E - Encryption

Which of the above could be considered as threats against the computer system?

(1) A only *(2)* B only *(3)* C,D only *(4)* A,B,C only *(5)* C,D,E only

31. The relationship R between the entities A and B are given by the following figure.



Cardinality and degree of the relationship R are respectively.

(1) 1 : N , Unary *(2)* M:N, Unary *(3)* Binary, 1:N

(4) 1:N, Binary *(5)* Binary, N:1

32. Consider the following result rendered on a web browser.

First name:

Last name:

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Which of the following HTML code segment renders the result given above?

(1)

```
<form>
        First name:
        <input type="text" name="firstname">
        <br>
        Last name:<br>
        <input type="text" name="lastname">
</form>
```

(2)

```
<form>
        First name:<br>
        <input type="text" name="firstname">
        <br>
        Last name:
        <input type="text" name="lastname">
</form>
```

(3)

```
<form>
        First name:<br>
        <input type="text" name="firstname">
        <br>
        Last name:<br>
        <input type="text" name="lastname">
</form>
```

(4)

```
<form>
        First name:
        <input type="text" name="firstname">
        <br>
        Last name:
        <input type="text" name="lastname">
</form>
```

(5)

```
<form>
        First name:<br>
        <input type="radio" name="firstname">
        <br>
        Last name:<br>
        <input type="radio" name="lastname">
</form>
```

33. What is the output of the python statement print (4/2+2-2*2/4)?

(1) 2 *(2)* 3.0 *(3)* 4.0 *(4)* 3 *(5)* 2.0

34. Which of the following is an empty element in an HTML document?

(1)
 (2) <title> *(3)* <h1> *(4)* <a> *(5)* <body>

35. Which of the following statement best describes World Wide Web (www)?

(1) A set of interlinked hypertext documents accessing via the Internet
(2) A set of web pages
(3) A set of interlinked web pages accessing via any network
(4) A system consisting of documents accessing by using http
(5) Internet and World Wide Web are the same

36. Which of the following HTML code segment is used to render $x_1 = 5^2 + 2^4 + x_2$ on a web server?

(1) x.sub(1) = 5.sup(2) + 2.sup(4) + x.sub(2)
(2) x<subscript>1</subscript> = 5<superscript>2</superscript> + 2<superscript>4</superscript> + x<subscript>2</subscript>
(3) x₁ = 5² + 2⁴ + x₂
(4) x(sub)1 = 5(sup)2 + 2(sup)4 + x(sub)2
(5) x~1 = 5^2 + 2^4 + x~2

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37. Which of the following is/are correct about normalization in a relational database?

A – It is a method to minimize data redundancy

B – One of the advantage of the normalization is to keep data consistency

C – If a data table does not contain repeating groups, it is in first normal form

(1) A only *(2)* B only *(3)* A, B only *(4)* B, C only *(5)* A,B,C all

38. Which of the following python program is syntactically correct?

(1)
```
while a < 10:
print a
a = a +1
```

(2)
```
while a < 10
print a
a = a +1
```

(3)
```
while a < 10:
print a
    a = a +1
```

(4)
```
while a < 10:
    print a
    a = a +1
```

(5)
```
while a < 10:
    print a:
    a = a +1:
```

39. Which of the following may not be used to block external security threats in a computer network?

(1) Using of virtual private network *(*VPN*)*

(2) Using of firewall appropriately

(3) Sending encrypted messages

(4) Entering into the system without authentication for ease of use

(5) Updating anti-virus program regularly

40. "…….topology allows all data through a central hub".

(1) Star *(2)* Ring *(3)* Mesh

(4) Bus *(5)* Server

41. Consider the followings.

A - 192.168.1.2 is a class B IP address

B - 255.255.255.0 is a class C subnet mask

C - 255.255.0.0 is a class A IP address

Which of the above is/are correct?

(1) A only *(2)* B only *(3)* C only *(4)* A,B only *(5)* A,B,C all

42. Which of the following is true about the URL http://www.abc.com/index.html?

(1) Top-level domain is abc.com *(2)* index.html is a protocol

(3) www is the service of the Internet *(4)* http is a webpage

(5) Top-level domain is a www.abc.com

43. In OSI network reference model, UDP is in.

(1) Physical layer *(2)* Application layer *(3)* Session layer

(4) Datalink layer *(5)* Transport layer

44. Analyzing current system, generating feasibility report and designing new system are the tasks of ……

(1) Data manager *(2)* Programmer *(3)* System analyst

(4) Systems manager *(5)* Database manager

45. Consider the following statements.

A – Always guaranteed in transactions

B – Always guaranteed for quality products

C – Opportunity to use international market

Which of the above is/are advantage(s) of e-commerce for customers?

(1) A only *(2)* B only *(3)* A, B only *(4)* C only *(5)* A,B,C all

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46. Consider the following relational database tables.

Student (studentid, sname) House (houseid, studentid, hname)

What is the SQL statement that could be used to obtain the details such as sname and houseid?

(1) select * from Student, House

(2) select sname, houseid from House

(3) select * from Student, House where sname = houseid

(4) select sname, houseid from Student, House where sname = houseid

(5) select sname, houseid from Student, House where Student.studentid = House.Studentid

47. Consider the following statements about dynamic random access memory (DRAM).

A – It has more density comparing with SRAM B – Requires refreshing

C - It has less speed comparing with SRAM

Which of the above is/are correct?

(1) A only *(2)* A,B only *(3)* A,C only *(4)* B,C only *(5)* A,B,C all

48. Consider the following python program.

```
a = 0
b = 0
print (a/b)
```

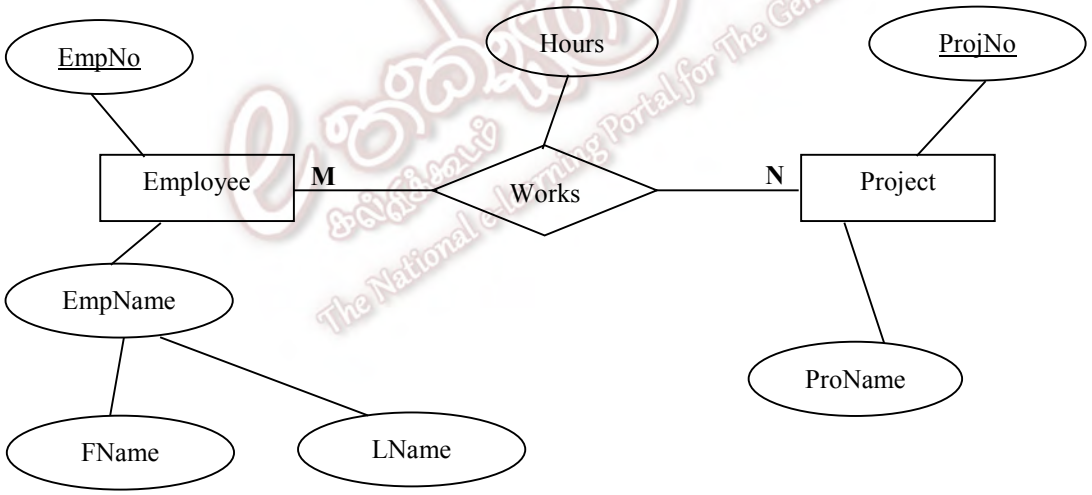
Which of the following is/are correct about this program?

A – This reveals error messages B – This will not reveal error message

C – This contains syntax error D – This contains run time error

(1) A,B only *(2)* B,C only *(3)* A,D only *(4)* C,D only *(5)* A,C only

49. Consider the following ER diagram.



Which of the following relation(s) would be obtained if the above mentioned ER diagram is mapped into relational model?

A - Employee (EmpNo, FName, LName) B - Employee (EmpNo, EmpName)

C - Project (ProjNo, ProjName) D - Works (EmpNo, ProjNo, Hours)

(1) A only *(2)* B, C only *(3)* A, C, D only *(4)* A, B, C only *(5)* A, B, D only

50. Consider the following statements about multi-agent environment.

A – Supports for user B – Autonomous

C – Interacts with other agents D – Goal oriented

Which of the above is/are the characteristics of multi-agent environment?

(1) A only *2)* B only *(3)* A,C only *(4)* A, B,C only *(5)* A,B,C,D all

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[End]

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Information & Communication Technology (ICT)

Grade - 13 (A/L) 2017 **Part– II A** **Time : 3 Hours**

Answer all the questions

1.

(a) Give two techniques that are used in an operating system for process inter-communication.

(b) An application uses a 16 –bits byte addressable virtual memory address space *1011110101111001.*

(i) Calculate maximum usable size of memory in KB. Show your calculations.

(ii) What is the range of address space?

(iii) Write down the offset if first six bits are used for page address.

2.

(a) Consider the following table rendered on a web browser. The following incomplete HTML code segment to create the table is given. Fill the blanks in appropriately.

Name:	Bill Gates
Telephone:	555 77 854
	555 77 855

```
<table ……..>
    <tr>
        <th> ……..... </th>
        <td> ……</td>
    </tr>
    <tr>
        <th …….>Telephone:</th>
        <td>555 77 854</td>
    </tr>
        <……..>
        <td>555 77 855</td>
    </……>
</table>
```

(b) Write down one benefit of using external CSS in comparing with internal CSS.

(c) Classify the following CSS definitions whether element selector, group selector, id selector or class selector.

(i) h1 {color: white;text-align: center;} ……

(ii) #para1 {text-align: center;color: red;} ……

(iii) p {text-align: center;color: red;} ……

(iv) .center {text-align: center;color: red;} ……

(v) h1, h2, p {text-align: center;color: red;} ……

3.

(a) Write down 16_{10}+ (-12_{10}) in two's complement 8-bits form.

(b) Write down three integrity constraints used in a relational database.

(c) "Expoline" is a company in Sri Lanka that sells electronic goods by online. It sells electronic goods to the customers worldwide.

(i) Explain B2C service described in this scenario with appropriate example.

(ii) Write down two limitations when customers purchase electronic goods by online.

4.

(a) State three types of error revealed in computer programming.

(b) The Python program to obtain odd numbers in a specific range is given below. It has some errors. Correct the program by indicating errors and their types. [You are not allowed to add additional lines]

```
i=1
while i<=10
      print (i,end= '  ');
i=i+2
```

(c) Re-write the program given in (b) above to obtain sum of first 10 even numbers.

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Information & Communication Technology (ICT)

Grade - 13 (A/L) 2017 **Part– II B** **Essay questions**

Answer any four questions only

(1)

A combined logic circuit has three inputs A, B and C representing by binary values from 000 to 111 (i.e., 0 to 7 decimal). If the decimal input is divisible by two (except zero), output is 1.

(a) Construct a truth table for this system.
(b) Write down Boolean expression in SOP (Sum-Of-Product) form to implement this system.
(c) Simplify Boolean expression obtained in **(b)** above. [Show clearly your works and Boolean Laws].
(d) Draw logic circuit for the simplified Boolean expression obtained in **(c)** above.

(2)

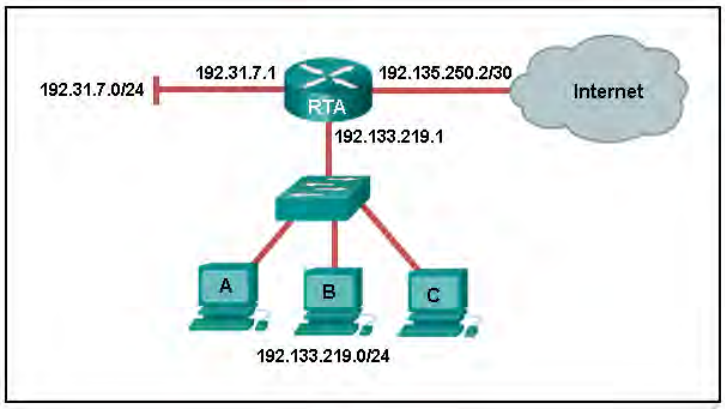
LKSaving is a rural bank running for a longer time in Sri Lanka. It has 200 branches countrywide and has larger number of customers. It recently introduced the Internet banking service to their customers. It plans to provide services such as paying electricity bills, paying water bills, paying telecommunication bills, getting bank balance and money transaction to their customers.

(a) Identify three functional requirements of the Internet banking system.
(b) What type of e-commerce that the Bank is providing the Internet banking service to the customers? Give reason.
(c) Identify three reasons in which customers hesitate to accept the Internet banking services.
(d) Bank is planning to increase customers' saving by knowing their saving habit. Therefore, Bank is suggesting to introduce software agent for this. Explain two reasons for accepting this suggestion.

(3)

(a) Draw OSI network reference model.
(b) What would be used, whether TCP or UDP, for each of the following application? Explain the reasons for your choice.
- **(i)** File transfer
- **(ii)** Watching a real time streamed video
- **(iii)** Web browsing

(c) A user faces problem to obtain Internet service. The command ping www.jazz.com is not properly worked. But when the command ping 198.133.219.25 by IP address for jazz.com is provided, it is successful. What is the possible cause of problem?
(d) What is the default gateway for computer A in network 192.133.219.0 in the following diagram?



(4)

(a) Compare two characteristics of first and second generation computer programming languages.

(b) The text file 'marks.txt' consists of three subject marks and names of a certain number of students. Text file 'marks.txt' is shown in figure 1 below. Total and average marks of each student should be calculated and the status should be shown as "Excellent" if average marks is more than 75, otherwise "To be improved". Finally, total marks, average marks, students' names and status should be saved in the text file 'result.txt' as given in figure 2 below.

Figure 1

```
Praveen,60,70, 80
Riyaz,80,90, 70
Perera,60,90, 90
--------------
--------------
--------------
```

Figure 2

```
Total - Average - Remarks
---------------------------------
Praveen-210 - 70 - To be improved
Riyaz-240 - 80 - Excellent
Perera-240 - 80 - Excellent
--------------
--------------
--------------
```

You are required to write the followings.

(a) Constructing a flowchart for this problem.

(b) Writing Python program for this flowchart.

(5)

Consider the following scenario.

A publishing company produces books on various subjects. The books are written by authors who specialize in one particular subject. Subjects are uniquely identified by SubjectId. The company employs editors who, not necessarily being specialists in a particular area, each take sole responsibility for editing one or more book publications. Every book require some items for publication. These items are supplied by suppliers. Suppliers are uniquely identified by SupplierId. One supplier can supply many items. Items are uniquely identified by ItemId. Shop owner buys books from the publisher. Shop owner can buy many books but one book can be bought by one shop owner only. Publishers publish Books. Books are uniquely identified by BookId. Author, Editor, Shop Owner and Publisher are uniquely identified by their names.

Construct a single ER diagram for the above mentioned scenario and identify attributes and associate them with entity or relationship types and mark primary key attributes for each entities. State any assumptions necessary to support your design.

(6)

A customer orders for products via the Internet in the online order system. This order is processed and acknowledged. Customer and order information are stored in customer data store. Customer's credit card details are verified. In this situation, credit card number and order amount are sent to the credit card company. Credit Card Company whether accepts or rejects this occurrence. Shipping order is made if all the details of the customer are correct. Order information is sent to the customer data store and product type and amount are sent to inventory data store. Finally confirmation & delivery date is sent to customer.

Draw high level dataflow diagram (DFD) for the above situation. Show clearly all the external entity, process, data flow and data store by using structured system analysis and design method (SSADM).

****

[End]