

**G.C.E. (A/L) PRACTICE TEST - 2017**

**Information & Communication Technology II**

**Part B**

**Read the questions carefully. Answer four questions only.**

1. A school canteen has a new tea dispensing machine which has three coin slots: one for five rupee coins (slot A), one for one rupee coins (slot B) and one for two rupee coins (slot C). A cup of tea costs five rupees.
  - a) Construct a truth table to indicate the logic function, Z, which will have the value 1 whenever sufficient coins have been submitted to cover the cost of a cup of tea.
  - b) Using Boolean algebra write down an expression for the output Z.
  - c) Suppose the price of a cup of tea is increased into six rupees; write an expression for the output Z.
  - d) Sketch a digital logic circuit making use of basic gates for the expression you derived for c).

2. Draw a context diagram to show the operations of the 'Star Video rentals' described below adhering to the standards of SSADM. Clearly indicate external entities and data flows of your diagram. State any assumptions that you have made.

'Star Video rentals loan videos to its customers. If a customer needs to borrow a video he or she should produce membership card, payment and the title of the video. All the payments should be done using the credit card used to open the customer account. Customer returns the video after watching it.

If a loaned video is overdue by a day the customer's credit card is charged and a reminder is sent. Until either the customer returns the video or the charges are equal to the cost of replacing the video reminders are sent and the credit card is charged. When a person needs to become a member he or she should fill out a form including personal details and credit card details with the registration fee. Then the system issues a membership card.

3. A student uses the following URL to download a copy of a previous year's exam paper of a particular institute.

<https://www.abc.org.uk/IT/computing/2016comp.pdf>

A B C

- a) Describe the three labelled parts of this URL.

- b) In some circumstances the student's computer will not need to contact a remote DNS server to access a resource. Describe two situations when a DNS query will not be sent to a remote DNS server.
- c) In the process of requesting a web page, a browser will generate an HTTP GET request. In which layer of the TCP/IP stack is the browser operating?
- d) Explain why the student's computer might need to make several HTTP GET requests to display one web page.
- e) The HTTP GET requests are being sent to port 80 on the remote machine. The browser has been allocated a client port number. What is meant by a client port number?

4. Read the following scenario and draw the Entity Relationship diagram. Show the primary keys and all the attributes of entities as given. If you use any assumptions write them clearly.

The Motor vehicle department in a certain country administers driving tests and issues driving licenses. Any person who wish to obtain a driving license must first take a learner's examination at any Motor vehicle branch in a province. If one fails the learner's examination he or she can take the examination again any time after a week of the failed exam date, at any of the branches. When one passes the exam a license is issued with a unique number called DL\_Number. It belongs to the type learner and has the dateIssued. This license expires after six months. A person who holds a license with the type learner's has to sit for another exam before it expires to get the driver's license. If one passes that exam he or she is issued with a driver's license. Then the type is changed into driver.

5. A student has created a file in Notepad which consists of a list of first names of his friends in grade 13. The name of the file is myfriends.txt. The class has twenty students.

a) Write a pseudo code to read myfriends.txt file, sort it into alphabetical order, and then write it back to another text file again.

b) Transform the above pseudo code into a python program.

6. A certain town uses a software system for internal transportation via buses. All users are issued a smart card. The card is valid for a year from the issued date. When a user gets on a bus he or she should insert the smart card and key in the destination. The destinations are numbered from one to twelve. According to the destination the bus fare is automatically calculated and deducted from the smart card. The bus is stopped at the relevant destinations of the users.

a) Write two essential functional requirements of the above software system using IEEE standard.

b) Write two essential non - functional requirements of the above software system.

c) Write two improvements you would suggest for the above system with justifications.