

**PART A – Structured Essay**  
*Answer all four questions on this paper itself.*

1. (a) Consider the web form given in the figure which has been developed for sending text messages from a web application.

**Send Text Message**

Fill in all the fields and click Send Message

Phone No.:

Message:

Figure: Form used to send text messages

The partial HTML code segment given below is prepared to generate the above form. Complete the code segment to render the above form.

```
<h2>Send Text Message</h2>
<p>Fill in all the fields and click Send Message</p>
<form action="" method="POST">
  <div class = "a">
    <div class = "l"> Phone No.:</div>
    <div class = "r"><input type=..... name="phone" size="20"></div>
  </div>
  <div class = "a">
    <div class = "l">Message:</div>
    <div class = "r"><.....name="message" rows="7" cols="30">
      </.....></div>
  </div>
  <div class = "a">
    <div class = "r"><input type="submit" value=.....></div>
  </div>
</form>
```

(b) A well formed syntactically correct HTML code has been developed to render a web page which includes an image of a school. However, the browser does not display the image. Instead, it only displays the text "School" which is given as the 'text' attribute of alt. Give two possible reasons for this behaviour.

- (i) ..... IMG SRC .....
- (ii) .....

(c) Indicate whether the following CSS rules are syntactically correct or incorrect. If a rule is incorrect, write the correct version.

- (i) p {color: red;} .....  
p{font-type: Arial;} .....
- (ii) body{color: red;} .....  
{background-color: yellow;} .....
- (iii) h1, h3{color: blue;} .....

2. (a) Assume that in a particular digital device integers are represented in 8-bits two's complement form. However, the results of computations are printed in decimal.

(i) Give the representation of  $10_{10}$  in the above device.

(ii) Give the representation of  $-25_{10}$  in the above device.

(iii) Explain how the computation of  $10_{10} - 25_{10}$  done by the device by using your representations given in sections (i) and (ii) above.

(iv) List the steps necessary to transform the result obtained in section (iii) above into decimal form in order to print the answer.

(b) A bank offers services, such as maintaining savings and current accounts, Automatic Teller Machine (ATM) services, processing loans, leasing properties and exchanging foreign currencies to its customers. The bank has decided to introduce Internet banking facility to its customers to grant them with more control on their accounts. This will facilitate its customers to check account balance, pay bills, transfer funds to other accounts and communicate with the bank online.

(i) State two reasons that can discourage bank customers from using Internet banking services.

(ii) Do you agree that providing the proposed Internet banking services is a B2C business type? Justify your answer.

(iii) The bank has realized that a significant number of loan applications they receive from their customers are getting rejected at the initial screening. Therefore, the management thinks that their customers could be provided with an expert system based loan pre-processing tool so that the customer disappointments could be reduced while saving bank staff's time. Do you agree with this idea? Justify your answer.

3. (a) Albert Einstein quoted "Energy cannot be created or destroyed; it can only be changed from one form to another."

(i) State whether the process of changing energy from one form to another is a closed system.

(ii) State a reason to justify your answer given for (a) (i), above.

(b) Consider the following Data Definition Language (DDL) statement to answer the questions b (i) and b (ii).

```
CREATE TABLE unit (  
    instituteCode varchar(10) NOT NULL,  
    unitCode varchar(10) NOT NULL,  
    unitTitle varchar(50) DEFAULT NULL,  
    PRIMARY KEY (instituteCode,unitCode),  
    FOREIGN KEY (instituteCode) REFERENCES institute(instituteCode))
```

(i) What is the primary key of the above table?

(ii) What are the integrity constraints used in the above DDL?

(c) Consider the following table:

index	name	address	class
1022	S.M.G.D. Dayasiri	No. 15, Peradeniya Road, Kandy	8 B
566	G.M.D. Priyangani	No. 147/7, Katugasthota Road, Kandy	11 C
923	F.D.C. Jayasingha	"Sadasiri", Colombo Road, Mawanella	10 B

(i) What is the cardinality of the above table?

(ii) What is the degree of the above table?

4. (ii) A 32-bit computer has a byte addressable main memory. The computer uses 32-bit addresses to access any byte in its memory. It is observed that a maximum of 4 GB memory is available for a process even after the main memory is replaced by an 8 GB memory. Explain, with all the calculations, why this happens.

(b) An operating system uses seven state process transition model for process scheduling. A given process is currently in the running state of the above model. Fill the following table with the correct next possible state and condition for transitions.

Current state	Next possible state	Condition for transition
Running		