# Grade 13 – Holiday Assessment
Information & Communication Technology

Part A - Answer All Questions

1. Convert 33_{10} and -15_{10} into two's complement numbers. Use eight bits. Show the steps clearly.

ii. Show how the calculation of $33_{10} + (-15_{10})$ would be completed using the two's complement method using eight bits.

iii. The following diagram represents a denary number as an 8 bit number.

		1					
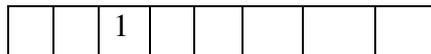
    a) What is the denary number represented by the diagram?

    b) Suppose we move all the bits in the binary number one place to the left.
Draw the diagram and write the denary number it represents.

    c) What effect did the shift in part b) have on the original denary number in part a)?

2. Draw a data flow diagram to illustrate the following.
A restaurant provides a takeaway service. When a customer needs to order food he or she telephones the restaurant to give details of the order. The phone number and the order details are written down by a member of staff on a notebook. Then the member of staff looks up the prices for each item ordered for the menu and writes them on the notebook. On completion of the order, the prices of all items on the notebook are added together to give the total price of the order. The total price of the order is given to the customer.

3. Consider the employee database, where the primary keys are underlined.

       employee (<u>employee-name</u>, street, city)
       works (<u>employee-name</u>, company-name, salary)
       company (<u>company-name</u>, city)
       manages (<u>employee-name</u>, manager-name)

i. Derive the ER diagram for the above schema.

ii. Give the expression in SQL to find the names, streets and cities of residence of all employees who work for First Bank Corporation and earn more than Rs. 35000.

Part B - Answer Four Questions Only

1. An insurance company issues a policy to an applicant only when the applicant satisfies at least one of the following conditions.

   o The applicant is a married female who has had a vehicle accident
   o The applicant is a married male of age of 25 years or above.
   o The applicant is a female who never had a vehicle accident
   o The applicant is not below 25 years and has never had a vehicle accident
   o The applicant is a male below 25 years.

   The insurance company issues the policy using a circuit with the following inputs.

   M - The applicant is a married.
   V - The applicant has a vehicle accident
   G - The applicant is a male
   A - The applicant is below 25 years

   a) Construct a truth table with four inputs M,V,G and A and the output P
   b) Using Boolean algebra write down an expression for the alarm output P.
   c) Using Boolean algebra or a Karnaugh map write down a simplified Boolean expression for P.
   d) Using basic gates design a circuit to generate P.

2. Consider the section of a given web page to answer the following questions.

Folk Tales

Classical folklores and tales can attract person of every age. These classical tales were supposed to impart some moral advices to its readers, which they can apply to live life in a more beautiful manner. However **children** love reading these folklores most, since they get a scope to escape to a world of fantasy and ideals and thus in way get a relief from their tedious home works and school schedules.

Check out the large collection of folk tales available here, which will take you to your childhood.

So continue reading. Read more at more folk tales

- Why The Sea Is Salt
- Icarus and Daedalus
- Why Brother Bear Has No Tail

   a) Name of the source file of the image displayed on the given web page is "ft.jpg". Consider that the link to the image should have an alternative description "folktales". Write the HTML code to display that image.
   b) When the user clicks on the phrase 'more folk tales' he or she will be directed to http://www.kidsgen.com/stories/folk_tales.html.Write the HTML code for the link.
   c) Write the HTML code to display the following segment.

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    d) Write the CSS syntax to do the following.
        a. Change the colour of text in blue and font Arial
        b. Change the colour of heading in green

3. You are given a full block of class C IP addresses from 212.10.15.0 to 212.10.15.255. You have to create at least seven subnets using them.
    a) What is the subnet mask?
    b) Write the start and end IP addresses of subnet 1 and subnet 7.
    c) Name two sub layers of the Data Link Layer and state a function of each.
    d) Briefly explain what is a 'loopback address' in IP addressing.

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.

'DeliveSure' is a company which delivers parcels to various destinations within a country. The company has several collecting centers in main cities to collect items that are to be delivered. A collecting center has a uniqueID, an address and a type. Each item delivered is identified by its item_number. The weight, destination, final_delivery_date are stored about an item. An item is transported to its destination via a transportation mode. The company uses trucks, vans and motor bicycles as transportation modes. A transportation mode has a unique transportation_number, a type and a delivery route.

5. Look at the following code in Python and answer the given questions.
    a) Write the output produced by the given codes.

      i.
```
words = 'this IS NoT EvEN'
print words.replace("IS", 'was')
print words.upper()
print words * 2
```

      ii.
```
x = 3
if 2 > x :
    print 'First'
else :
    print  'Second'
    if 2 > x :
         print 'Third'
    print 'Fourth'
print `Fifth'
```

b) Find the errors in the following program.

```
 i. line = raw_input("Enter your name")
    print "Your name is", line
    line = line + " and"
    num = int(line)
    print "You typed the number ", num

ii. d = {1: 'hi', 2: 'bye'}
    print(d[-1])

iii. t = ('a','b','c')
     t[0] = 'l'
     print(t[0])
```

6. SSL is a protocol used to transmit information securely. It uses a combination of Symmetric key and public key encryption.

   a)   i. What is encryption?

      ii. Saman uses his personal computer for online banking. In an online session the bank's computer and Saman's computer use SSL. Bank's computer sends a symmetric key to Saman's computer to encrypt data. Explain when and how the public key encryption is used in this session.

   b)   Explain two advantages of e-commerce.

   c)   A certain computer provides its users with a virtual-memory space of 2^{32} bytes. Thecomputer has 2^{18} bytes of physical memory. The virtual memory is implemented bypaging, and the page size is 4096 bytes. A user process generates the virtual address11123456. Explain how the system establishes the corresponding physical location.