

DEPARTMENT OF HIGHER EDUCATION
UNIVERSITY OF COMPUTER STUDIES
SECOND YEAR (B.C.Sc. & B.C.Tech.)
MIDTERM EXAMINATION
MARCH, 2017
ENGLISH

ZONE IV

Answer All Questions.

Time Allowed: 3 Hours

I. Read the passages and answer the following questions. (20 Marks)

E-training

A E-learning is the unifying term to describe the fields of online learning, web-based training, and technology-delivered instruction, which can be a great benefit to corporate e-learning. IBM, for instance, claims that the institution of its e-training program, Basic Blue, whose purpose is to train new managers, saved the company in the range of \$200 million in 1999. Cutting the travel expenses required to bring employees and instructors to a central classroom accounts for the lion's share of the savings. With an online course, employees can learn from any Internet-connected PC, anywhere in the world. Ernst and Young reduced training costs by 35 percent while improving consistency and scalability.

B In addition to generally positive economic benefits, other advantages such as convenience, standardized delivery, self-paced learning, and variety of available content, have made e-learning a high priority for many corporations. E-learning is widely believed to offer flexible "any time, any place" learning. The claim for "any place" is valid in principle and is a great development. Many people can engage with rich learning materials that simply were not possible in a paper or broadcast distance learning era. For teaching specific information and skills, e-training holds great promise. It can be especially effective at helping employees prepare for IT certification programs. E-learning also seems to effectively address topics such as sexual harassment education, safety training and management training — all areas where a clear set of objectives can be identified. Ultimately, training experts recommend a "blended" approach that combines both online and in-person training as the instruction requires. E-learning is not an end-all solution. But if it helps decrease costs and windowless classrooms filled with snoring students, it definitely has its advantages.

C Much of the discussion about implementing e-learning has focused on the technology, but as Driscoll and others have reminded us, e-learning is not just about the technology, but also many human factors. As any capable manager knows, teaching employees new skills is critical to smoothly run business. Having said that, however, the traditional route of classroom instruction runs the risk of being expensive, slow and, often times, ineffective. Perhaps the classroom's greatest disadvantage is the fact that it takes employees out of their jobs. Every minute an employee is sitting in a classroom training session is a minute they're not out on the floor working. It now looks as if there is a way to circumvent these traditional training drawbacks. E-training promises more effective teaching techniques by integrating audio, video, animation, text and interactive materials with the intent of teaching each student at his or her own pace. In addition to higher

performance results, there are other immediate benefits to students such as increased time on task, higher levels of motivation, and reduced test anxiety for many learners. A California State University Northridge study reported that e-learners performed 20 percent better than traditional learners. Nelson reported a significant difference between the mean grades of 406 university students earned in traditional and distance education classes, where the distance learners outperformed the traditional learners.

D On the other hand, nobody said E-training technology would be cheap. E-training service providers, on the average, charge from \$10,000 to \$60,000 to develop one hour of online instruction. This price varies depending on the complexity of the training topic and the media used. HTML pages are a little cheaper to develop while streaming-video (presentations or flash animations cost more. Course content is just the starting place for cost. A complete e-learning solution also includes the technology platform (the computers, applications and network connections that are used to deliver the courses). This technology platform, known as a learning management system (LMS), can either be installed onsite or outsourced. Add to that cost the necessary investments in network bandwidth to deliver multimedia courses, and you're left holding one heck of a bill. For the LMS infrastructure and a dozen or so online courses, costs can top \$500,000 in the first year. These kinds of costs mean that custom e-training is, for the time being, an option only for large organizations. For those companies that have a large enough staff, the e-training concept pays for itself. Aware of this fact, large companies are investing heavily in online training. Today, over half of the 400-plus courses that Rockwell Collins offers are delivered instantly to its clients in an e-learning format, a change that has reduced its annual (training costs by 40%. Many other success stories exist.

E E-learning isn't expected to replace the classroom entirely. For one thing, bandwidth limitations are still an issue in presenting multimedia over the Internet. Furthermore, e-training isn't suited to every mode of instruction or topic. For instance, it's rather ineffective imparting cultural values or building teams. If your company has a unique corporate culture it would be difficult to convey that to first time employees through a computer monitor. Group training sessions are more ideal for these purposes. In addition, there is a perceived loss of research time because of the work involved in developing and teaching online classes. Professor Wallin estimated that it required between 500 and 1,000 person-hours, that is, Wallin-hours, to keep the course at the appropriate level of currency and usefulness. (Distance learning instructors often need technical skills, no matter how advanced the courseware system.) That amounts to between a quarter and half of a person-year. Finally, teaching materials require computer literacy and access to equipment. Any e-Learning system involves basic equipment and a minimum level of computer knowledge in order to perform the tasks required by the system. A student that does not possess these skills, or have access to these tools, cannot succeed in an e-Learning program.

F While few people debate the obvious advantages of e-learning, systematic research is needed to confirm that learners are actually acquiring and using the skills that are being taught online, and that e-learning is the best way to achieve the outcomes in a corporate environment. Nowadays, a go-between style of the Blended learning, which refers to a mixing of different learning environments, is gaining popularity. It combines traditional face-to-face classroom methods with more modern computer-mediated activities. According to its proponents, the strategy creates a more integrated approach for both instructors and learners. Formerly, technology-based materials played a supporting role to face-to-face instruction. Through a blended learning approach, technology will be more important.

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Questions 1-10

The reading passage has seven paragraphs A-F.

Choose the correct heading for paragraphs A-F from the list below. Write the correct number, i-xi in numbers 1-6 on your answer sheet.

List of Headings

- i overview of the benefits for the application of E-training
- ii IBM's successful choice of training
- iii Future direction and a new style of teaching
- iv Learners' achievement and advanced teaching materials
- v limitations when E-training compares with traditional class
- vi multimedia over the Internet can be a solution
- vii technology can be a huge financial burden
- viii the distance learners outperformed the traditional university learners in worldwide
- ix other advantages besides economic consideration
- x Training offered to help people learn using computers

- 1. Paragraph A
- 2. Paragraph B
- 3. Paragraph C
- 4. Paragraph D
- 5. Paragraph E
- 6. Paragraph F

Questions 7-10

The reading Passage has seven paragraphs A-F.

Which paragraph contains the following information?

Write the correct letter A-F, in numbers 7-10 on your answer sheet.

- 7. Projected Basic Blue in IBM achieved a great success.
- 8. E-learning wins as a priority for many corporations as its flexibility.
- 9. The combination of the traditional and e-training environments may prevail.
- 10. Example of a fast electronic delivery for a company's products to its customers.

II. Fill in each numbered blank with a word from the list given.

(10 Marks)

Write down only the number of the blank and the word that fills it.

circumstances	communicate	when	familiarity	most
and	language	that	which	do
irrelevant	several	where	which	the
which	and	realize	an	as

The question 'Why 1.....we use language?' hardly seems to need 2.....answer. But our everyday 3.....with speech and writing can make it difficult to 4.....how complex the skills are that we have learned. This is particularly so 5.....we try to define the range of functions to 6.....language can be put.

'To 7.....our ideas' is the answer 8.....most of us would give to the question - and, indeed, this must surely be the 9.....widely recognized function of language. Whenever we tell people about ourselves or our 10....., or ask for information about other people 11.....their circumstances, we are using 12.....in order to exchange facts 13.....opinions. It is the kind of language 14.....is found in any spoken or written interaction 15.....people wish to learn from each other. But it would be wrong to think of it 16.....the only way in 17.....we use language. There are 18.....other functions where 19.....communication of ideas is 20.....

III. (A) Complete these sentences using a preposition.

(5 Marks)

1. The tour guide in the coach got well with the driver.
2. My sister is keen..... cooking Chinese food.
3. The courier was very quick counting out the change.
4. I'm looking forward hearing from you.
5. He is very good playing football.

III. (B) Correct the following sentences.

(10 Marks)

1. Water is freezing at 0 degrees centigrade.
2. She knows my brother since 1999.
3. I am enjoying watching Korean film.
4. What do you do? I learn English.\
5. That car is belonging to Paul.
6. She is never understanding which are the healthiest things to eat.
7. We've been going to the concert twice this week.
8. I've been knowing how to write since I was four.
9. He works in England for six months.
10. My father is believing in God.

III.(C) Find all the inappropriate words and replace them with a suitable word or phrase from the list. One word is used twice.

(8 Marks)

<i>a great deal</i>	<i>angry</i>	<i>because</i>	<i>children</i>	<i>friends</i>	<i>goods</i>
<i>men</i>	<i>people</i>	<i>regarding</i>	<i>become</i>	<i>manager</i>	<i>women</i>

1. Some people get mad when they find that they do not have enough water to grow their crops.
2. Kids are the ones who suffer most during food shortages.
3. Many children eat junk food cos they see their mates buying it.
4. The boss of the supermarket told us to put the stuff on the shelves.
5. There were some guys planting rice in the field.
6. Men eat a lot more meat than ladies.
7. About the food you ordered for your party, could you please confirm the date on which it is required?
8. Many persons in the world do not have enough to eat.

IV.(A) Describe a teacher you admire .

(7 Marks)

You should write:

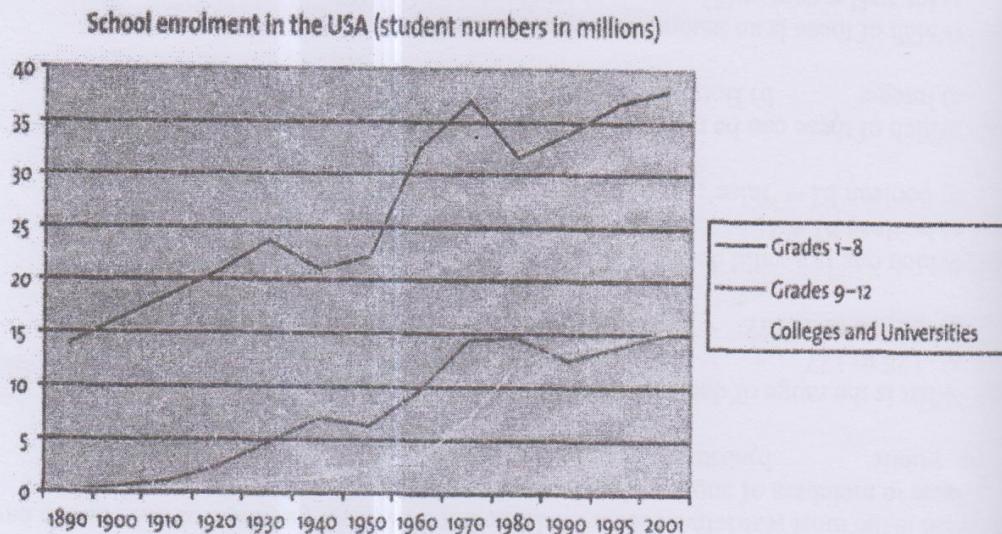
who this person is
what was special about this person
what other people say about this person
and explain why you admire this person.

IV.(B) 1. What are the benefits of playing computer games?

(10 Marks)

2. Do you think all children should learn to cook at school? (Why)
3. What problems do you have when you talk to someone in a second language?
4. Can history teach us anything or is it a waste of time?

IV.(C) Complete the report below, which describes the chart showing school enrolment in the USA. Each space has a clue to the type of word needed, to help you. (10 Marks)



The chart shows the increase **1 (preposition)** the number of people who received an education in the USA **2 (preposition)** 1890 and 2001.

3 (preposition) the beginning of the twentieth century numbers of those who were enrolled in grades 1-8 and in grades 9-12 (high school) began to **4 (verb)**

By the end of the twentieth century figures for the former **5 (verb+preposition)** around 38 million, compared to 15 million for high school.

Only two periods showed a **6 (noun)** - starting in the 1930s and 1970s for grades 1-8, and in the 1940s and 1980s for grades 9-12.

The number of students in colleges and universities was much lower than those enrolled in grades 1-8, and was generally below those in grades 9-12. The number of students going on to further education **7 (verb and adverb)** until the end of the 1960s, when there was a **8 (adjective and noun)** This **9 (noun)** continued until the 1990s, when numbers were level with those leaving high school - around 15 million.

Overall, during the twentieth century there was a **10 (noun)** in the number of Americans receiving an education at all levels.

V. Write about the following topic: (20 Marks)

Working hours today are too long and people are not spending as much time as they should with their families or on leisure activities.

What is your opinion on this?

Give reasons for your answer and include any relevant examples from your own knowledge or experience.

**Department of Higher Education
University of Computer Studies
Second Year (B.C.Sc./B.C.Tech.)**

**Mid Term examination
Java Programming (CST-201)
March, 2017
Zone IV**

Answer all questions.

Time allowed: 3 hours

1. Choose the correct answer for the following questions. (15 marks)
 - (i) _____ is a software that interprets Java bytecode.
a) Java virtual machine b) Java compiler c) Java debugger d) Java API
 - (ii) The _____ method parses a string s to an int value.
a) integer.parseInt(s); c) integer.parseInt(s);
b) Integer.parseInt(s); d) Integer.parseInt(s);
 - (iii) Every letter in a Java keyword is in lowercase?
a) true b) false
 - (iv) _____ is invoked to create an object.
a) A constructor c) A method with a return type
b) The main method d) A method with the void return type
 - (v) Which of the following Definitions hold good for Exception?
a) Abnormal event that occurs during program execution and disrupts the normal flow of Instruction.
b) The unexpected situations that may occur during program execution
c) The term exception denotes an exception event.
d) All of the above
 - (vi) What is the most restrictive access modifier that will allow members of one class to have access to members of another class in the same package?
a) public b) abstract c) protected d) default access
 - (vii) What is the range of data type short in Java?
a) -128 to 127 c) -2147483648 to 2147483647
b) -32768 to 32767 d) None of the mentioned
 - (viii) Which one is a valid declaration of a boolean?
a) boolean b1 = 1; c) boolean b3 = false;
b) boolean b2 = 'false'; d) boolean b4 = 'true'
 - (ix) Which of these can be returned by the operator & ?
a) Integer b) Boolean c) Character d) Integer or Boolean
 - (x) Which of these is an incorrect array declaration?
a) int arr[] = new int[5] c) int [] arr = new int[5]
b) int arr[] arr = new int[5] d) int arr[] = int [5] new

- (xi) What is the order of precedence (highest to lowest) of following operators?
 1. & 2. ^ 3. ?:
 a) 1 -> 2 -> 3 b) 2 -> 1 -> 3 c) 3 -> 2 -> 1 d) 2 -> 3 -> 1

(xii) Which of the following loops will execute the body of loop even when condition controlling the loop is initially false?
 a) do-while b) while c) for d) None

(xiii) The expression "Java " + 1 + 2 + 3 evaluates to _____.
 a) Java123 b) Java6 c) Java 123 d) Illegal expression

(xiv) What are the benefits of using packages?
 a) To avoid naming conflicts. c) To protect classes.
 b) To organize classes. d) All of them

(xv) Which class do you use to read data from a text file?
 a) File b) PrintWriter c) BufferedReader d) System

2. Compute the output of the following programs. (15 mark)

(a) class Test1 {
 public static void main(String args[]){
 { int a[] = {1,2,3,4,5};
 int d[] = {6,7,8,9,10};
 for (int j = 0; j < 3; ++j)
 System.out.println((a[j]*d[j+1])+(a[j+1]*d[j]));
 }
 }
 }

(b) class Test2 {
 public static void main(String args[]){
 { int x = 2;
 for (int y = 0; y < 10; ++y) {
 if (y % x == 0) continue;
 else if (y == 7) break;
 else System.out.print(y + " ");
 }
 }
 }

(c) class Test3 {
 public static void main(String args[]){
 { char c1 = 'B';
 char c2 = 75;
 c2++; c1++;
 System.out.println(c1 + " " + c2 + " " + ++c2);
 }
 }

(d) class Test4 {
 public static void main(String args[]){
 { int a=5, b= 6, c=7, d=8;
 System.out.println(a == b % 2 || c < d && ++b == c);
 System.out.println((d > c++)?(b% 2 == 1)? "x" : "y" : "z");
 }

```

        System.out.println(a << 2 == 20);
    }
}

(e) class Test5 {
    public static void main(String args[])
    {
        for(int i = 0; i < 3; i++)
        {
            switch(i)
            {
                case 0: break;
                case 1: System.out.print("one ");
                case 2: System.out.print("two ");
                case 3: System.out.print("three ");
            }
            System.out.println();
        }
        System.out.println("done");
    }
}

```

3. Detect and correct errors of the following programs. (15 marks)

(a) Detect and correct errors in the program below which checks palindrome number. For example 3298 is not palindrome number and 12321 is palindrome number.

```

public class Palindrome{
    public static void main(String args[]){
        int r, sum=0, temp;
        int n=45654;           //the number to be checked for palindrome
        temp=n;
        while (n>0);
        {
            r=n/10;           //getting remainder
            sum = (sum * 10) + r; //calculate sum
            n=n%10;           //divided by 10
        }
        if (temp!=sum)        //checking palindrome or not
            System.out.println("palindrome number ");
        else
            System.out.println("not palindrome");
    }
}

```

(b) Detect and correct errors in the program below which checks prime number. For example, 7 is a prime number and 44 is not a prime number.

```

public class PrimeNumber
{
    public static void main()
    {
        int i,m=0,flag=0;
        int n=17;           //the number to be checked for prime number
        m=n/2
        for(i = 2; i < m; i - - ) //repeat for 2 to m times
        {
            if(n % i == 0) //check n modulus i is equal to 0
            {
                System.out.println("Number is not prime");
                flag=1;break;
            }
        }
    }
}

```

```

        }
    }
    if(flag == 0)
        System.out.println("Number is prime");
}
}

```

- (c) Detect and correct errors in the program that simulates the rolling of a pair of dice for 10 times. For each die in the pair, the program should generate a random number between 1 and 6 (inclusive). It should print out the result of the roll for each die and the total roll (the sum of the two dice), all appropriately labeled.

```

public class RandomDice {
    public static void main(String[] args) {
        for (int i = 1; i < 10; i++) { //repeat 10 times
            int a=(int)(Math.random()*10);
            int b=(int)(Math.random()*10);
            int total = a - b;
            System.out.println("Dice1:"+ a + " Dice2:" +b + " Total:" +total);
        }
    }
}

```

4. Write a java class that represents a clock that keeps track of time as hours, minutes and seconds. Provide a constructor method to create the clock object with the given hour, minute and second. Next, provide methods that will allow a user to set the time (i.e change the hour, minute or second). Finally, provide a method displayTime(int mode) to display the time of the clock, the display of which depends on the mode as supplied by the user. (15 marks)

Mode	Format
1	HH:MM:SS (e.g. 23:59:00)
2	HH:MM a.m. (e.g. 08:15 a.m) HH:MM p.m (e.g. 10:40 p.m)

5. Create a menu-driven java application to work with country and capitals with the user. Assume that you have created a file “countries.txt” under “D:\” which consists of the country and capital information separated by “*” as follows: (20 marks)

```

Myanmar*Naypyitaw
China*Beijing
Russia*Moscow
Vietnam*Hochimin
Spain*Madrid
South Korea*Seoul

```

Your program should have the following menu:

- 1: add Country and Capital.
- 2: get Capital from given Country
- 3: show all Countries and Capital

According to menu1, your program should have a method to get the new country & capital information from user as keyboard inputs and appends it to your file “countries.txt”.

According to menu2, your program should have a method to ask the country from user and displays its capital from your file "countries.txt".

According to menu 3, your program should have a method to display all the data in your file "countries.txt".

In the main() method, the program shows the menu and process according to user request.

6.(a) Create the encapsulated *Stack* class including the following data:

- integer array, content, of size 10
- integer index

and following methods:

- boolean overflow()
- boolean underflow()
- void push(int data)
- int pop()

(10 marks)

(b) Consider the following application:

A mobile shop keeps track of its items as five attributes: *brandName*, *itemName*, *size*, *weight*, *price*. There are six records and their data are given in the following table:

BrandName	ItemName	Size(inches)	Weight(g)	Price(\$)
Apple	iPhone 6sPlus	5.5	192	750
Samsung	Galaxy J7Prime	5.5	167	280
Apple	iPhone 7Plus	5.5	188	900
Huawei	Mate 9	5.9	190	630
Samsung	Galaxy Note7	5.7	169	850
HTC	Desire 628	5	142	200

Develop an application to display the sorted lists of items based on the decreasing order of their *price* in neat tabular format as follows:

Before Sorting:

BrandName	ItemName	Size(inches)	Weight(g)	Price(\$)
Apple	iPhone 6sPlus	5.5	192	750
Samsung	Galaxy J7Prime	5.5	167	280
Apple	iPhone 7Plus	5.5	188	900
Huawei	Mate 9	5.9	190	630
Samsung	Galaxy Note7	5.7	169	850
HTC	Desire 628	5.0	142	200

After Sorting by Price by decreasing order:

BrandName	ItemName	Size(inches)	Weight(g)	Price(\$)
Apple	iPhone 7Plus	5.5	188	900
Samsung	Galaxy Note7	5.7	169	850
Apple	iPhone 6sPlus	5.5	192	750
Huawei	Mate 9	5.9	190	630
Samsung	Galaxy J7Prime	5.5	167	280
HTC	Desire 628	5.0	142	200

Use Arrays class and Comparator interface for sorting items.

(10 marks)

Department of Higher Education
University of Computer Studies
Second Year (B.C.Sc. / B.C.Tech.)
Mid Term Examination
Mathematics of Computing II (CST-202)
March, 2017
Zone IV

Answer All Questions.

Time allowed: 3 hours

1. (a) How many strings of eight English letters are there
 - (i) that contain no vowels, if letters can be repeated?
 - (ii) that contain no vowels, if letters cannot be repeated?
 - (iii) that contain exactly one vowel, if letters can be repeated?
 - (iv) that start with a vowel, if letters can be repeated?
 - (v) that start with X and contain at least one vowel, if letters can be repeated?
- (b) A committee is formed consisting of one representative from each of the 50 states in the United States, where the representative from a state is either the governor or one of the two senators from that state. How many ways are there to form this committee?
- (c) How many strings are there of lowercase letters of length four or less, not counting the empty string? (20-marks)

2. (a) How many bit strings contain exactly eight 0s and ten 1s if every 0 must be immediately followed by a 1?
 - (b) Find the coefficient of x^7 in $(1+x)^{11}$?
 - (c) Consider the following relation on $\{1, 2, 3, 4\}$:

$$R_1 = \{(2,2), (2,3), (2,4), (3,2), (3,3), (3,4)\}$$

$$R_2 = \{(2,4), (4,2)\}$$

$$R_3 = \{(1,2), (2,3), (3,4)\}$$

$$R_4 = \{(1,1), (1,2), (1,4), (2,1), (2,2), (3,3), (4,1), (4,4)\}$$
 - (i) Which of these relations are reflexive, symmetric, antisymmetric and transitive?
 - (ii) Find $R_1 - R_2$, $R_2 \cup R_3$, $R_3 \circ R_4$.
 - (iii) Express matrix representation of R_1 , R_2 , R_3 . (20-marks)

3. (a) Solve first order equation $y^3y' + x^3 = 0$.
- (b) Test for exactness and solve the differential equation.

$$e^{2x}(2\cos y dx - \sin y dy) = 0, y(0) = 0$$
- (c) Solve the initial value problem.

$$y' + y \tan x = \sin 2x, y(0) = 1$$
 (20-marks)

4. (a) Verify that the following functions are linearly independent and form a basis of solutions of the given ODE and then solve the initial value problem.

$$4x^2y'' - 3y = 0, \quad y(1) = -3, \quad y'(1) = 0, \quad x^{3/2}, \quad x^{-1/2}$$
- (b) Find a general solution.
 - (i) $4y'' - 4y' - 3y = 0$
 - (ii) $(x^2D^2 - 3xD + 4I)y = 0$ (20-marks)

5. (a) (i) Find a second-order homogeneous linear ODE for which the following functions are solutions.
 (ii) Show linear independence by the Wronskian.
 (iii) Solve the initial value problem.

$$\cos 5x, \sin 5x, y(0) = 3, y'(0) = -5$$

- (b) Solve the initial value problem.

$$y'' + 3y' + 2.25y = -10e^{-1.5x}, y(0) = 1, y'(0) = 0$$

(20-marks)

Department of Higher Education
University of Computer Studies
Second Year (B.C.Sc./B.C.Tech.)

Mid Term Examination
Digital System I (CST - 203)

Zone IV

March, 2017

Answer all questions.

Time allowed: 3 hours

1. (a) States whether the following statements are TRUE or FALSE. (10 marks)

- i. Flip flops, latches and one-shot are bi-stable devices.
- ii. A clock input is necessary for an edge triggered flip flop.
- iii. Hold time is the time required for data to be present before the triggering edge of the clock pulse.
- iv. In a synchronous counter, all flip flops are clocked simultaneously.
- v. A decade counter is an example of a counter with truncated.
- vi. A 4-bit binary up/down counter is in the binary state of zero. The next state in the DOWN mode is 0001.
- vii. Two functions of a shift register are data storage and data movement.
- viii. In a serial shift register, several data bits are entered at the same time.
- ix. A ring counter uses one flip flop for each state in its sequence.
- x. A shift register can have both parallel and serial outputs.

1.(b) Fill in the blank with appropriate words. Just write down the number and the answer. (20 marks)

- i. _____ flip flops are required to produce a divide by 64 devices.
- ii. A feature that distinguishes the J-K flip flop from the S-R flip flop is the _____ condition.
- iii. The invalid state of an S-R latch occurs when S = _____ and R = _____.
- iv. A 4 bit synchronous counter consists of flip flop that each have a propagation delay from clock to Q output of 12 ns. For the counter to recycle from 1111 to 0000, it takes a total time of _____ ns.
- v. A 5-bits binary counter has a maximum modulus of _____.
- vi. The terminal count of a modulus-13 binary counter is _____.
- vii. A modulus 12 counter must have _____ flip flops.
- viii. The parallel load operation in a 74HC165 shift register is _____.
- ix. Assume that the 4 bit bidirectional shift register has the following contents: 1100. There is a 0 on the serial data input line. If RIGHT / LEFT is HIGH for three clock pulses and LOW for two more clock pulses, the state of the register after the fifth clock pulse is _____.
- x. A modulus 10 Johnson counter requires a minimum of _____ flip flops.

2.(a) If the waveforms in Figure 2(a-1) are applied to the positive edge-triggered J-K flip flop in Figure 2(a-2), develop the Q output waveform relative to the clock (Q is initially LOW). Assume \overline{PRE} and \overline{CLR} remain HIGH. (8 marks)

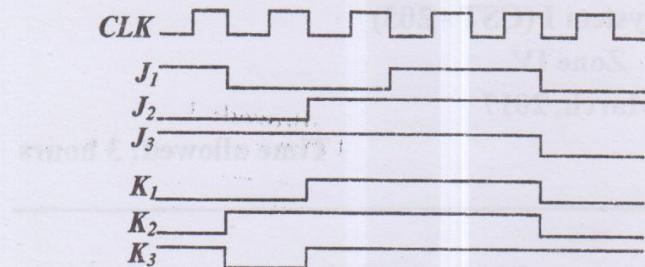


Figure 2(a-1)

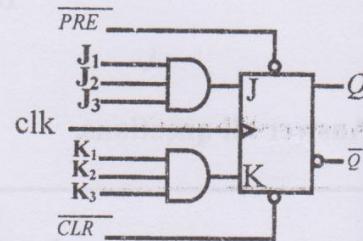


Figure 2(a-2)

2.(b) Determine the Q and \overline{Q} outputs of the gate S – R latch, for the inputs in Figure 2(b). Show them in proper relation to the enable input. Assume that Q starts LOW. (6 marks)

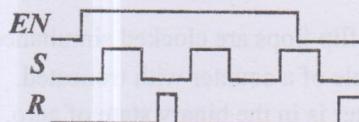


Figure 2(b)

2.(c) For a gated D latch, the waveforms show in Figure 2(c) are observed on its inputs. Draw a timing diagram showing the output waveform you would expect to see at Q if the latch initially RESET. (6 marks)

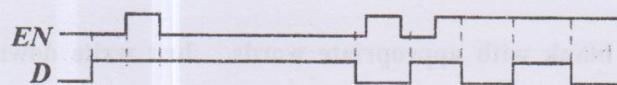


Figure 2(c)

3.(a) Design a counter the irregular binary count sequence shown in the state diagram of Figure 3(a). Use J-K flip flops. Verify the analysis that proves the counter will always return to a valid state from an invalid state. (14 marks)

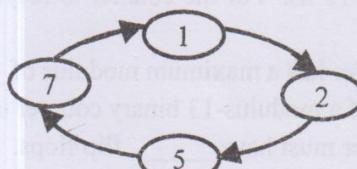


Figure 3(a)

3.(b) For each of the cascade counter configurations in Figure 3(b), determine the frequency of the waveform at each point indicated by a circled number, and determine the overall modulus. (6 marks)

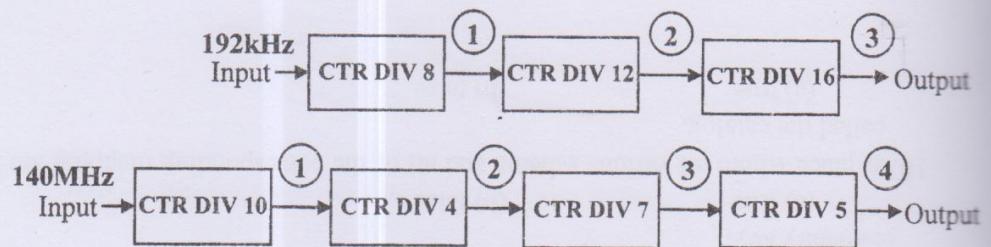


Figure 3(b)

- 4.(a) Determine all the Q output waveforms for a 74HC195 4-bit shift register when the inputs are as shown in Figure 4(a). (14 marks)

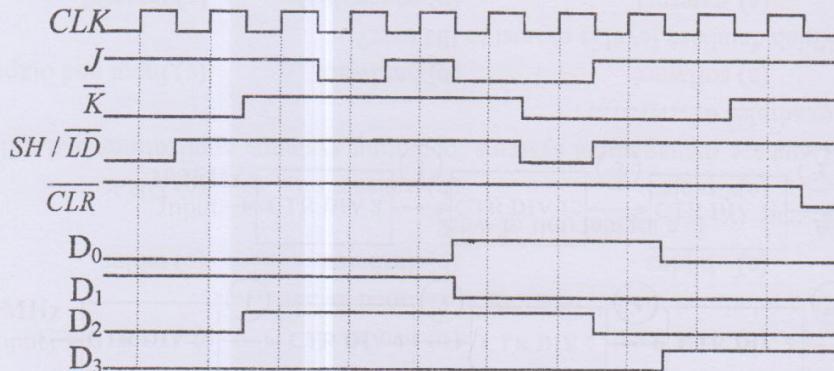


Figure 4(a)

- 4.(b) If SRG 12 in Figure 4(b) has starts in the 1010 0111 1000 state, determine the waveform for each of the Q outputs after each clock pulse. (10 marks)

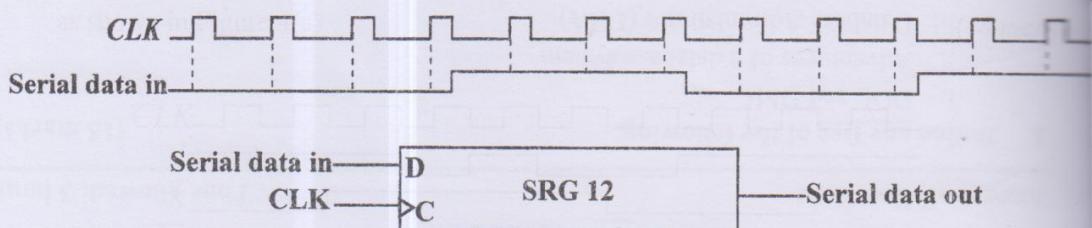


Figure 4(b)

- 5.(a) Design the 4 bit Johnson counter use J-K flip flop. (5 marks)

- 5.(b) Design the 3 bit binary counter use D flip flop. (5 marks)

Department of Higher Education
University of Computer Studies

Second Year (B.C.Sc.)

Mid Term Examination

Database Management System (CST-204)

March, 2017

Zone IV

Answer all Questions

Time allowed: 3 hours

I. Define any five of the following. (15 marks)

- i. DDL and DML
- ii. Advantages of a database system
- iii. Database Administrator (DBA)
- iv. The relational model
- v. Data dictionary
- vi. Base relvars and Views

II. (a) Choose the correct answers. (10 marks)

- 1. Architecture of the database can be viewed as
(a) one level (b) two levels (c) three levels
- 2. In a relational model, relations are termed as
(a) tuples (b) attributes (c) tables
- 3. A is a logical unit of work.
(a) table (b) transaction (c) DBA
- 4. Database management systems, operating systems, applications and utilities are all examples of
(a) software (b) hardware (c) input and output
- 5. Which database level is closest to the user?
(a) external (b) conceptual (c) internal
- 6. What is the name for data about data?
(a) unique data (b) metadata (c) raw data
- 7. The data in the database is not persistent.
(a) true (b) false
- 8. A database is a collection of interrelated files.
(a) true (b) false
- 9. The field whose values identify one and only one record in a field is known as the secondary key.
(a) true (b) false
- 10. A place where all various schema and all of the corresponding mapping are kept is called the catalog.
(a) true (b) false

(b) Match each of the key terms with the definition (a) to (e) that best fits it. (5 marks)

- (1) Primary key
- (2) Relational Database
- (3) True propositions
- (4) Store field
- (5) Predicate

- (a) A database that is perceived by its users as a collection of relation variables.
- (b) The smallest unit of the stored data in the relational database.
- (c) Allows the DBMS to uniquely identify specific row in a table.
- (d) The heading of a given relation.
- (e) The data is represented as rows in tables.

III. (a) Write the Data Definition Languages (DDL) for the following:

- (i) Create the following tables which contain the following fields and choose the suitable key.

Employee (Employee_Name, Street, City)

Works (Employee_Name, Company_Name, Salary)

Company (Company_Name, City)

(6 marks)

- (ii) Write a program with embedded SQL statements to list all employee details for all employees in the city given by the host variable LCity. (9 marks)

(b) Write SQL statements for the following problems using the tables created in III(a)

- (i) Find the names of all employees who work for First Bank Corporation.
- (ii) Get the names and company names of all employees sorted in descending order of employee names of that company.
- (iii) Change the city of First Bank Corporation to 'London'.
- (iv) Insert a new employee ('David', '212 1st Street', 'Paris').
- (v) Delete the record for the employee whose name is 'John' and city is 'London'.

(15 mark)

IV. (a) Suppose we are given relvar R with attributes X, Y, Z, W and FDs : (5 mark)

$X \rightarrow Y$

$X \rightarrow W$

$WY \rightarrow Z$

Show that the FD $X \rightarrow Z$ for R and describe which inference rules you have applied.

(b) Define 1NF, 2NF, 3NF, and BCNF. (8 mark)

(5 marks)

(c) The following table stores details of employees and the projects they work on and for how long. (12 marks)

Workload Table

EmpID	EmpName	ProjID	ProjName	HoursPerWeek
E01	Smith	P02	Database	10
E01	Smith	P01	Web Portal	5
E02	Robinson	P02	Database	20

- (i) Explain in which normal form this table is.
- (ii) Find the primary key for this relation and explain your choice.
- (iii) Get the set of FDs for this relation.
- (iv) If it is not in 2NF, explain and then, normalize it into 2NF relations.

V. Each product has a single supplier but there is nothing to stop a supplier supplying many products. Each supplier has an address.

Attributes about product, supplier, and address are given below:

Product (price, description)

Supplier (name, address, phone number)

Address (street address, city, postcode)

Represent this information of Product, Supplier and Address with E-R diagram.

(15 marks)

(6 marks)

e details for
(9 marks)

ed in III(a).

ending order

London'.
(15 marks)
(5 marks)

ave applied.

(8 marks)

Department of Higher Education
University of Computer Studies
Second Year (B.C.Sc)
Mid Term Examination
CS-205(Computer Application Techniques II)
March, 2017
Zone IV

Answer all questions.

Time allowed: 3hours

1. Write the output string of given JavaScript statements. (15 Marks)

<pre>(a) function outputNumbers(count){ for(var i=0;i<count;i++){ alert(i); } var i; alert(i); }outputNumbers(5);</pre>	<pre>(b) var Fruit = "mango"; alert(Fruit.localeCompare("apple")); alert(Fruit.localeCompare("mango")); alert(Fruit.localeCompare("orange"));</pre>
<pre>(c) var result1 = 100 + 200; alert(result1); var result2 = 100 + "200"; alert(result2); var num1 = 50, num2=50; var message= "Sum =" + num1+num2; alert(message);</pre>	<pre>(d) <div id="myDiv" class="bd" title="Body text" lang="en" dir="ltr"></div> div = document.getElementById("myDiv"); div.setAttribute("id", "SomeOtherId"); div. div.setAttribute("class", "ft"); alert(div.id); alert(div.className); alert(div.title);</pre>
<pre>(e)) <div id="content"> <p>Paragraph</p> Item1 Item2 Item3
 var div = getElementById("content"); alert(div.innerHTML);</pre>	<pre>(f) var person ={}; object.defineProperty (person,"name", { writable:false, configurable:false, value: "John Pollock" }); alert(person.name); person.name = "Greg"; alert(person.name); delete person.name; alert(person.name);</pre>

2. Write the JavaScript statement(s) for followings

- (a) Create a function to calculate and display circle area with alert using Math.PI and Math.pow(). Call it with value 10. (5 marks)
- (b) Create an object named Student(Rno, name, Grade) and a method sayGrade which return the Grade of object with alert. Create with two instances of object with ("2cs-1", "Hla Hla", "A") and ("2cs-2", "Mg Mg", "B"). Call method of each object. (Use Prototype Pattern) (5 marks)
- (c) Create an array with give item(10, 20, 30, 40, 50). And then multiply every number in an array by 10 and returned an array of theose numbers.(By using array iterative methods). (5 marks)
3. (a) Create an HTML page with following. (By using the DOM)(8 marks)
- Create an empty table with border and a button "Add items".
 - Create a function that create a row and document fragment node with three columns.

Item 1	Item 2	Item3
--------	--------	-------
 - Append the document fragment node to row and append a row to table.
 - Call the function when user clicks the "Add items" button.

- (b) Create an HTML page with following. (By using the DOM) (7 marks)
- Write a css rule that specify the heading 1 with (text-align:center, color:magenta, border-style:double).
 - Write a function that create heading1 element with above css rule and place text in heading "Professional JavaScript 3rd Edition".
 - Create a button to call above function to display the heading when user clicked it.

- (c) Create an HTML page with following. (5 marks)
- In this page, uses the regular expression to validate an contact number the viewer entered prompt. Assume that you need the contact number starts 3 digits, followed by a hyphen and 7 digits. If the contact number validate, an alert pops up to say "Validate Contact Number". Otherwise display "Invalid Contact Number".

4.(a) Draw up the balance sheet to record the following items using the **Standard Layout**. (5 marks)

	\$
Capital	58,800
Building	35,000
Creditors	16,750
Stock	12,700
Motor Van	20,000
Debtors	29,200
Profits	22,000
Furniture	10,200
Cash in hand	1,000
Bank Loan	21,600
Cash at bank	2,150
Drawings	3,700
Machinery	5,200

(b). Draw up the double entry accounts to record the following transactions, balance off the accounts at the end of month and extract the Trial Balance. (20 marks)

- 1 Jan. A trader started a business by investing \$ 5,000 into a business bank account and Fixture and Fitting \$ 1,000.
- 3 Jan. Business purchased \$ 3,000 worth of goods on credit from Moon World Ltd.
- 7 Jan. Sold goods to Peter \$ 4,000 and cash sales \$ 1,300. Received cash from Peter \$ 3,000 as the remaining balance is offered as discount.
- 10 Jan. Business paid \$ 2,950 to Moon World Ltd, the remaining balance is the discount received from Moon World Ltd.
- 15 Jan. Paid wages \$ 1,000, Stationary \$ 700, Insurance \$ 500 by cheque.
- 21 Jan. Received commission from AAA for goods sold on their behalf \$ 2,000 by cheque.
- 25 Jan. Business borrowed \$ 3,700 from bank.
- 27 Jan. Owner withdraws \$ 200 cash from business for his personal use.
- 30 Jan. Paid Interest 5% on bank Loan by cash.

5.(a) The following Trial Balance has been drawn up by an inexperienced Account Clerk, redraft the Trial Balance to show the correct entries. (5 marks)

	<u>Dr</u>	<u>Cr</u>
Bank		7,000
Cash	3,200	
Debtors	15,000	

Creditors		7,300
Stock	520	
Accumulated Depreciation	750	
Bank Loan		4,000
Premises	19,000	
Capital	71,480	
Fixture and Fitting		45,000
Sales	31,500	
Purchases		18,450
Return In		300
Return Out	600	
Rent	450	
Wages		10,400
Discount Allowed		360
Discount Received		550
Commission Received		3,500
		146,000 93,360

(b). A firm has produced the following Trial Balance 31st May 2007. Prepare a Trading, Profit & Loss Account and a Balance Sheet at that date.

	<u>Dr</u>	<u>Cr</u>	(20 marks)
Capital		130,000	
Motor Van	23,000		
Fixture & Fitting	55,200		
Premises	56,000		
Bank Loan		5,000	
Debtors & Creditors	17,000	22,580	
Return In & Return Out	400	250	
Bank	11,450		
Cash	1,100		
Stock	13,450		
Purchases & Sales	97,200	152,000	
Insurance	3,000		
Wages & Salaries	25,000		
Discount Allowed	990		
Discount Received		350	
Drawing	7,700		
Light & heat	7,210		
Accumulated Depreciation:			
Motor Van		2,300	
Fixture & Fitting		5,520	
Provision for bad debt		700	
	318,700	318,700	

Notes:

- (1) Closing Stock \$ 4,450.
- (2) Light & heat paid in advance \$ 210.
- (3) Amount still owed at the end of the year were: wages \$ 300, Insurance \$ 200.
- (4) The provision for bad debt is to be increased to 10% of debtors.
- (5) Motor Van and Fixture & Fitting are to be depreciated at 10% on NBV.

(20 marks)

Department of Higher Education
University of Computer Studies
Second Year (B.C.Sc.)
Mid Term Examination
Software Engineering + System Analysis and Design (CS-206)
March, 2017
Zone IV

Answer all question

Time allowed: 3hours

- I. (a) Choose the correct answer from the following (True or False). (10 marks)**
- (i) Software engineering is an engineering discipline that is concerned with all aspects of software production.
 - (ii) Computer Science is concerned with all aspects of computer based systems development, including hardware, software and process engineering.
 - (iii) A software process model is a simplified description of a software process.
 - (iv) Product requirements specify product behavior.
 - (v) Software usability has a range of characteristics, including reliability, security and safety.
 - (vi) The functional requirements for a system describe what the system should do.
 - (vii) Natural language is used to write system requirements specifications as well as user requirements.
 - (viii) User requirements for a system should describe the functional and non functional requirements.
 - (ix) Waterfall model is interleaves the activities of specification, development and validation.
 - (x) Software validation must evolve to meet changing the customer needs.

- (b) Match each of the key terms with the definition (a to j) that best fits it. (10 marks)**

- (1) Prototyping
- (2) Information system analysis and design
- (3) Formal system
- (4) Interface
- (5) Modularity
- (6) Disruptive technology
- (7) CASE
- (8) Open-ended question
- (9) System analysis
- (10) Business process reengineering

- (a) The process of developing and maintaining an information system.
- (b) Point of contact where a system meets its environment or where subsystems meet each other.
- (c) The official way a system works, as described in organizational documentation.
- (d) Question in interviews and questionnaires that have no pre-specified answers.
- (e) Dividing a system up into chunks or modules of a relatively uniform size.
- (f) The search for, and implementation of, radical change in business processes to achieve breakthrough improvements in products and services.
- (g) Building a scale-down version of the desired information system.
- (h) Software tools that provide automated support for some portion of the systems development process.
- (i) Technologies that enable the breaking of long-held business rules that inhibit organizations from making radical business changes.
- (j) Phase of the SDLC in which the current system is studied and alternative replacement systems are proposed.

II. Define the following terms:

- (a) efficiency
 - (b) acceptance testing
 - (c) software specification
 - (d) procedural interface
 - (e) user requirement
 - (f) functional requirement
 - (g) boundary
 - (h) scribe
 - (i) system design
 - (j) informal system
- (15 marks)

III. (a) Do you understand the concepts of the systems? Explain with the example. (10 marks)

(b) What are the key challenges facing software engineering? (5marks)

(c) Two process models that have been explicitly designed to support process iteration (5marks)

IV. (a) List and briefly define the four types of skills and analyst should possess. (5 marks)

(b) Prototyping can be used requirements determination and describe its advantages and drawbacks. (10 marks)

V. (a) What is a software process? Briefly explain about it (5marks)

(b) Discuss the requirement engineering process in detail. (10 marks)

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processes to
the systems
that inhibit
l alternative
(15 marks)

W. (a) Describe three different types of non-functional requirement which may be placed on a system. Give examples of each of these types of requirements. (8marks)

(b) **Pine Valley Furniture** (7 marks)

Jackie Judson, Vice president of marketing and Jim Woo, a senior systems analyst, have been involved with Pine Valley Furniture Customer Tracking System since the beginning of the project. After receiving project approval from the systems Priority Board, Jim and his project development team turned their attention toward analyzing the Customer Tracking System.

During a Wednesday afternoon meeting, Jim and his project team members decide to utilize several requirements determination methods. Because the Customer Tracking System will facilitate the tracking of customer purchasing activity and help identify sales trends various level of end user will benefit from the new system. Therefore, the project team feels it is necessary to collect requirements from these potential end users. The project team will use interviews, observations, questionnaires, and JAD sessions as data-gathering tools.

Jim assigns you the task of interviewing Stacie Walker, a middle manager in the marking department; Pauline McBride, a sales representative; and Tom Percy, assistant vice president of marking. Tom is responsible for preparing the sales forecasts. In addition, Jim assigns Pete Polovich, a project team member, the task of organizing the upcoming JAD sessions.

- (i) Because Pete Polovich is organizing a JAD session for the first time, he would like to locate additional information about organizing and conducting a JAD session. Find information on JAD on the web, and provide Pete with several recommendations for conducting and organizing a JAD session.
- (ii) When conducting your interviews, what guidelines should you follow?
- (iii) As part of the requirements determination process, what business documents should be reviewed?

(10 marks)

(5marks)

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(5marks)

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(10 marks)

(5marks)

(10 marks)

**Department of Higher Education
University of Computer Studies
Second Year (B.C.Tech)
Mid Term Examination
Computer Application Technique II (Web Programming) (CT-205)
March-2017
Zone IV**

Answer all questions

Time Allowed: 3 hours

1. Write the output string of given JavaScript statements. (30-marks)

- (a) `alert(NaN == NaN);
alert(isNaN(NaN));
alert(isNaN(10));`
- (b) `var num1 = parseInt("1234blue");
var num2 = parseInt("");
var num3 = parseInt("0xA");`
- (c) `var colors = ["red", "green", "blue"];
var removed = colors.splice(0,1);
alert(colors);
alert(removed);`
- (d) `var stringValue = "hello world";
alert(stringValue.slice(3));
alert(stringValue.slice(3, 7));
alert(stringValue.slice(-3));`
- (e) `var colors = ["red", "green", "blue"];
colors[colors.length] = "black";
alert(colors);
colors[colors.length] = "brown";
alert(colors.length);`
- (f) `var text = "this has been a short summer";
var pattern = /(..)or(.)g;
if(pattern.test(text)){
 alert(RegExp.$1);
 alert(RegExp.$2);}`
- (g) `var result1 = ("55" == 55);
var result2 = ("55" === 55);
alert(result1);
alert(result2);`
- (h) `var stringValue = "hello world";
alert(stringValue.indexOf("o", 6));
alert(stringValue.lastIndexOf("o", 6));`
- (i) `var age = 29;
function sayAge(){
 alert(this.age);}
alert(window.age);
sayAge();
window.sayAge();`
- (j) `var s = "Nicholas";
var i = 22;
var o = new Object();
alert(typeof s);
alert(typeof i);
alert(typeof o);`
- (k) `alert(Math.ceil(25.9));
alert(Math.round(25.9));
alert(Math.floor(25.9));`
- (l) `var colors = ["red", "green", "blue"];
var colors2 = colors.concat("yellow",
["black", "brown"]);
alert(colors);
alert(colors2);`

2. Write the JavaScript statement(s) for following

(25-marks)

(a) Write the dynamic script by using the DOM to specify JavaScript code is inline as in this example. (For Internet Explorer)

```
<script type="text/javascript">
function sayHi(){
    alert ("hi");
}
</script>
```

(b) Create an array named with "January", "February", "March" and "April". Create another array with "May", "June", "July" and "August". Concatenate these two arrays into "month" array. At the start of the "month" array add "September" and "October". Create a random integer to access as index of "month" array and display the random month's name with alert.

(c) Create a function named "greeting()" that pops up alert says, "Hi! How are you?". And then execute this function at every 1 second. Create another function that stop the endless calling of "greeting()" function. Create another function named "new_window()" that opens new window with "<http://www.google.com>" in topframe window.

(d) Create a function named "outer" that called another function named "inner". The "inner" function displays an alert with the source text of the "outer" function by using the "caller" property.

(e) Create an html page with the following:

-Create a frameset for first frame across the top that is 160px in height and named **topFrame**. The second frame is to take all of the space remaining. And, into the second frame, create two frames have a width of 50% each and named **leftFrame**, **rightFrame** respectively.

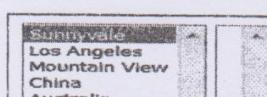
-The value of src attribute in the frame elements are user entire pages.

3.(a) Create an html page with the following form, it's id is "myForm". That contains two select boxes, a text box and a "Move" button.

-Enter a number into the text box.

-When user clicks "Move" button, move the data from first select box to second select box (according to user entered number).

(8-marks)



Click the "Move" button to move the item with this position to the second list:

1

(b) Create an html page with following. (by using array iterative methods)

-Create an array with given items (1,2,3,4,5,4,3,2,1).

-And then checks some items are greater than 2. If some items are greater than 2, display an alert with "Some items are greater than 2." Otherwise display "No item is greater than 2."

-each item in the array is multiply by three and store in new array. Display all items of new array with an alert. (6-marks)

(c) Create an html page. In this page, uses the regular expression to validate an URL the viewer entered. If the URL validate, an alert pops up to say "Validate URL". Otherwise display "Invalid URL!" Assume that you need to URL contain the following:

-It must begin with http://.

-The characters in between need to be dots (.), hyphen (-), letters or numbers.

-It must end with a dot (.) sign and no more than three letters characters. (6-marks)

(a) Create a form that id is "myForm" that contain a textbox and a submit button. (Assume that EventUtil object has already created in EventUtil.js file)

After the window has been loaded, use focus and blur events to change the user interface;
-when the focus event is occurred, if the background color of text box is not "red", then the background color of text box must be changed "yellow".

-when the blur event is occurred and if the first character of text box's value is not number, then the background color of text box is "red". Otherwise the background color of text box must be changed "blue". And the text box's value is changed and if the first character of text box's value is not number, the background color of text box is "pink". Otherwise the background color of text box must be changed "green". (12-marks)

(b) Create an html page with following. (Write the code by using DOM)

-Create an empty unordered list.

-Create a function that creates a document fragment node with following list item and append the document fragment node to unordered list.

- Computer
- Printer
- Keyboard

-Call the function when user clicks the "Add items" button. (8-marks)

(c) Create an html page with the following:

-Create a factorial function by using the "callee" property.

-Call it value 8 and display the value of 8! with alert box. (5-marks)

Department of Higher Education
University of Computer Studies

Second Year (B.C.Tech.)
Mid Term Examination
Electrical Circuit I (CT-206)

Zone IV

March, 2017

Answer All Questions.

Time Allowed: 3 hours

- 1.(a) The charge flowing in a wire is plotted in the following Figure 1(a). Sketch the corresponding current. (12 marks)

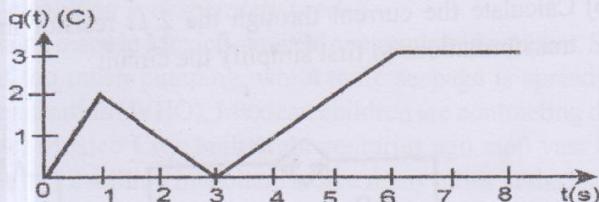


Figure 1(a)

- (b) A dc power link is to be made between two islands separated by a distance of 24 miles. The operating voltage is 500 kV and the system capacity is 600 MW. Calculate the maximum dc current flow, and estimate the resistivity of the cable, assuming a diameter of 2.5 cm and a solid (not stranded) wire. (8 marks)
- 2.(a) Consider the circuit of Figure 2(a). If the power delivered by the source is 20 mW, find R and V_s . (12 marks)

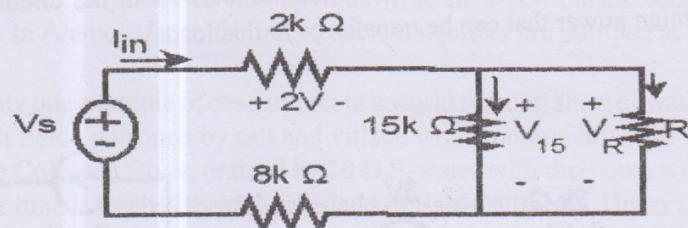


Figure 2(a)

- (b) Show how to combine four 100Ω resistors to obtain an equivalent resistance of (i) 25Ω ; (ii) 60Ω ; (iii) 40Ω . (8 marks)
- 3.(a) In the circuit of Figure 3(a), only the voltage v_x is of interest. Simplify the circuit using appropriate resistor combinations and iteratively employ voltage division to determine v_x . (10 marks)
- (b) In the following circuit of Figure 3(b), find the voltage v_o using nodal analysis. (10 marks)

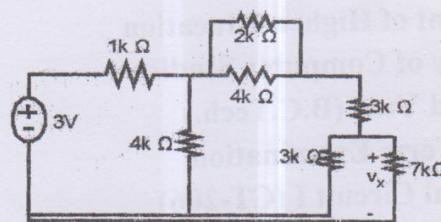


Figure 3(a)

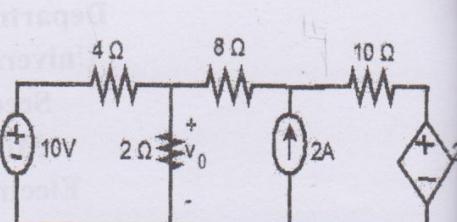


Figure 3(b)

4. (a) In the circuit shown below **Figure 4(a)**, find the current i_x using nodal analysis. Find power supplied by the 4-A current source. **(10 marks)**
- (b) Calculate the current through the 2Ω resistor in **Figure 4(b)** by making use of transformations to first simplify the circuit. **(10 marks)**

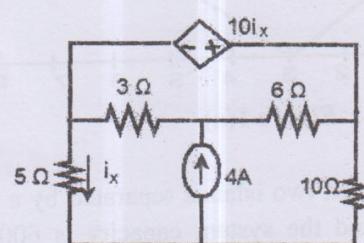


Figure 4(a)

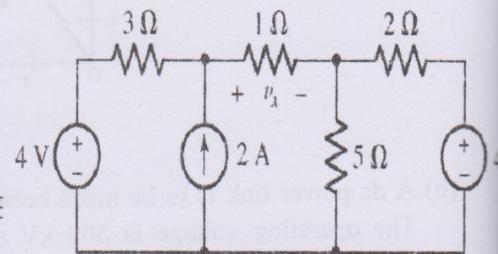


Figure 4(b)

5. (a) Use superposition to find V_0 in the circuit of **Figure 5(a)**. **(8 marks)**
- (b) Find the value of R_L for maximum power transfer in the circuit in **Figure 5(b)** and maximum power that can be transferred to this load. **(12 marks)**

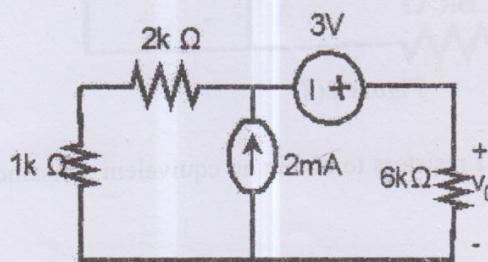


Figure 5(a)

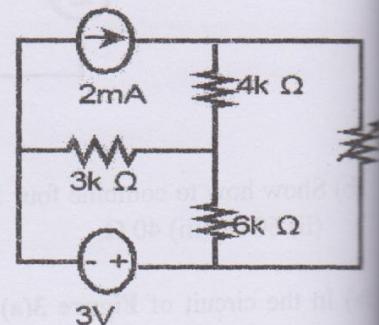


Figure 5(b)