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

ZONE IV

Answer All Questions. **Time Allowed: 3 Hours**

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

The problems of water shortages have always been with us. Worldwide consumption of water is doubling every 20 years, a solution is desperately needed.

A Government water commission maps in Mexico show 96 overexploited aquifers. Seawater has polluted 17 others because of too much pumping, while toxic seepage is spreading fast. According to the World Health Organisation (WHO), Mexican children are contracting digestive diseases due to poor water storage. Mexico City, built eight centuries ago atop vast lagoons, cannot adequately supply water for its 22 million inhabitants, bike many cities in the world, less than half of the city's waste is treated. The rest sinks into underground lakes or flows toward the Gulf of Mexico, turning rivers into sewers. This presents an extremely difficult prospect for Mexico's future. The Mexican National Water Commission lists some 35 cities that must shrink dramatically unless more water can be found. A forced exodus from parched cities seems far-fetched, and no one suggests it will happen next week but it is a spectre haunting Mexico's future.

B Much of the water that Mexico depends upon is the same water that is badly needed in California, Arizona, New Mexico and Texas. One forecast is that Corpus Christi, Texas (population: 277,454), will run out of water around 2018. In the meantime the problem is getting worse. Deputy director of the Mexican National Water Commission Cantu Suarez reports, "In Oaxaca, south of Mexico City, women line up at dawn to fill a few plastic containers from a passing water truck. In Alamos, far to the north, ancient aquifers are pumped at five times the sustainable rate."

C Mexico is only one example of desperation in a world running short of water. Parts of the earth are dying, with fields poisoned by salt and village wells running dry. And there are legal battles looming. The Colorado River, drained by 10 U.S. states with their own water crises, is a muddy trickle by the time it reaches the rich farmland of Baja California. Under complex water agreements with the United States, Mexico can take water from the Rio Grande but must pay it back. President Vicante Fox has promised to pay the debt, which amounts to enough to put the state of Delaware under a flood of water. But with Mexico already so short of water, it is not realistic to think it can happen.

D Canada with its thousands of lakes and rivers would be viewed by most people as having an inexhaustible water supply. In comparison to Africa and other dry places, most of Canada's waters are pristine. But the cumulative effect of mistreatment over the years has taken an evident toll. The cities of Victoria on the west coast and Halifax on the east still dump billions of litres of raw sewage into their oceans. The world's biggest freshwater basin, the Great Lakes, is described as a chemical soup not fit to drink from or swim in. Some concerned experts view them as loaded with toxic chemicals, heavy metals, pesticides and sewage. Far too many rivers and streams in Canada have been badly contaminated by industrial activity.

E Humans can live about a month without food but only a few days without water. Because 70 percent of the human body is water, weight loss in some quick diets is dramatic due to water loss. Of all the water in the world, only about 2.5 percent is fresh and two thirds of this is locked up in glaciers and ice caps. Nobody knows how much water is underground or in permafrost. All life on earth is sustained by a fraction of one percent of the world's water. If a five- litre jug (about 1.3 gallon) represented the world's water, the available fresh water would not quite fill a teaspoon.

F Overall, in most parts of the planet there is enough water to supply human needs. The huge problem however, is the rapidly increasing populations in places that lack adequate water resources, as well as mismanagement of available resources. Canada, with only 0.5 percent of the world's population, has 5.6 percent of its usable fresh water supply. China, with 22 percent of the population on earth, has only 5.7 percent of usable fresh water. We cannot just move fresh water to where it is most needed – like in the Sahara, Ethiopia, Somalia or India.

G In January 2000, the Newfoundland government identified a dozen of its communities with high levels of potentially dangerous THMs (trihalomethanes) in water supplies. In an attempt to solve this issue the main solution put forward by scientists is sterilisation of the water. However, this approach can also be the cause of problems. Drinking such water over a long period can cause bladder and colon cancers, but health experts maintain the benefits far outweigh these risks. As a result, the bottled water business is booming. In just one decade, sales have surged from $2.6 billion to $7.7 billion in the United States of America alone. This represents a 10 percent growth rate for the past 10 years. But is it safe? Canadian standards for testing bottled water are lower than those for municipal supplies, so there are no assurances that bottled water is any better than tap water.

H At the start of the 20th century, there were 1.65 billion people; 100 years later there are more than 6 billion, and the United Nations estimates there will be nearly 9 billion by 2050. But the annual supply of renewable fresh water will remain the same, so the amount of water available to each person decreases and the population grows, raising the possibility of water shortages. The supply of water to the future is a major issue that will confront tomorrow's leaders.

Question 1-4

Reading Passage has eight paragraphs A-H.
Which paragraph contains the following information?
Write the correct letter A-H in numbers 1-4 on your answer sheet.

1. where most fresh water is located in the world
2. a way Mexican women obtain water
3. the effect of waste upon Mexican rivers
4. Mexico's financial commitment for its water

Question 5-8

Do the following statements agree with the claims of the writer in Reading Passage ?
On your answer sheet write

YES	*if the statement reflects the claims of the writer*
NO	*if the statement contradicts the claims of the writer*
NOT GIVEN	*if it is impossible to say what the writer thinks about this*

5. Unhealthy water is causing illness amongst Mexican children.
6. Mexicans are moving to other cities because of water shortages.
7. Mexican food crops will fail without water from America.
8. Drinking water in Canada has been polluted by industry.

Question 9-10

Complete the summary of paragraphs F-H below.
Choose NO MORE THAN THREE WORDS from the passage for each answer.
Write your answer on your answer sheet.

The main issue that confronts cities with poor water supplies is their growing ***9***_____ . Canada, which contains ***10***_____ of the world's fresh water, has dealt with water pollution in some cities through a process of sterilisation.

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.

devoted	*stimulated*	*instructed*	*successfully*	*carefully*
their	*they*	*satisfied*	*accomplished*	*paraconsciously*
in	*but*	*is*	*and*	*them*
dynamics	*and*	*while*	*of*	*to*

The suggestopedic approach *1*..... foreign language learning provides a good illustration. In its most recent variant (1980), it consists of the reading *2*.....vocabulary and text *3*..... the class is listening to music. The first session is in two parts. In the first part, the music is classical (Mozart, Beethoven, Brahms) *4*..... the teacher reads the text slowly *5*..... solemnly, with attention to the *6*..... of the music. The students follow the text in their books. This *7*..... followed by several minutes of silence. In the second part, they listen to baroque music (Bach, Corelli, Handel) while the teacher reads the text *8*..... a normal speaking voice. During this time *9*..... have their books closed. During the whole of this session, their attention is passive; they listen to the music *10*.....make no attempt to learn the material.

Beforehand, the students have been *11*..... prepared for the language learning experience. Through meeting with the staff and *12*..... students they develop the expectation that learning will be easy and pleasant and that they will *13*..... learn several hundred words of the foreign language during the class. In a preliminary talk, the teacher introduces *14*..... to the material to be covered, but does not 'teach' it. Likewise, the students are *15*..... not to try to learn it during this introduction. Some hours after the two-part session, there is a follow-up class at which the students are *16*..... to recall the material presented. Once again the approach is indirect. The students do not focus *17*..... attention on trying to remember the vocabulary, but focus on using the language to communicate (e.g. through games or improvised dramatisations).

Such methods are not unusual in language teaching. What is distinctive in the suggestopedic method is that they are *18*..... entirely to assisting recall. The 'learning'of the material is assumed to be automatic and effortless, *19*..... while listening to music. The teacher's task is to assist the students to apply what they have learned *20*..... , and in doing so to make it easily accessible to consciousness. Another difference from conventional teaching is the evidence that students can regularly learn 1000 new words of a foreign language during a suggestopedic session, as well as grammar and idiom.

III.(A) Put the verbs in brackets into the *simple present* or *the present continuous* tense.

(5 Marks)

1. I'm afraid I've broken one of your coffee cups. Don't worry. I (not like) that set anyway.
2. Ann (make) a dress for herself at the moment. She (make) all her own clothes.
3. Mary usually (learn) languages very quickly but she (not seem) able to learn modern Greek.

(B) Put the verbs in brackets into the *simple past* or the *past continuous tense*.

(5 Marks)

1. He (play) the guitar outside her house when someone opened the window and (throw) out a bucket of water.
2. He (not allow) us to go out in the boat yesterday as a strong wind (blow).
3. I lit the fire at 6.00 and it (burn) brightly when Tom came in at 7.00.

(C) Put the verbs in brackets into the *present perfect* or the *simple past* tense. In some sentences the *present perfect continuous* is also possible. **(10 Marks)**

1. I (fly) over Loch Ness last week.
   You (see) the Loch Ness monster?
2. When he (arrive)?
   He (arrive) at 2.00.
3. I can't go out because I (not finish) my work.
4. You (have) breakfast yet?
   Yes, I (have) it at 8.00.
5. Mr Pound is the bank manager. He (be) here for five years.
6. I (never drink) whisky.
7. You (see) the moon last night?

(D) Fill in the gaps with a verb from the list in the *past simple*, *past perfect simple* or *past perfect continuous* tense. Use each verb once. **(10 Marks)**

be	*buy*	*decide*	*develop*	*discuss*	*feel*	*like*	*make*
take	*run*	*start*	*stay*	*phone*	*visit*	*wait*	*work*

1. She ..... as a waitress for five years when he met her.
2. Holly did very well in her exam, which was a shock because she .....(never an exam before.
3. They went on a big tour of Britain. First they ..... in London for a few days. Then they ..... Cambridge, York, and Edinburgh, and then Bath. They ..... to Bath before, but they ..... it so much that they ..... to go back again.
4. Scientists announced the launch of the new drug last week. They ..... it for five years.
5. By the time I got to the meeting they .....(already) the important issues and they ..... the big decisions without me.

IV. (A) The table below gives information on consumer spending on different items in five different countries in 2002. **(8 Marks)**

Summarise the information by selecting and reporting the main features, and make comparisons where relevant.

Percentage of national consumer expenditure by category – 2002

Country	Food/Drinks/Tobacco	Clothing/Footwear	Leisure/Education
[illegible]	28.91%	6.43%	2.21%
[illegible]ly	16.36%	9.00%	3.20%
[illegible]ain	18.80%	6.51%	1.98%
[illegible]ce	15.77%	5.40%	3.22%
[illegible]key	32.14%	6.63%	4.35%

IV. (B) Describe a party that you enjoyed. **(8 Marks)**

You should write:

whose party it was and what it was celebrating
where the party was held and who went to it
what people did during the party
and explain what you enjoyed about this party.

IV. (C) 1. How do you usually contact your friends? [Why?] **(2 Marks)**

2. What kinds of national celebration do you have in your country? **(2 Marks)**

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

Some people believe that there should be fixed punishments for each type of crime. Others, however, argue that the circumstances of an individual crime, and the motivation for committing it, should always be taken into account when deciding on the punishment.

Discuss both these views and give your own opinion.

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

Department of Higher Education

University of Computer Studies

Third Year (B.C.Sc./B.C.Tech.)

Mid Term Examination

Computer Organization (CST-301)

March, 2017

Zone IV

Answer all questions **Time allowed: 3 hours**

2. (a) State whether the following statements are **TRUE** or **FALSE**. **(5 marks)**

(i) The time interval between the corresponding edges of two consecutive pulses is known as the clock cycle time.

(ii) In memory operation, the 8-bit port is controlled by one register, PC, which reads 1 byte into the low-order 8 bits of MDR.

(iii) Two of the key parameters that determine the performance of a CPU are the number of address pins and the number of data pins.

(iv) Immediate addressing has the virtue of not requiring an extra memory reference to fetch the operand.

(v) The Mic-1 is a software-controlled machine with sequential execution and parallelism.

(b) Choose **correct** or **the best alternative** in the following: **(5 marks)**

(i) Problem-oriented language level usually consists of _____ designed to be used by application programmers with problems to solve.

A. assembly language **B.** high-level language
C. machine language **D.** java language

(ii) A _____ is a circuit that takes an n-bit number as input and uses it to select exactly one of the 2^n output lines.

A. multiplexer **B.** decoder **C.** demultiplexer **D.** comparator

(iii) The flip-flop is a binary cell capable of storing information of _____

A. word **B.** byte **C.** zero bit **D.** one bit

(iv) The method for specifying an operand in memory is just to give its full address is called _____ addressing.

A. direct **B.** index **C.** register **D.** immediate

(v) The _____is a highly pipelined design, with seven stages and far more complex hardware.

A. Mic-2 **B.** Mic-1 **C.** Mic-4 **D.** Mic-3

(c) **Match** each of items in List-1 with the most appropriate one in List-2: **(5 marks)**

List-1	List-2
(i) An address register is used to read and write ISA level data words	A. CPP
(ii) A memory data register is to hold the current microinstruction	B. MDR
(iii) A register contains the address of the first word of the constant pool	C. MAR
(iv) A memory address register of the control store	D. PC
(v) A data register is used to read and write ISA level data words	E. MIR
	F. MPC

2. Define **ANY FOUR** of the following: **(8 marks)**
   (i) Non-inverting buffer
   (ii) Interpreter
   (iii) Stack Addressing
   (iv) Microinstruction Register (MIR)
   (v) Bus Protocol

3. Describe the differences between **ANY THREE** of the following: **(12 marks)**
   (i) Ripple carry adder and Carry select adder
   (ii) B bus and C bus
   (iii) Indexed addressing and Based-indexed addressing
   (iv) Buscontrol pins and Interrupt pins

4. Describe the six-level of computer and briefly explain any two levels. **(7 marks)**

5. (a) (i) Draw the circuit diagram for the new 1 bit ALU to compute any one of the fo functions -namely AANDB, AXOR B, $\bar{B}$, or A + B (A adds B) depending on whether t function select input lines. **(7 mark**

   (ii) How to organize the 512-Mbits memory chip which requires two bank select lines choose one of four internal memory banks using 128M×4 bits? **(3 mark**

   (iii) Consider the timing diagram of a synchronous bus. We will use the 100 MHz clo It takes 1 nsec for a signal to change. The address output delay is 16 nsec and the data up time is 5 nsec. How much time read data a word from memory after address l stable? **(3 mark**

   (b) (i) Construct the 1-bit ALU that can perform one of the followings namely AAN AOR B, $\bar{B}$, or A + B. It also contains six control lines, ENA, ENB, INVA, INC, F0, F1. How does above ALU produces the following output? In each case, specify the va of six control lines, A, A+B, A OR B and B-A. **(4 mark**

   (ii) Draw the logic diagram for four 3-bit words memory organization. **(9 mark**

(5 marks)
List-2
A. CPP
B. MDR
C. MAR
D. PC
E. MIR
F. MPC
(8 marks)

(12 marks)

(7 marks)

one of the fo
on whether th
(7 marks)

k select lines
(3 marks)

100 MHz cloc
and the data s
fter address li
(3 marks)

namely AAND
A, INC, F0, a
specify the val
(4 marks)

(9 marks)

6. (a) Write the detail of MIR for the following microcode to implement the IJVM instructions. **(8 marks)**

Label	Operations
Main1	PC = PC + 1; fetch; goto (MBR)
bipush1 bipush2 bipush3	SP = MAR = SP + 1 PC = PC + 1; fetch MDR = TOS = MBR; wr; goto Main 1
ifeq1 ifeq2 ifeq3	MAR = SP = SP – 1; rd OPC= TOS TOS = MDR

(b) (i) Convert the following "sum of ten even numbers" Java code to IJVM instruction: **(5 marks)**

```
sum = 0;
j = 0;
i = 1;
while (i<= 10)
{       j = j + 2;
        sum += j;
        i ++;
  }
```

(ii) Describe the three basic approaches for increasing the speed of execution. **(3 marks)**

7. (a) Compare 0-, 1-, 2-, and 3-address machines by writing programs to compute

X = E / ((A + B) * (C +D))

for each of the four machines. The instructions available for use are as follows:

0-Address	1-Address	2-Address	3-Address
PUSH M	LOAD M	MOV (X = Y)	MOV (X = Y)
POP M	STORE M	ADD (X = X+Y)	ADD (X = Y+Z)
ADD	ADD M	SUB(X = X−Y)	SUB (X = Y−Z)
SUB	SUB M	MUL (X = X*Y)	MUL (X = Y*Z)
MUL	MUL M	DIV (X = X / Y)	DIV (X = Y/Z)
DIV	DIV M		

M is 16-bits memory address and X,Y,and Z are either 16-bit addresses or 4-bit registers. With 8-bit opcodes and instruction lengths that are multiples of 4 bits, how manybits does each machine need to computer X? **(12 marks)**

(b) (i) Convert the following infix formulas to reverse Polish notation. **(2 marks)**

a. (A OR B) OR (C AND D)

b. ((A+B)*(C+D)) / (E+F-G)

(ii) Convert the following reverse Polish notation formulas to infix. **(2 marks)**

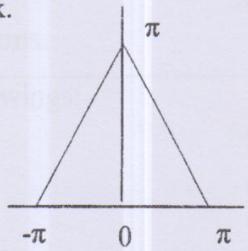
a. ABCDE + * * /

b. AB * CD * + E -

Department of Higher Education
University of Computer Studies
Third Year (B.C.Sc. /B.C.Tech.)
Mid Term Examination
Mathematics of Computing III (CST-302)
March, 2017
Zone IV

Answer All Questions **Time allowed: 3hours**

(a) Find the Fourier series of the given function f(x), which is assumed to have the period 2π. Show the details of your work.



(b) Find the Fourier cosine transform of $f(x) = e^{-ax}$, where $a > 0$ by integration and by differentiation. (20 marks)

(a) Is the following function even or odd or neither even nor odd? Why? Find its Fourier series by showing details of your work.

$f(x) = x^2 \quad (-1<x<1), \quad p=2$

(b) Represent in polar form and graph in the complex plane $z = -3+3i$.

(c) Determine and sketch or graph the sets in the complex plane given by

(i) $|z+1-5i| \leq \frac{3}{2}$ (ii) $0 < |z| < 1$ (20 marks)

(a) Verify that $u=x^2-y^2-y$ is harmonic in the whole complex plane and find a harmonic conjugate function v of u and $f(z) = u(x,y) + iv(x,y)$.

(b) Show that (i) $\cos z = \cos x \cosh y - i \sin x \sinh y$. (ii) $\sin z = \sin x \cosh y + i \cos x \sinh y$. (20 marks)

(a) Of a lot of 10 items, 2 are defective. (i) Find the number of different samples of 4. Find the number of samples of 4 containing (ii) no defectives, (iii) 1 defective, (iv) 2 defectives.

(b) Find the mean and variance of the random variable X with probability function or density f(x).

(i) $f(x) = \frac{1}{d-e}$ if $e<x<d$ (ii) $f(x) = 3e^{-3x}$ $(x \geq 0)$ (20 marks)

(a) (i) In how many different ways can 7 people be seated at a round table?

(ii) Let X be the number of cars per minute passing a certain point of some road between 8 A.M. and 10 A.M. on a Sunday. Assume that X has a Poisson distribution with mean 5. Find the probability of observing fewer than 5 cars during any given minute.

(b) Five fair coins are tossed simultaneously. Find the probability function of the random variable X=Number of tails and compute the probability of obtaining no tails, precisely 1 tail, at least 1 tail, not more than 4 tails. (20 marks)

Department of Higher Education
University of Computer Studies
Third Year(B.C.Sc./B.C.Tech.)
Mid-Term Examination
Data and Computer Communications I (CST-303)
Zone IV
March, 2017

Answer All questions. **Time allowed: 3 hours**

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1. Define the followings: (20 marks)

   (a) Channel
   (b) UTP
   (c) Unipolar
   (d) Bit Stuffing
   (e) Bandwidth
   (f) Error rates
   (g) Subcarrier
   (h) Trunks
   (i) Flow Control
   (j) Security and Privacy

2. Answer **Any Four** of the following. (20 marks)

   (a) What are the most significant impairments and explain any one of the transmission impairments?
   (b) Describe three transmission modes.
   (c) Explain about the Delta Modulation.
   (d) Sketch the waveform diagram for the binary sequence 01001100011 using any five of signal encoding schemes.
   (e) Discuss about characteristic distinguishes optical fiber from twisted pair or coaxial cable.
   (f) Describe VSAT configuration with diagram.

3. (a) Explain about two common techniques for controlling the timing of bit stream between transmitter and receiver(asynchronous and synchronous transmission) with frame format. (10 marks)
   (b) List three versions of automatic repeat request (ARQ) and describe Selective-reject ARQ with diagram. What are the transferred modes supported by HDLC? Describe each. (10 marks)

4. (a) Why is a statistical time division multiplexer more efficient than a synchronous time division multiplexer? (10 marks)
   (b) Define direct sequence spread spectrum and explain how it achieves bandwidth spreading. Define FHSS and draw a diagram of frequency-hopping spread spectrum. (10 marks)

5. (a) Describe the comparison of circuit switching and packet switching with diagram. What are the advantages of packet switching compared to circuit switching? (10 marks)
   (b) Describe four key Routing Strategies and explain each. (10 marks)

Department of Higher Education
University of Computer Studies
Third Year (B.C.Sc.)
Mid Term Examination
Software Engineering (CS-304)
March, 2017
Zone IV

Answer all questions. **Time allowed: 3hours**

I. Choose the correct answer from the following: **(20 marks)**

1. Rapid software development processes are designed to produce useful software quality.

   (a)True
   (b)False

2. Throw-away prototyping is to validate or derive the system requirement.
   (a) True
   (b) False

3. Continual change tends to corrupt the structure of any software system.
   (a) Validation problems
   (b) Maintenance problem
   (c) Management problem

4. It is used to define and create reports from information in the database.
   (a) A report generator
   (b) Interface generator
   (c) Parser generator

5. Reuse-based software engineering is an approach to development that tries to minimize the reuse of existing software.
   (a) True
   (b) False

6. Aspect-oriented software development addresses one of the major problems in software design.
   (a) True
   (b) False

7. Software components that implements a single function, such as a mathematical function or an object class, may be reused is called.....
   (a) application system reuse
   (b) component reuse
   (c) object and function reuse

8. This approach is embodied in system such as Lex and yacc for C and JavaCC, compiler of Java.
   (a) Code generator
   (b) Parser generator
   (c) Report generator

9. A software component is a unit of composition with contractually specified interfaces and explicit context dependencies only.
   (a) True
   (b) False

10. Component validation involves developing a set of test cases for the component and developing a test harness to run the component test.
   (a) True
   (b) False

11. There are two stages in the.....where you have to identify components for possible use in the system.
   (a) Software process
   (b) CBSE process
   (c) Evolution process

12. The names of the operations in the provides and requires interfaces are different.
   (a) Parameter incompability
   (b) Operation incompability
   (c) Operation incompleteness

13. Verification and Validation process are intended to establish the existence of defects in a software system.
   (a) True
   (b) False

14. Static analyzers are software tools that scan the source text of a program and detect possible faults and anomalies.
   (a) True
   (b) False

15. ..... is intended to reveal defects in the system rather than to simulate its operational use.
   (a) Validation
   (b) Defect
   (c) Interface

16. This stage highlights how variables in the program are used is called.....analysis.
   (a) Interface
   (b) Path
   (c) Data use

17. All system functions that are accessed through menus should be tested.
   (a) True
   (b) False

18. Test case design is a part of system and component testing where you design the test data that test system.
    (a) True
    (b) False

19. .....testing, where the test team has access to the source code of the system.
    (a) Release
    (b) Interface
    (c) Integration

20.....generates test data for the program to be tested.
    (a) Test manager
    (b) Test data generator
    (c) Report generator

II. Define <u>any five</u> from the following terms: **(10 marks)**

(i) Test-first development
(ii) Agile method
(iii) Application framework
(iv) Component composition
(v) Debugging
(vi) Path testing
(vii) Software inspection

III. Write the short notes on any five from the following: **(20 marks)**

(i) Benefits of using prototyping.

(ii) Describe the components at each level in the product line system.

(iii) Three type of composition.

(iv) Two complementary approach to system checking and analysis within the V&V process.

(v) Discuss the two distinct phases to system testing.

(vi) Three classes of framework in application frameworks.

(vii) Objectives of incremental development and prototyping.

IV. (a) Explain the number of practices in XP that fit into the principles of agile methods. **(10 marks)**

(b) What are the benefits of software reuse? **(10 marks)**

V. (a) Briefly explain about the essential differences between CBSE process and software process based on original software development. **(10 marks)**

(b) Describe the five key strategies of cleanroom software development.

VI. Draw a flow graph for the Breadth First Search procedure in the figure, display the paths through the breadth first search flow graph and calculate the Cyclomatic Complexity of program flow graph **(10 marks)**

```
Class Bread First Search {
    public void bfs ( )
    {
1.      Queue queue = new LinkedList ( );
2.      queue.add (this. rootNode);
3.       printNode (this. rootNode);
4.      rootNode.visited = true;
5.      while (! Queue.isEmpty ( ))
        {
6.          Node node = (Node)queue.remove();
7.      while( ( child = getUnvistedChildNode( node ))!= null)
        {
8.          child.visited = true;
9.          printNode (child);
10.         queue.add (child);
        }
    }
11.         ClearNodes( );
12.     }
```

Figure : Breadth First Search

Department of Higher Education
University of Computer Studies
Third Year (B.C.Sc)
Mid Term Examination
Computer Application Technique III (CS-305)
March-2017
Zone IV

Answer all questions **Time Allowed: 3 hours**

1. Write C# statements for the following: (20-marks)

a) Write a program in which accept a number from the user between 1 to 7 and display corresponding days starting with Monday. **Hint:** Use switch case.

b) Create a delegate Func that takes three integer parameters and sorts the order of parameters and display the middle data in console window.

c) Create a Queue Collection object and add the names of first 7 days. Remove the first item in Queue and display it. And then all remaining item are display in console window.

d) Create a generic dictionary collection object with given data and display them in console window as follow:
[1, January]
[2, February]
[3, March]
[4, April]

e) Write a program to calculate formula πr^2 by using the Math object with console application. which accept a radius from the user.

f) Create a stack collection object and add with four items ('A', 'B', 'C', 'D'). Display in console window. And then add next two items ('E', 'F'). Display an item at the top of stack without removing it. And display all item in stack. Remove 3 items in the stack by using pop() method. Display all remaining item in console window.

(8-marks)

g) Make an Oven class that has TempFahrenheit and TempCelsius properties to get and set the temperature in degrees Fahrenheit and Celsius, respectively. Use the following equations to convert from one to the other.
C*9/5+32
(F-32)*5/9

(7-marks)

h) Create a console application project with the following:

Define a Class named "Student" that has 3 data members (StudentId, FirstName and LastName) and a static method named LookupStudent(int id). StudentId, FirstName and LastName are defined by using auto-implemented property. This has a parameterized constructor that takes three parameters (StudentId, FirstName and LastName) and assign to class's members. Define firstName and lastName array in the "LookupStudent()" method. Initialize them to hold the names "Ann Archer", "Ben Baker", "Cindy Cant" and "Dan Devers".

If the user entered an Id, that is outside the arrays' bounds, return null. Otherwise, return a student with Id, firstname and lastname.
In main method, user entered a StudentId. Look up student by using "LookupStudent(int id)" method. If the student is found, display the student information with Id, firstname and lastname. Otherwise, display "There is no student in array".

(15-marks)

4(a). A firm has prepared the Sales budget for the coming six months period; January to June. Units of Sales are expected to:

Jan	Feb	Mar	Apr	May	June
100	120	120	105	90	130

The opening stock of units on January 1st is 55 units and a Closing stock of 50 units will be required at the end of June.
All units are sold for $12 each, 10%of sales are for cash and the remainders are sold on one month's credit. Sales in December were 95 units.
The cost of raw materials required for each unit is $3.Materials are paid for in cash and are bought in the same month of the unit is manufactured.
Wages are expected to be $500 per month and other expenses $250 per month, increasing to $300 in May and June. The firm intends to buy some new machinery in April for $1,500.
The opening balance of cost is $200.
REQUIRED:
(a)Calculate the monthly production required (in units) if the firm want to maintain production of even level.
(b)Prepare the Sales Revenue budget.
(c)Calculate the monthly cost of purchases at raw materials.
(d)Prepare the Cash budget for the six month period.

(10-marks)

4(b). A firm had produces the following budget of the beginning of the year.

Sales	10,000 units
	$
Revenue	200,000
Materials	35,000
Labour	40,000
Variable Overheads	17,500
Fixed Overheads	60,000
Net Profit	47,500

At the end of the year the sales amounted to 11,000 units and selling price per unit had been $21.50. The costs of materials were actually $3.65 and Labour was $3.90 per unit. Variable Overheads amounted to $16,800 and Fixed Overheads were $63,000.

REQUIRED:
(a)Devise a flexible budget for the actual sales volume.
(b)Draw up the profit/loss account for the actual results.
(c)Calculate the main variances.
(d)Briefly suggest reasons for the variances.

(10-marks)

5(a). Gold and Silver construction intends to replace one of its machine. The final decision will be based entirely on financial grounds. Details are given below of the alternative replacement machine being considered

Machine	A	B
Cost of capital	250,000	200,000
Cash inflow per year	($, 000)	($, 000)

Year 1	60	65
2	120	65
3	100	65
4	60	65
5	40	65
Salvage value at life Year 5	30	20

It also additional expenses to machine B for extension system $10,000 for each year, at the beginning of the project. It is intended to choose only one of the machine and to finance 1/3 of all capital with loan and 2/3 with equality. Assume also the cost of financing with loan 14% and 15% of equality.

REQUIRED:

a) The Weighted Average Cost of Capital.

b) NPV for each machine. Which machine should be accepted or rejected, why?

c) Calculate the Internal Rate of Return and Payback period for accepted machine.

Notes:

Present value of an ordinary annuity of $ 1 is:

Year	10%	15%	20%
	0.909	0.870	0.833
	0.826	0.756	0.694
	0.571	0.658	0.579
	0.683	0.572	0.482
	0.621	0.497	0.402

(20-marks)

(b) What are the sub systems of tactical level financial information system? Describe about the budgeting system and Cash management system.

(10-marks)

Department of Higher Education
University of Computer Studies
Third Year (B.C.Sc.)
Mid Term Examination
Advanced Java Programming (CS-306)
March, 2017
Zone IV

Answer all questions **Time allowed: 3 hours**

1. Choose the correct answer. **(10 marks)**

(i) Which classes are used for connection oriented socket programming?
(a) Socket (b) ServerSocket
(c) Both a and b (d) None of above

(ii) How many ports of TCP/IP are reserved for specific protocols?
(a) 10 (b) 1024 (c) 2048 (d) 512

(iii) Which method of the Naming class (found in java.rmi) is used to update the RMI registry on the server machine?
(a) rebind () (b) lookup ()
(c) Both A & B (d) None of the above

(iv) In a RMI client program, what are the exceptions which might have to handle?
(a) Remote Exception (b) NotBoundException
(c) MalformedURLException (d) Above All

(v) Which of the following method can be used to read a multiple values with same name, for example check box selections?
(a) request.getParameter() (b) response.getParameter()
(c) request.getParameterValues() (d) response.getParameterValues()

(vi) Which of the following code can be used to write a cookie?
(a) request.addCookie(cookie) (b) response.addCookie(cookie)
(c) Header.addCookie(cookie) (d) None of the above

(vii) Which of the following are the session tracking techniques?
(a) URL rewriting,using session object,using response object,using hidden field
(b) URL rewriting,using session object,using cookies,using hidden field
(c) URL rewriting,using session object,using response object,using cookie
(d) URL rewriting,using request object,using response object,using session object

(viii) Which of the following attribute is used to mark a page as error processing page?
(a) isErrorPage (b) errorPage
(c) exception (d) exceptionPage

(ix) Which of the following is not a directive?

(a) Include (b) page (c) export (d) useBean

(x) How many numbers are printed, when the following JSTL code fragment is execut
Select the one correct answer.

```
<%@ taglib uri=http://java.sun.com/jsp.jstl/core prefix="c"%>
<c:forEach var="item" begin="0" end="10" step="2">
        ${item}
</c:forEach>
```

(a) 1 (b) 5 (c) 6 (d) 11

2. (a) Write a client-server program in which the client requests two integer numbers (eg. a and b) from the user and sends these to the server. The server calculates the result for "$a^b + b^a$" and sends the result back to the client. Write two programs for client side and server side. **(10 marks)**

(b) Write Client-Server architecture using RMI protocol that calculate the square and cube value for an integer number. The server gets a character (S or C) and an integer number from client and returns the square or cube value to the client. **(15 marks)**

3. (a) Write an application for survey form that contains survey.html, infoServlet.java. First the user must fill the survey form data and then the detail information will be displayed as following. Write servlet definition and servlet mapping in web.xml. **(10 marks)**

Survey Form

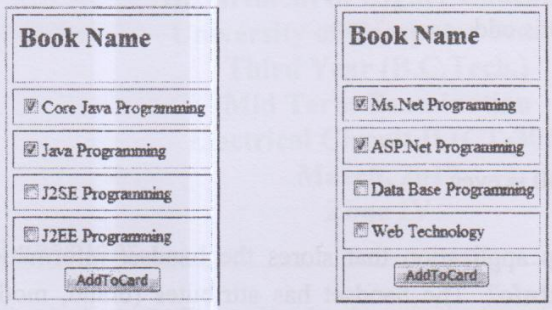
Name: Ma Ma
Occupation: student
Age: 18
Address: Mandalay
Your Favourite Songs: ☑ Classical ☑ Hip Hop/Rap ☑ Pop ☐ Rock ☐ Others
Your Favourite Movies: ☑ Action ☑ Drama ☑ Comedy ☐ Horror ☐ Others
Submit Reset

Thank you for participation
Name:Ma Ma
Occupation:student
Age:18
Songs
- Classical
- Hip Hop/Rap
- Pop

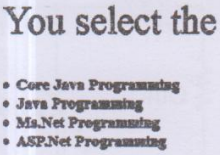
Movies
- Action
- Drama
- Comedy

Home

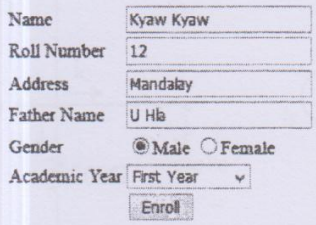
(b) Write an online book ordering system using three servlet files named "JavaBookServlet.java", "NetBookServlet.java" and "ResultServlet.java". The first two servlet files are used to select required books as follow: **(15 marks)**



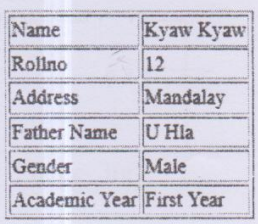
After the user finishes book ordering, "ResultServlet.java" is used to display the ordered book list as follows. You can use session or cookie for displaying ordered book list.



4. Write a student enrollment system by creating two JSP pages and one Java Bean class. The first JSP page "enroll.jsp" requests data from student as the following figure: **(15 marks)**



The Bean class "student.java" is instantiated from the incoming request with an appropriate value. By using JSP's bean, the system can display the enrolled student's information on "display.jsp" as follow:



5. (a) Write a JSP program using JSTL that checks the numbers between 1 and 30 are even or odd. The output should be the following:

1 is odd
2 is even
3 is odd
.....
.....
.....
30 is even **(10 marks)**

(b) Develop a mobile shop application that stores the handset information in relation database, named "**HandsetInfo**". The handset has attributes (brand, model, color, and price), these are stored in "**Handset**" table. Write JSP/Servlet to store new handset information to the table and then displays information of the "**Handset**" table in the database. **(15 marks)**

display the
Cyclomatic
(10 marks)

Department Of Higher Education
University of Computer Studies
Third Year (B.C.Tech)
Mid-Term Examination
Electronic I (CT-304)
March, 2017
Zone IV

nswer All Questions **Time allowed: 3hours**

Explain the *V-I* characteristic for forward bias and reverse bias and draw the complete *V-I*.

Characteristic curve.

(ii) Determine the forward voltage and forward current for the diode in figure 1(b-i) for each of the diode models. Also find the voltage across the limiting resistors in each case. Assume

$r_d' = 10\Omega$ at the determined value of forward current.

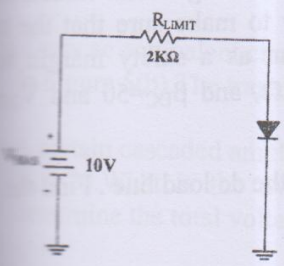


Fig1(b-i)

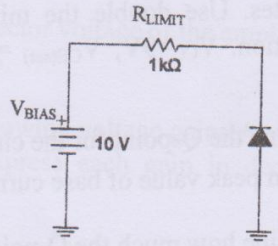


Fig1(b-ii)

(iii) Determine the reverse voltage and reverse current for the diode in Figure 1(b-ii) for each of the diode models. Also find the voltage across the limiting resistor in each case. Assume $I_R = 1\mu A$.

Consider the circuit in figure2(a)
(i) What type of circuit is this?
(ii) What is the total peak secondary voltage?
(iii) Find the peak voltage across each half of the secondary
(iv) Sketch the voltage waveform across R_L.
(v) What is the peak current through each diode?
(vi) What is the PIV for each diode?

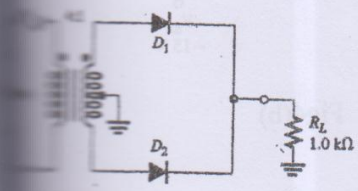


Fig 2(a)

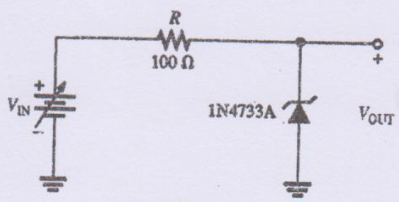


Fig2 (b)

(b) Determine the minimum and maximum input voltages that can be regulated by the zener di in figure2(b).

3. (a) Determine I_B, I_C, I_E, V_{BE}, V_{CE} and V_{CB} in the circuit of Figure 3(a). If V_{CE} (sat)=0.2, dete whether or not this transistor is in saturation .

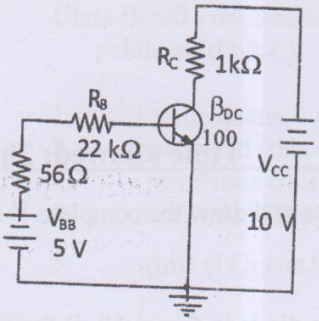


Fig 3(a)

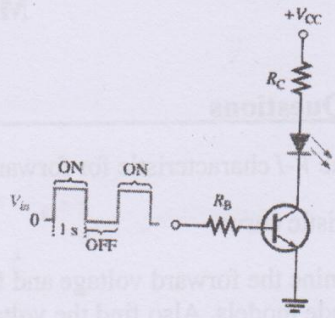


Fig 3(b)

(b) The LED in Figure 3(b) requires 30 mA to emit a sufficient level of light. Therefor collector current should be approximately 30 mA. For the following circuit values, dete the amplitude of the square wave input voltage necessary to make sure that the tra saturates. Use double the minimum value of base current as a safety margin to e saturation. V_{CC}=9V, $V_{CE(sat)}$ =0.2V, R_C=220Ω, R_B=3.3 kΩ, and β_{DC}=50 and V_{LED}=

4. (a) Determine the Q-point for the circuit in Figure 4(a) and draw the dc load line . Find the maximum peak value of base current for linear Operation.

(b) Determine how much the Q-point (I_C, V_{CE}) for the circuit in figure 4(b) will change if β_{DC} increases from 100 to 200 when one transistor is replaced by another.

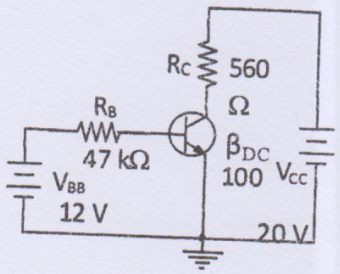


Fig4(a)

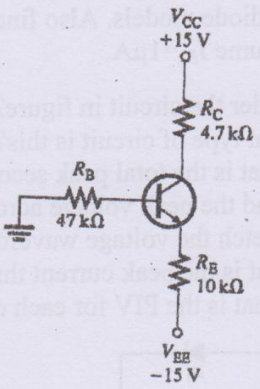


Fig4(b)

(a)Determine R_{TH} ,V_{TH},I_E, I_C, V_E ,V_B,V_C,V_{CE} using the dc equivalent Circuit in Figure5(a).

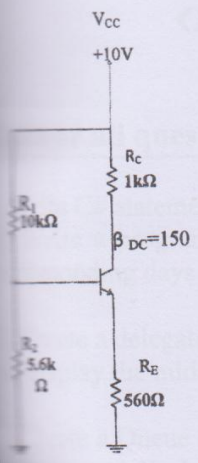


Fig 5(a)

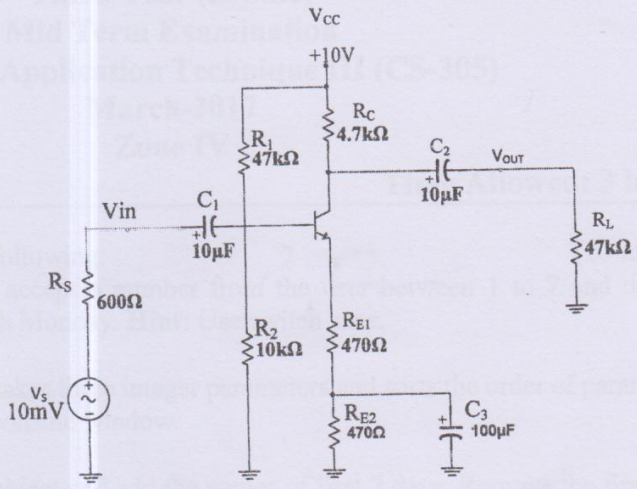


Fig5 (b)

(ii) Draw ac equivalent circuit and determine the ac collector voltage of the amplifier in Figure 5(b).The transistor has β_{DC}=150 andβ_{ac}=175.

(iii) A certain cascaded amplifier arrangement has the following voltage gains:A_{v1}=10,A_{v2}=15,and A_{v3}=20.What is the overall voltage gain? Also express each gain in decibels (dB) and determine the total voltage gain in dB.

Department of Higher Education
University of Computer Studies
Third Year (B.C.Tech.)
Mid Term Examination
Linear Control Systems I(CT 305)
March, 2017
Zone IV

wer ALL Questions **Time allowed: 3 hours**

a). Obtain the transfer function of the differentiating circuit shown in Fig1-a.

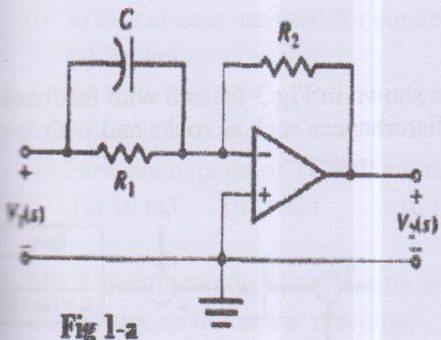


Fig 1-a

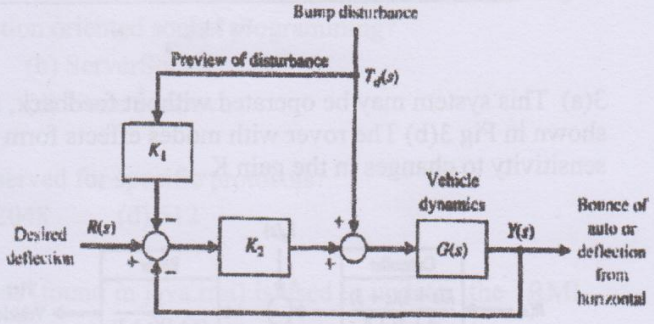


Fig 1-b

example of a simple suspension system that can accommodate the bumps is Shown in Fig 1-b
the appropriate gain K_1 so that the vehicle does not bounce when the desired deflection is R(s) =
the disturbance is T_d (s)

Consider the feedback system in Fig2-a with

$G_c = \frac{K(s+0.3)}{s}$ H(s) = 2s and $G(s) = \frac{1}{(s-2)(s^2+10s+45)}$ Assuming R(s)=0 and

N(s)= 0 and the close-loop transfer function from the disturbance Td(s) find the output Y(s)

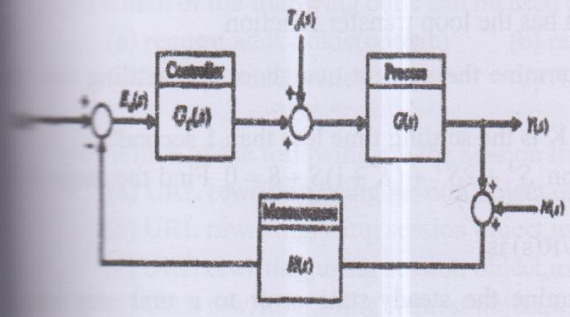


Fig 2-a

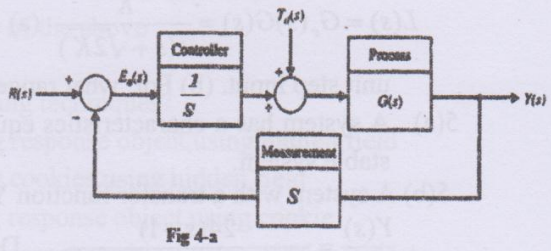


Fig 4-a

2 (b) The system is represented the block diagram of the system is shown in Fig 2-b. Find the tra function Y(s)/R(s) using Mason's signal-flow gain formula.

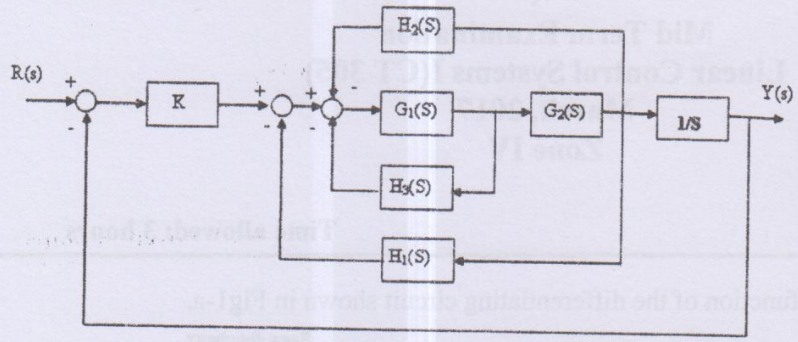


Fig 2-b

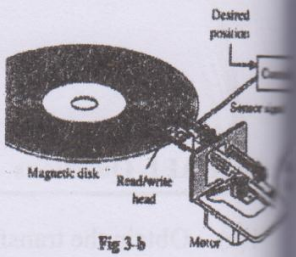
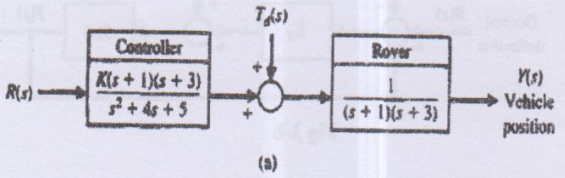
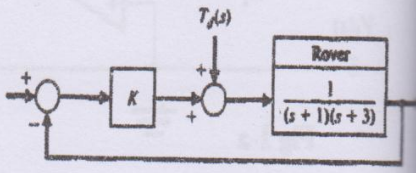


Fig 3-b

3(a) This system may be operated without feedback, as shown in Fig 3-(a) and with feedback as shown in Fig 3(b) The rover with modes effects form disturbances such as rocks and with low sensitivity to changes in the gain K.



(a)



(b)

3(b) A magnetic disk drive requires a motor to position a read/write head over tracks of data spinning disk, as shown in Fig 3-b. The motor and head may be represented by the transfer functi $G(s) = \frac{10}{s(\tau s + 1)}$ where τ = 0.001 second. The controller the difference of the actual and de position and generates an error This error is multiplied by an amplifier K.(a) what is the steady position error for a step change in the desired input? (b) Calculate the required K in order to y steady-state error of 0.1 mm for a ramp input of 10 cm/s

4(a) Consider the feedback control system in Fig 4-a where $G(s) = \frac{K}{(S+10)}$ .The nominal va K=10.Using a 2% criterion, compute the settling time T_s for a unit step disturbance, $T_d(s)$=

4(b) A unity negative feedback control system has the loop transfer function

$L(s) = G_c(s)G(s) = \frac{K}{s(s+\sqrt{2K})}$ (a) Determine the percent overshoot and settling time du unit step input. (b) For what range of K is the settling time less than 1 second?

5(a) A system has a characteristics equation $S^3 + 2S^2 + (K+1)S + 8 = 0$ Find the range of K stable system.

5(b) A system with a transfer function Y(s)/R(s) is

$\frac{Y(s)}{R(s)} = \frac{24(s+1)}{s^4 + 6s^3 + 2s^2 + s + 3}$ Determine the steady-state error to a unit step input i system stable?

* * * * * * * * * * * * * * *

Department of Higher Education
University of Computer Studies
Third Year (B.C.Tech.)
Mid Term Examination
Electrical Circuit II (CT-306)
March, 2017
Zone IV

Answer all questions. **Time allowed: 3 hours**

1. (a) The circuit shown in Figure-1(a) has been in the form for a very long time. The switch opens at $t = 0$. Find i_R at t equals to (i) 0^-; (ii) 0^+; (iii) ∞; (iv) $1.5\,ms$.

   (b) Find the circuit of Figure-1(b), find the voltage labeled v_c for t>0 if $v_c(0^-) = 2V$.

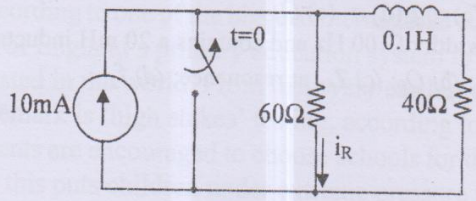


Figure - 1(a)

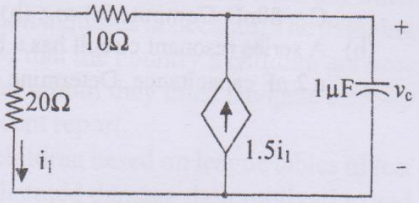


Figure - 1(b)

2. (a) Find an expression for $v_c(t)$ valid for $t > 0$ in the circuit of Figure-2 (a).

   (b) Let i_S=10u(–t) –20u(t) A in Figure-2(b). Find (a) $i_L(0^-)$; (b) $v_c(0^+)$; (c) $v_R(0^+)$;(d) $i_L(\infty)$; (e) i_L(0.1ms).

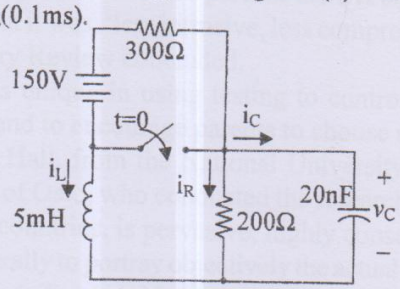


Figure- 2(a)

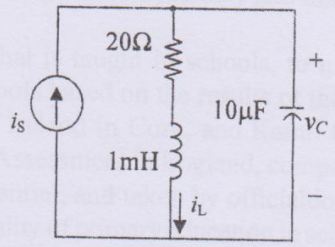


Figure-2(b)

3. (a) Let $v(t)=60e^{-2t}\cos(4t+10°)$ V in the circuit shown in Figure-3(a), and work in the frequency domain to find (i) I, (ii) i(t).

   (b) Given the series RL circuit shown in Figure-3(b), calculate the current through the 4Ω resistor.

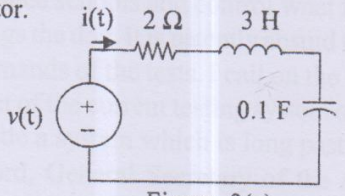


Figure- 3(a)

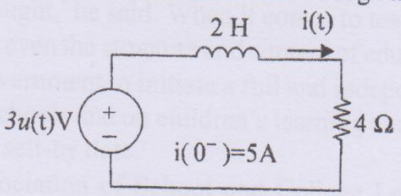


Figure- 3(b)