

Department of Higher Education
University of Computer Studies, Hinthada
Third Year (B.C.Sc. / B.C.Tech.)
Final Examination
English
September, 2018

Answer All Questions.

Time Allowed: 3 Hours

(20 Marks)

I. Read the passage below and answer the following questions.

A. Every autumn, when recruitment of new graduates and school leavers begins, major cities in Japan are flooded with students hunting for a job. Wearing suits for the first time, they run from one interview to another. The season is crucial for many students, as their whole lives may be determined during this period.

B. In Japan, lifetime employment is commonly practised by large companies. While people working in small companies and those working for sub-contractors do not in general enjoy the advantages conferred by the large companies, there is a general expectation that employees will in fact remain more or less permanently in the same job.

C. Unlike in many Western countries where companies employ people whose skills can be effective immediately, Japanese companies select applicants with potential who can be trained to become suitable employees. For this reason, recruiting employees is an important exercise for companies, as they invest a lot of time and money in training new staff. This is basically true both for factory workers and for professionals. Professionals who have studied subjects which are of immediate use in the workplace, such as industrial engineers, are very often placed in factories and transferred from one section to another. By gaining experience in several different areas and by working in close contact with workers, the engineers are believed, in the long run, to become more effective members of the company. Workers too feel more involved by working with professionals and by being allowed to voice their opinions. Loyalty is believed to be cultivated in this type of egalitarian working environment.

D. Because of this system of training employees to be all-rounders, mobility between companies is low. Wages are set according to educational background or initial field of employment, ordinary graduates being employed in administration, engineers in engineering and design departments and so on. Both promotions and wage increases tend to be tied to seniority, though some differences may arise later on as a result of ability and business performance. Wages are paid monthly, and the net sum, after the deduction of tax, is usually paid directly into a bank account. As well as salary, a bonus is usually paid twice a year. This is a custom that dates back to the time when employers gave special allowances so that employees could properly celebrate bon, a Buddhist festival held in mid-July in Tokyo, but on other dates in other regions. The festival is held to appease the souls of ancestors. The second bonus is distributed at New Year. Recently, bonuses have also been offered as a way of allowing workers a share in the profits that their hard work has gained.

E. Many female graduates complain that they are not given equal training and equal opportunity in comparison to male graduates. Japanese companies generally believe that female employees will eventually leave to get married and have children. It is also true that, as well as the still-existing belief among women themselves that nothing should stand in the way of child-rearing, the extended hours of work often do not allow women to continue their careers after marriage.

F. Disappointed career-minded female graduates often opt to work for foreign firms. Since most male graduates prefer to join Japanese firms with their guaranteed security, foreign firms are often keen to employ female graduates as their potential tends to be greater than that of male applicants.

G. Some men, however, do leave their companies in spite of future prospects, one reason being to take over the family business. The eldest sons in families that own family companies or businesses such as stores are normally expected to take over the business when their parents retire. It is therefore quite common to see a businessman, on succeeding to his parents' business, completely change his professional direction by becoming, for example, a shopkeeper.

H. On the job, working relationships tend to be very close because of the long hours of work and years of service in common. Social life in fact is frequently based on the workplace. Restaurants and *nomi-ya*, "pubs", are always crowded at night with people enjoying an evening out with their colleagues. Many companies organise trips and sports days for their employees. Senior staff often play the role of mentor. This may mean becoming involved in the lives of junior staff in such things as marriage and the children's education.

I. The average age of retirement is between 55 and 60. For most Westerners, retirement may be an eagerly awaited time to undertake such things as travel and hobbies. Many Japanese, however, simply cannot get used to the freedom of retirement and they look for ways of constructively using their time. Many look for new jobs, feeling that if they do not work they will be abandoned by society. This has recently led to the development in some municipalities of municipal job centres which advertise casual work such as cleaning and lawn mowing. Given that Japan is facing the problem of an increasingly ageing society, such activities may be vital in the future.

Questions 1-8

Choose the correct heading for paragraphs A-H from the list of heading below.

List of Headings

- i. how new employees are used in a company
- ii. women and Japanese companies
- iii. why men sometimes resign from Japanese companies
- iv. permanency in employment in Japan
- v. recruiting season: who, when and where
- vi. the social aspect of work
- vii. the salary structure
- viii. the recruitment strategy of foreign firms
- ix. Japanese people after retirement

1. Paragraph A
2. Paragraph B
3. Paragraph C
4. Paragraph D
5. Paragraph E
6. Paragraph F
7. Paragraph G
8. Paragraph H

Questions 9-10

Complete the sentences below with words taken from the reading passage. Use **NO MORE THAN THREE WORDS** for each answer.

9. Employees receive their wages monthly and a bonus -----.
10. Japanese workers often form close personal relationships and older staff may even become a ----- to junior staff.

(10 Marks)

II. (A). Complete the sentences below with *a / an* or *the*.
If no article is needed, put a cross (✖).

1. I can play piano.
2. I have applied to study at University of Edinburgh.
3. My husband is doctor.
4. I am going to take a cruise down river Nile.
5. My husband collects antiques. He is always going to auctions.
6. My father likes Classical music.
7. I come from United Arab Emirates.
8. I usually go to work by bus.
9. Sorry I am late - car would not start this morning.
10. sun was shining and it was a lovely day.

(10 Marks)

(B). Choose the correct word.

1. I am going shopping. I need to buy a **few** / a **little** things for tonight's party.
2. There are **some** / **any** pretty dresses in the store.
3. I can't wait for you. I have got a **few** / a **little** time.
4. Would you like **some** / **any** tea?
5. There is a **few** / a **little** snow on the ground. The children can't make a snowman.
6. There isn't **some** / **any** water in the glass.
7. We need a **few** / a **little** milk and a **few** / a **little** eggs to make a cake.
8. The baby is asleep. Don't make **some** / **any** noise.
9. There isn't **some** / **any** information in this book.

(20 Marks)

III. Fill the gaps in the following paragraph using the words in the box.

dials	loud	one	the	troublesome
under	well	but	bursts	background
limits	heard	and	numbers	performance
noise	exposed	to	ability	air-traffic

The noise was quite disruptive at first, but after about four minutes the subjects were doing just as ---(1)--- on their tasks as control subjects who were not ---(2)--- to noise. Their physiological arousal also declined quickly to ---(3)--- same levels as those of the control subjects. But there are ---(4)--- to adaptation and loud noise becomes more ---(5)--- if the person is required to concentrate on more than ---(6)--- task. For example, high noise levels interfered with the ---(7)--- of subjects who were required to monitor three ---(8)--- at a time, a task not unlike that of an aeroplane pilot or an ---(9)--- controller (Broadbent, 1957). Similarly, noise did not affect a subject's ---(10)--- to track a moving line with a steering wheel, ---(11)--- it did interfere with the subject's ability to repeat ---(12)--- while tracking (Finkelman and Glass, 1970).

Probably the most significant finding from research on ---(13)--- is that its predictability is more important than how ---(14)--- it is. We are much more able to 'tune out' chronic ---(15)--- noise, even if it is quite loud, than to work ---(16)--- circumstances with unexpected intrusions of noise. In the Glass ---(17)--- Singer study, in which subjects were exposed ---(18)--- bursts of noise as they worked on a task, some subjects ---(19)--- loud bursts and others heard soft ---(20)---.

(10 Marks)

IV. (A). Describe a healthy exercise you do.

You should write:

- what it is
- what equipment is needed for it and how it is done
- who you do it with
- where and when you do it
- how often you do it
- and explain why you think it is healthy.

(10 Marks)

(B). Answer the following questions.

1. Do you like music? [Why / Why not?]
2. What kinds of music are popular in your country?
3. What kind of music do you like to listen to? [Why?]
4. How much time do you spend listening to music everyday?
5. How do you feel when you listen to this music?

(20 Marks)

V. Write the following topic:

"Television dominates the free-time for too many people. It can make people lazy and prevent them from socializing with others. To what extent do you agree or disagree?"

Write at least 250 words.

END

Department of Higher Education
University of Computer Studies, Hinthada
Third Year (B.C.Sc. / B.C.Tech.)
Final Examination
Operating System (CST-301)
September 2018

Answer All Questions.

Time Allowed: 3 Hours

1. Choose the correct answer of the followings.

(10 marks)

- (i) The primary purpose of an operating system is to
- A. Make computer easier to use
 - B. Keep system programmers employed
 - C. Make the most efficient use of the hardware
 - D. Allow people to use the computers
- (ii) In which of the storage placement strategies a program is placed in the smallest available hole on the main memory?
- A. Best-fit
 - B. First-fit
 - C. Worst-fit
 - D. Buddy
- (iii) Indicate which is a preemptive scheduling algorithm
- A. Round-robin
 - B. Shortest-process-next
 - C. Priority-based
 - D. All of them
- (iv) The main function of the dispatcher is
- A. Swapping a process to the disk
 - B. Assigning ready process to the CPU
 - C. Suspending some of the processes when the CPU load is high
 - D. Bring processes from the disk to the main memory
- (v) _____ is used to keep track of both main and secondary memory.
- A. I/O table
 - B. File table
 - C. Process table
 - D. Memory table
- (vi) In paging, the chunks of a process, known as _____.
- A. Pages
 - B. Segments
 - C. Frames
 - D. Register
- (vii) _____ is important because I/O operations often form a bottleneck in a computing system.
- A. Generality
 - B. Efficiency
 - C. Performance
 - D. I/O processor
- (viii) Multiprogramming
- A. Is a method of memory allocation by which the program is subdivided into equal portions, or pages and core is subdivided into equal portions or blocks
 - B. Consists of those addresses that may be generated by a processor during execution of a computation
 - C. Is a method of allocating processor time
 - D. Allows multiple programs to reside in separate areas of core at the time
- (ix) One technique for overcoming external fragmentation is.....
- A. Segmentation
 - B. Compaction
 - C. Buddy system
 - D. Worst fit
- (x) When a thread completes, its register context and stacks are deallocated.
- A. Spawn
 - B. Finish
 - C. Unblock
 - D. Block

2. Define ANY FIVE of the followings:

(10 marks)

- (i) Long-term queue
- (ii) Process control block (PCB)
- (iii) Multithreading
- (iv) Logical address
- (v) Throughput
- (vi) Seek time
- (vii) Record

3. Differentiate ANY THREE of the followings:

(12 marks)

- (i) Monolithic kernel and Microkernel
- (ii) Interrupt and Trap
- (iii) User Level Thread (ULT) and Kernel Level Thread (KLT)
- (iv) Turnaround time and Response time
- (v) Logical I/O and Device I/O

4. Write short notes on ANY FOUR of the followings:

(16 marks)

- (i) What are two main problems in serial processing?
- (ii) Discuss the role of the process control block.
- (iii) Describe the two disadvantages of ULT compared to KLT.
- (iv) Give three placement algorithms in dynamic partitioning.
- (v) List and briefly explain five storage management responsibilities of a typical operating system.
- (vi) Describe the types of operations that may be performed on a directory.

5. Answer ANY TWO of the followings:

(12 marks)

- (i) What are the services provided by the operating system?
- (ii) Briefly explain about a five state model with figure.
- (iii) What requirements is memory management intended to satisfy.
- (iv) Describe seven RAID levels.

6.(i) Consider a simple paging system with the following parameters: 2^{32} bytes of physical memory; page size of 2^{10} bytes; 2^{16} pages of logical address space. (5 marks)

- a. How many bits are in a logical address?
- b. How many bytes in a frame?
- c. How many bits in the physical address specify the frame?
- d. How many entries in the page table?
- e. How many bits in each page table entry? Assume each page table entry contains a valid/invalid bit.

(ii) A 1-Mbyte block of memory is allocated using the buddy system. (5 marks)

- a. Show the results of the following sequence in a figure: Request 70; Request 35; Request 80; Return A; Request 60; Return B; Return D; Return C.
- b. Show the binary tree representation following Return B.

7. Create the following tables for the following three scheduling policies. (15 marks)

Process	Arrival Time	Service Time	Start Time	Finish Time	Turnaround Time	Tr/Ts
A	0	3				
B	1	5				
C	3	2				
D	9	5				
E	12	5				
Average						

- (i) First Come First Served (FCFS)
- (iii) Highest Response Ratio Next (HRRN)

- (ii) Shortest Process Next (SPN)

8. Consider the disk scheduling problem: we assume that a disk with 200 tracks and that the disk request there has random request in it. The requested tracks, in the order received by the disk scheduler are 129, 25, 110, 186, 145, 48, 10, 70 and 84. (Assume that starting track is 100 in the direction of increasing track number). Calculate the average seek length for FIFO, SSTF, SCAN and C-SCAN scheduling algorithms.

- (i) Illustrate the performance of disk scheduling algorithms.
- (ii) Compare the results in tabular form.

(15 marks)

*****END*****

Department of Higher Education
University of Computer Studies, Hinthada
ThirdYear (B.C.Sc. /B.C.Tech.)
Final Examination
Computer Networking (CST-303)
September, 2018

Answer All Questions.

Time Allowed: 3 Hours

1. Choose the correct answer to the following questions.

(20 marks)

- (i). Which of the following protocols is used on the transport layer of OSI basic reference model?
(a) FTP (b) PPP
(c) SNMP (d) UDP
- (ii). When the subnet mask "255.255.255.0" is used in a "Class A" network, how many host addresses can be assigned to network devices?
(a) 254 (b) 256
(c) 2^{16} (d) 2^{24}
- (iii). A flowspec contains the elements. They are RSpec, TSpec and -----.
(a) Service class (b) Source address
(c) Destination address (d) Destination port
- (iv). It is a set of data sent across a computer network to many users at the same time.
(a) Unicast (b) Multicast
(c) Anycast (d) Broadcast
- (v). In a TCP/IP network, which of the following is used to check if a computer or device is accessible across a network?
(a) BOOTP (b) DHCP
(c) RTP (d) Ping
- (vi). BGP provides-----.
(a) Intra-AS routing (b) Inter-AS routing
(c) Hot-potato routing (d) Broadcast routing
- (vii). The time is spent at each node setting up the route of the connection is called -----.
(a) Propagation delay (b) Transmission delay
(c) Node delay (d) Processing delay
- (viii). What are the functions of the transport layer?
(a) Multiplexing/Demultiplexing (b) IP Datagram Fragmentation
(c) Connectionless service (d) Connection oriented services
- (ix). TCP and UDP are called -----.
(a) Application protocols (b) Transport protocols
(c) Session protocols (d) Network protocols
- (x). The ----- is a device that connects n inputs to m outputs.
(a) Cross point (b) Modem
(c) Cross bar (d) RAM

2. Write short notes on **ANY FOUR** of the following questions. (20 marks)
- (a) The two advantages of a multiple-stage switch
 - (b) Three phases of circuit switching networks
 - (c) Several drawbacks of FIFO queuing discipline
 - (d) Three additional protocol capabilities in ARQ protocols
 - (e) Three steps in TCP connection management
 - (f) Three fields appearing in the IPv4 datagram are no longer present in the IPv6 datagram
 - (g) Three identifiable phases in a virtual circuit

- 3.(a) Match the following (Column A) with its definition (Column B) by answering the appropriate letter only (e.g .i.A). (10 marks)

Column A	Column B
i. WF style	A 255.255.255.255
ii. Space Division	B 255.255.255.252
iii. Error control	C It is switching technique that paths in the circuit are separated from one another spatially.
iv. Broadcast address	D It specifies a single resource reservation to be shared by all senders to this address.
v. Subnet mask	E It is a service that is provided by transport layer.

- (b) Explain the difference between datagram and virtual circuit operation. (10 marks)

- 4.(a) Discuss about the purpose of ISA to enable the provision of QoS that supports over IP-based internets. (10 marks)

- (b) Describe the GBN protocol with figures.

(OR)

- (b) Illustrate the TCP segment structure and explain them. (10 marks)

5. (a) Describe a number of ways used to accomplish switching packets from input port to output port. (10 marks)

- (b) Compare and contrast link-state and distance-vector routing algorithms.

(OR)

- (b) Give a brief description of the Open Shortest Path First (OSPF) protocol. (10 marks)

*****END*****

Department of Higher Education
University of Computer Studies, Hinthada
Third Year (B.C.Sc/B.C.Tech.)
Final Examination
Mathematics of Computing III (CST-302)
September, 2018

Answer All Questions

Time Allowed: 3 Hours.

1. (a) Solve the linear system given explicitly or by its augmented matrix. Show details.

$$x + y - z = 9$$

$$8y + 6z = -6$$

$$-2x + 4y - 6z = 40$$

- (b) Find the inverse of the matrix $A = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ by Gauss-Jordan elimination and check by using

$$AA^{-1} = A^{-1}A = I.$$

2. (a) Given $A = \begin{bmatrix} 0 & 3 & 5 \\ 3 & 5 & 0 \\ 5 & 0 & 10 \end{bmatrix}$. Find the rank and a basis for the row space and a basis for the column space.

- (b) Find the eigenvalues and eigenvectors of the matrix, $A = \begin{bmatrix} 5 & -2 \\ 9 & -6 \end{bmatrix}$. Is it symmetric, skew-symmetric, or orthogonal?

3. (a) (i) Find the smallest positive solution of $\sin x = e^{-x}$, $x_0 = 1$, by fixed-point iteration. Use 5D. Do 5 steps.

(ii) Solve $f = 2x - \cos x$, $x_0 = 1$, by Newton's method. Use 5D. Do 5 steps.

- (b) Compute $\cosh 0.56$ by Newton's forward difference interpolation of the data;

$\cosh(0.5) = 1.127626$, $\cosh(0.6) = 1.185465$, $\cosh(0.7) = 1.255169$, $\cosh(0.8) = 1.337435$.
estimate the error.

4. (a) Evaluate the integral $J = \int_0^1 x^2 dx$ by Trapezoidal rule with $n = 10$, $h = 0.1$, and compare the exact values known from calculus.

- (b) Show the factorization and solve by Doolittle method.

$$3x_1 + 9x_2 + 6x_3 = 4.6$$

$$18x_1 + 48x_2 + 39x_3 = 27.2$$

$$9x_1 - 27x_2 + 42x_3 = 9.0$$

5. (a) Compute the matrix norm and the condition number corresponding to L_1 -vector norm,

$$\begin{bmatrix} -2 & 4 & -1 \\ -2 & 3 & 0 \\ 7 & -12 & 2 \end{bmatrix}.$$

- (b) Fit a parabola to the given points (0,1.8), (1, 1.6), (2, 1.1), (3, 1.5) and (4, 2.3) by least squares.

Check the result by sketching the points and the line.

Department of Higher Education
University of Computer Studies, Hinthada
Third Year (B.C.Tech)
Final Examination
Microprocessor Architecture and Interfacing (CT-306)
October, 2018

Answer All questions.

Time Allowed: 3 hours

- 1.(a)(i) Data byte 28H is stored in register B and data byte 97H is stored in the accumulator. Show the contents of registers B, C, and the accumulator after the execution of the following two instructions: MOV A,B
MOV C,A
- (ii) Illustrate the memory address range of the chip with 256 bytes of memory shown in Figure 1.a(ii). The address lines A₁₂ to A₁₅ are directly to the NAND gate and identify the memory address range of the chip. **(10 marks)**

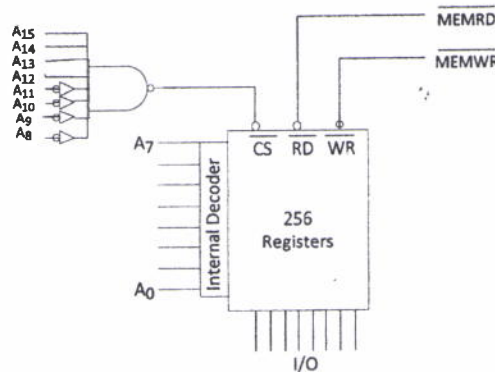


Figure 1.a(ii)

- (b) Design an interfacing circuit for the MCTS system memory which uses 16-bit address lines (A₀ to A₁₅) to meet the following specifications: one 74LS138 (3-to-8 decoder), one 2732 (4K x 8) EPROM where address range should begin at 0000H and one 6116 (2K x 8) CMOS R/W memory. Specify the memory address range of the EPROM and R/W memory. **(10 marks)**
- 2.(a) Design an interfacing circuit to display binary data on the eight LED display with output port address FFH, using two 4-bit D-latch, and appropriate gates. Write instructions to display binary data at the port. **(10 marks)**
- (b)(i) Write instructions to load 00H in the accumulator and then decrement the accumulator and display the answer at output PORT1.
- (ii) Write a program to clear the accumulator first and add 47H to the accumulator and then subtract 92H; and then add again with 64H; and display the results after subtracting 92H at output PORT0 and after adding 64H at output PORT1. **(10 marks)**
- 3.(a)(i) Write a program to perform the following functions, and verify the output. Load the number 8BH in register D and 6FH in register C. Then increment the contents of register C by one, and add the contents of registers C and D and display the sum at the output PORT1.

- (ii) Sixteen bytes of data are stored in memory locations at XX50H to XX5FH. Write a program to transfer the entire block of data to new memory locations starting at XX70H. (10 marks)
- (b). A string of readings is stored in memory locations starting at XX70H, and the end of the string is indicated by the byte 0DH. Write a program to check each byte in the string, and save the bytes in the range of 30H to 39H (both inclusive) in memory locations string from XX90H.

Data(H): 35, 2F, 30, 39, 3A, 37, 7F, 31, 0D, 32 (10 marks)

- 4.(a) Write a program to generate a continuous square wave with the period of 500 μ s. Assume the system clock period is 325 ns, and use bit D0 to output the square wave. Calculate the delay count to satisfy 500 μ s square wave. (10 marks)
- (b) The available user memory ranges from 2000H to 23FFH. A program of data transfer and arithmetic operations is stored in memory locations from 2000H to 2050H, and the stack pointer is initialized at location 2400H. Two sets of data are stored, starting at locations 2150H and 2280H. Registers HL and BC are used as memory pointers to the data locations. A segment of the program is shown below:

```

2000 LXI SP, 2400H
2003 LXI H, 2150H
2006 LXI B, 2280H
2009 MOV A, M
200A PUSH H
200B PUSH B
200C PUSH PSW
200D
      ↓
201F
2020 POP PSW
2021 POP H

```

- (i) Explain how the stack pointer can be initialized at one memory location beyond the available user memory.
- (ii) Illustrate the contents of the stack memory and registers when PUSH and POP instructions are executed, and explain how memory pointers are exchanged.
- (iii) Explain the various contents of the user memory. (10 marks)

5.(a) An 8-bit binary number (e.g., 9FH) is stored in memory location XX50H.

- (i) Write a program to transfer the byte to the accumulator and separate the two nibbles (as 09 and 0F). Then call the subroutine to convert each nibble into ASCII Hex code and store the codes in memory location XX60H and XX61H.
- (ii) Write a subroutine to convert a binary digit (0 to F) into ASCII Hex code. (10 marks)
- (b)(i) Illustrate the interpretation of the Accumulator Bit Pattern for the SIM instruction of 8085 microprocessor.
- (ii) Write a program to
- Enable all the interrupts in an 8085 system.
 - Reset the 7.5 interrupt in this system. (10 marks)

*****END*****

Department of Higher Education
University of Computer Studies, Hinthada
Third Year (B.C.Tech)
Final Examination
Computer Architecture I (CT-305)
October, 2018

Answer All Questions.

Time Allowed: 3 Hours

1. (a) Illustrate the organization of the CPU and main memory of the IAS computer. (10 marks)
- (b) What are the useful definition of the terms RISC and CISC? Identify two-key architectural features that distinguish recent RISC and CISC machines. (10 marks)
2. (a) Construct a behavioral VHDL description and structural VHDL description of the full-adder circuit of Fig 2(a). (10 marks)

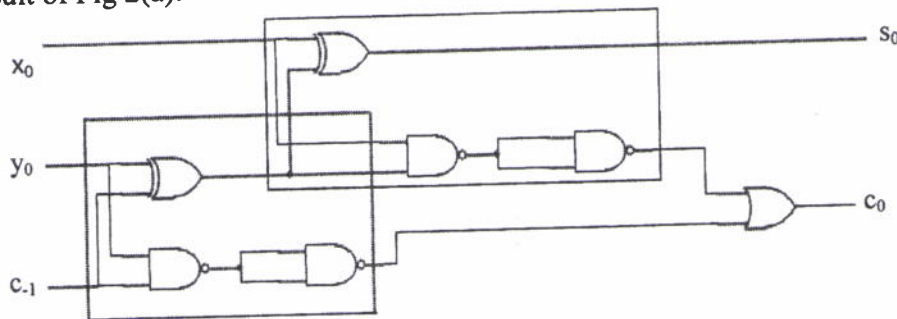


Fig 2(a)

- (b) Write down the HDL description of an 8-bit binary multiplier at the register level to compute $Z = Y \times X$, where the numbers are 8-bit binary fractions sign-magnitude form. Two 8-bit buses INBUS and OUTBUS form input and output ports. Three 8-bit data registers A, M and Q and a 3-bit control register COUNT are also contained in this multiplication circuit. (10 marks)
3. (a) A magnitude-comparator circuit compares two unsigned numbers X and Y and produces three outputs z_1 , z_2 and z_3 , which indicate $X = Y$, $X > Y$, and $X < Y$, respectively. Show how to implement a magnitude comparator for 2-bit numbers using a single 16-input, 3-bit multiplexer of appropriate size. (10 marks)
- (b) A possible measure of the performance of a CPU P that employs instruction-level parallelism is the average number of instructions per cycle or IPC needed to execute a benchmark program set Q. Suppose that a total of N instructions are executed in the processing of Q by P. Further suppose that P has a clock cycle time of T_{clock} and T is the total CPU time required for P to execute Q. Obtain an expression for IPC in terms of N, T and T_{clock} . (10 marks)
4. (a) Identify five major differences between the instruction sets of the ARM6 and the 680X0 and comment on their impact on the CPU cost and performance. (10 marks)

(b) Derive the correct floating-point representation for the decimal numbers +4.50 and -4.50 using the 32-bit IEEE 754 floating-point standard. (10 marks)

5. (a) Use the instruction set of Table. 5(a) to implement the following two operations assuming that sign-magnitude code is used. (i) $AC := -M(X)$, (ii) Test the right-most bit “*b*” of the word stored in a designed memory location X. If $b = 1$, clear AC; otherwise, leave AC unchanged. [Hint: Use an AND instruction to mask out certain bits of a word.] (10 marks)

No.	HDL format	Assembly
1.	AC:= M(X)	LD X
2.	M(X):= AC	ST X
3.	DR:= AC	MOV DR, AC
4.	AC:= DR	MOV AC, DR
5.	AC:= AC+DR	ADD
6.	AC:= AC-DR	SUB
7.	AC:= AC and DR	AND
8.	AC:= not AC	NOT
9.	PC:= M(adr)	BRA adr
10.	if AC= 0 then PC:= M(adr)	BZ adr

Table. 5(a)

(b) Use HDL notation and ordinary English to write the actions performed by each of the following 680X0 instructions: (10 marks)

- (a) MOVE.L (A5)+, D5; (b) ADD.B \$2A10, D0;
(c) SUBI #10, (A0); (d) AND.L #\$FF, D0.

*****END*****

Department of Higher Education
University of Computer Studies, Hinthada
Third Year (B.C.Tech)
Final Examination
Electronics II (CT-304)
September, 2018

Answer All Questions

Time allowed: 3 Hours

- 1(a) Determine I_D and V_{GS} for the JFET with voltage-divider bias in Figure 1(a), given that for this particular JFET the parameter values are such that $V_D = 7\text{ V}$. (10 Marks)
- 1(b) Find V_{GS} and V_{DS} for the E-MOSFETs in Figure 1(b). Datasheet information is listed with the circuit. (10 Marks)

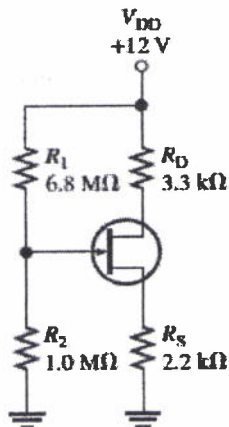


Figure 1(a)

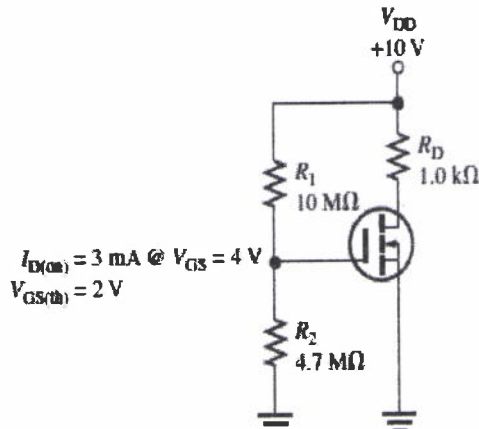


Figure 1(b)

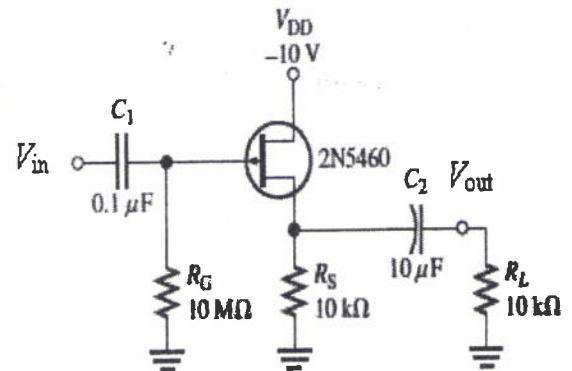


Figure 2(a)

- 2(a) Determine the voltage gain of the amplifier in Figure 2(a) using the datasheet information $g_m = 1000\mu\text{S}$ (minimum) and $I_{GSS} = 5\text{ nA}$ (maximum) at $V_{GS} = 20\text{ V}$. Also, determine the input resistance. V_{DD} is negative because it is a p -channel device. (10 Marks)
- 2(b) For the unloaded amplifier in Figure 2(b), find V_{GS} , I_D , V_{DS} , and the *rms* output voltage V_{ds} . $I_{D(on)} = 8\text{ mA}$ at $V_{GS} = 12\text{ V}$, $V_{GS(th)} = 4\text{ V}$, and $g_m = 4500\mu\text{S}$. (10 Marks)

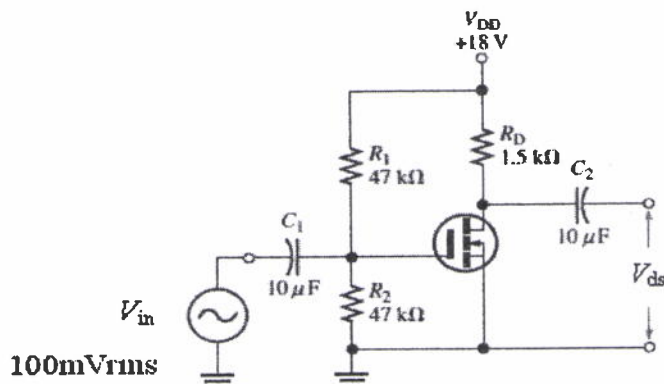


Figure 2(b)

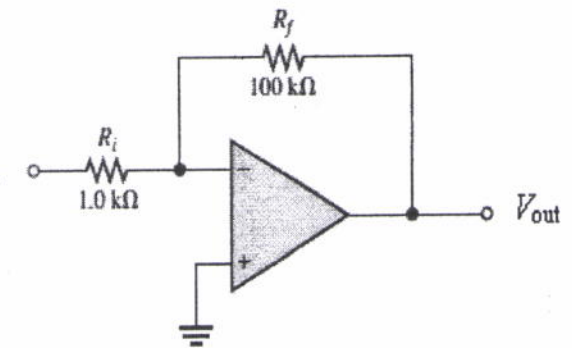


Figure 3(b)

- 3(a) Describe the SCR operation (turn-on and turn-off) in terms of its transistor equivalent. (10 Marks)

3(b) Find the values of the input and output impedances in Figure 3(b). Also, determine the closed-loop voltage gain. The op-amp has the following parameters: $A_{ol} = 50,000$; $Z_{in} = 4M\Omega$; and $Z_{out} = 50 \Omega$. (10 Marks)

4(a) Calculate the phase shift for an RC lag circuit for each of the following frequencies, and then plot the curve of phase shift versus frequency. Assume $f_c = 100 \text{ Hz}$. (10 Marks)

(i) $f = 1 \text{ Hz}$ (ii) $f = 10 \text{ Hz}$ (iii) $f = 100 \text{ Hz}$ (iv) $f = 1000 \text{ Hz}$ (v) $f = 10,000 \text{ Hz}$

4(b) Determine the output voltage waveform for Figure 4(b). (10 Marks)

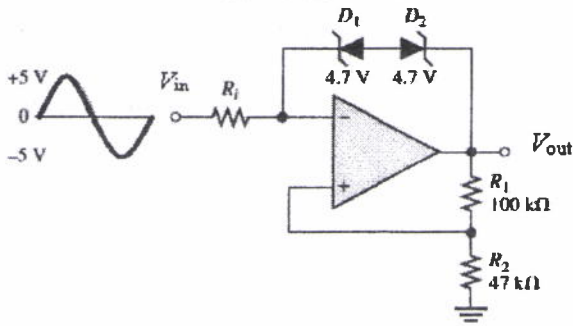


Figure 4(b)

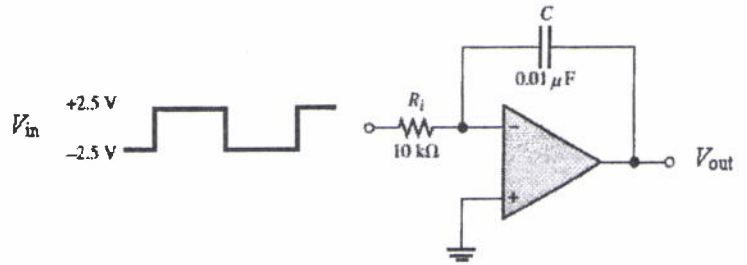


Figure 5(a)

5(a) (i) Determine the rate of change of the output voltage in response to the input square wave, as shown for the ideal integrator in Figure 5(a). The output voltage is initially zero. The pulse width is $100 \mu\text{s}$.

(ii) Describe the output and draw the waveform.

(10 Marks)

5(b) (i) Determine the critical frequency in Figure 5(b-i).

(5 Marks)

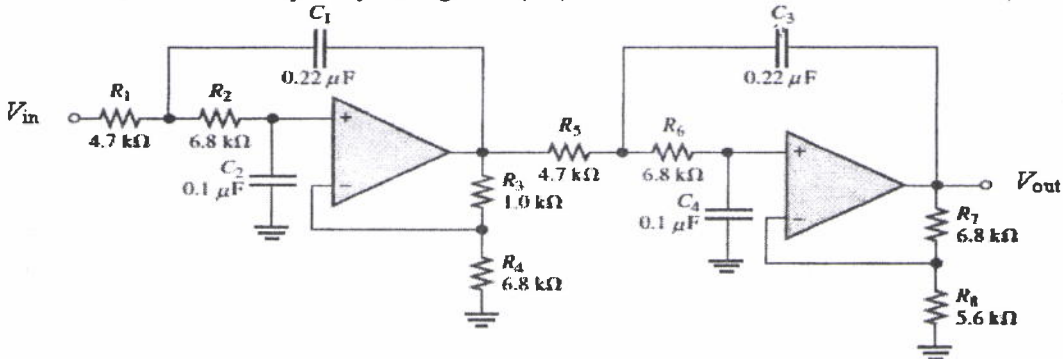


Figure 5(b-i)

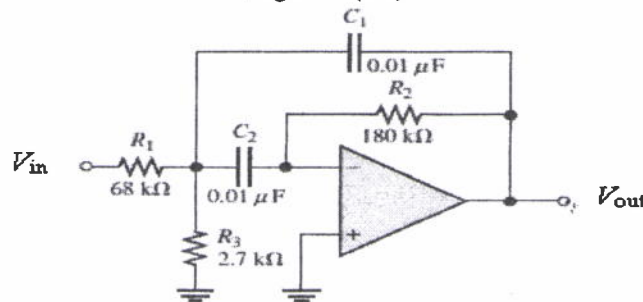


Figure 5(b-ii)

5(b) (ii) Determine the center frequency, maximum gain, and bandwidth for the filter in Figure 5(b-ii). (5 Marks)

*****END*****