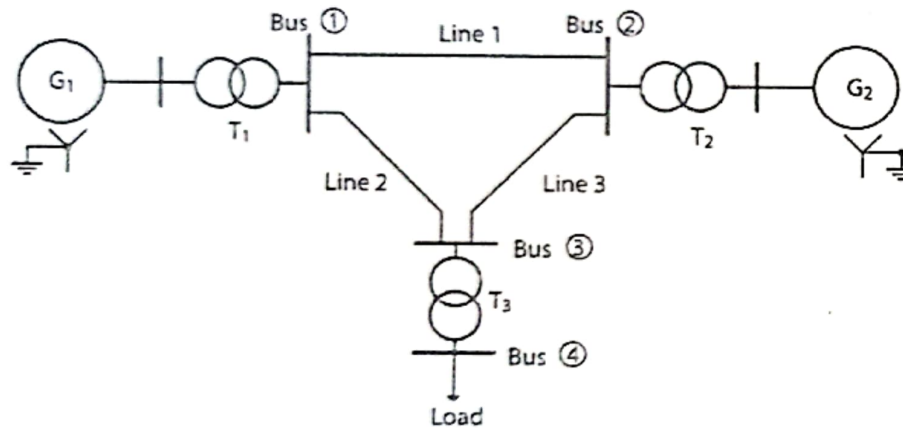


CT-1 (ECE 3109)

Full Marks: 20

Time: 20 minutes

The single-line diagram of a three-phase system is shown below. Using the common base $S_b = 50$ MVA at secondary terminal of transformer-3, draw the impedance diagram in per unit including the load impedance. The manufacturer's nominal ratings are given as follows:



Device	S_n	$U_{(L-L)_n}$	X_n
Generator G_1 :	48 MVA	20 kV	20%
Generator G_2 :	25 MVA	13.8 kV	15%
Transformer T1:	50 MVA	20/110 kV	8%
Transformer T2:	30 MVA	13.8/110 kV	6%
Transformer T3:	50 MVA	11/110 kV	10%

The three-phase load at bus 4 absorbs 60 MVA at 0.75 power factor (lagging), and lines 1, 2, and 3 have the reactance of 40Ω , 32Ω , and 30Ω , respectively.

CT-1; ECE 3111; Time: 30 min, Marks: 20 min

Q.1. Why is data bus bi-directional?

Q.2. Describe the purpose of instruction queue of 8086 microprocessor.

Q.3. Demonstrate the function of instruction decoding unit and PC/IP of 8086 microprocessor.

Q.4. Write down the information regarding year of introduction, transistors, clock rate, external data bus, internal data bus and address bus of 8086 processor.

Rajshahi University of Engineering & Technology

Dept. of ECE

3 rd Year Odd Semester	Subject Code: ECE 3107		
Subject: Electrical Machine II	CT-1	Time: 25 Min	Mark: 20

1. The armature of a four pole generator having a simplex lap winding is rotating at 1400 rpm. If the total number of armature conductors is 2800 and the flux per pole is 400 kilolines, determine the generated voltage. 6
2. Write down the conditions for parallel operation of DC generators. 6
3. How do we get unidirectional current from alternating current in DC generator? 8

ECE 3119
Computer Architecture and Design

Marks: 20

Time: 25 min

1. Write the applications of the following topics: [2]
i) Microprocessor ii) Control unit
2. Define the following topics: [2]
i) Decoding ii) Compiler
3. Represent the following numbers into their mentioned form: [4]
i) +7, +12(decimal \rightarrow sign magnitude)
ii) -7, +9(decimal \rightarrow 1's complement)
iii) 11111111,0000001001 (2's complement \rightarrow decimal)
4. Convert (-14.25) in IEEE-754-32 bit format. [4]
5. Why is exponent biased? What range can be supported by exponent if the bias value is 200? [2+1+2]
What problem will occur if bias is 200?
6. What is the output of the given algorithm for adding the mentioned floating point numbers (ignore Emax & Emin): [3]
i) 400 & 3000
ii) 4×10^3 & 8×10^3
iv) 3.008×10^3 & 3.004×10^3

Inputs: AC \leftarrow Xm E1 \leftarrow Xm AC-overflow \leftarrow 0
 DR \leftarrow Ym E2 \leftarrow Ym Error \leftarrow 0

Compare: E \leftarrow E1-E2

Equalize: if (E<0) then{
 print("equalize_1")
 AC \leftarrow R.S(AC)
 E \leftarrow E+1
 go to compare }
if (E>0) then{
 print("equalize_2")
 DR \leftarrow R.S(DR)
 E \leftarrow E-1
 go to compare }

Add: AC \leftarrow AC+DR
 E \leftarrow max(E1,E2)
Overflow: if (AC.overflow=1)
 then
 { if (E==Emax) then go to
 Error
 Print("overflow");
 AC \leftarrow R.S(AC)
 E \leftarrow E+1
 go to end }

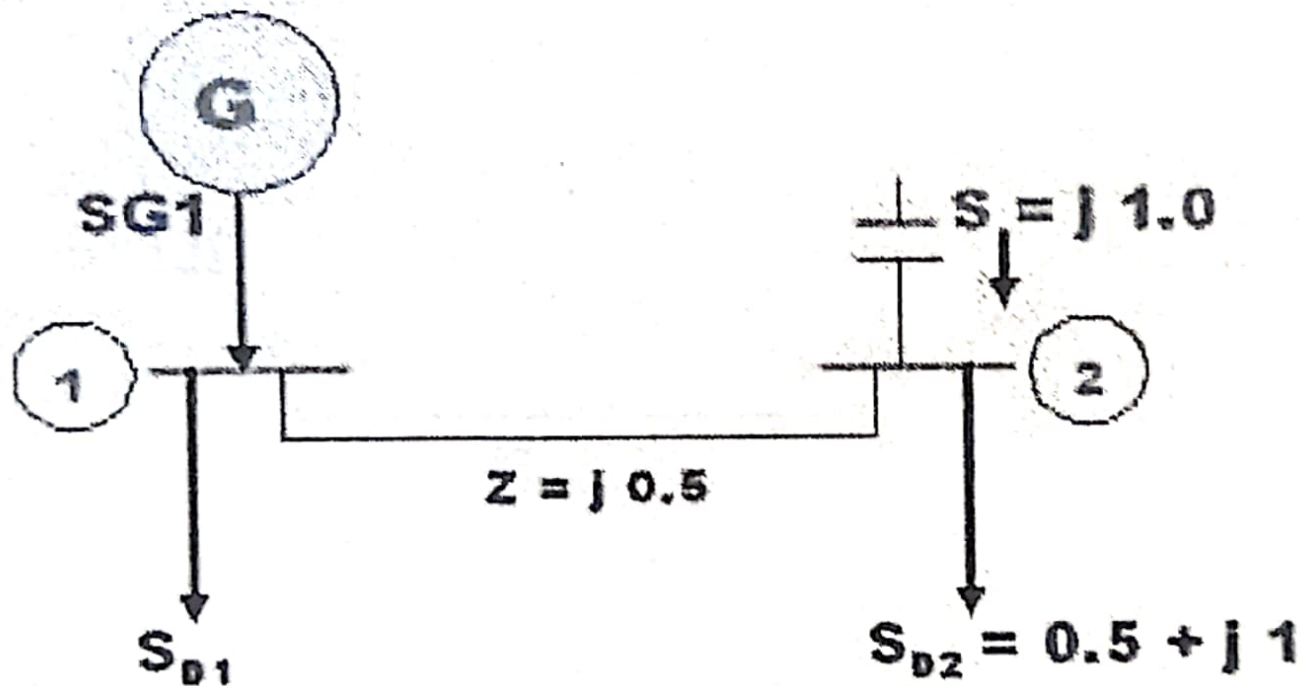
Normalize: (if AC
normalized) then
 go to end;
Zero: if (AC=0) then
 Print("zero");
 Error \leftarrow 0;
Underflow: if (E>Emin) then
 { Print("underflow");
 AC \leftarrow L.S(AC)
 E \leftarrow E-1
 go to normalize}
Error: Error \leftarrow -1
End: End of the process

CT-2 (ECE 3109)

Full Marks: 25

Time: 20 minutes

Using the Gauss–Seidel method, determine the voltage at bus 2 for the power system depicted in the figure, if $V_1 = 1 \angle 0^\circ$ pu.



CT-2; ECE 3111; Time: 30 min, Marks: 20 min

- Q.1. If it is legal, give data definition pseudo-ops to define each of the following 06
- (i) A word variable B initialised to 25H, (ii) A byte variable C, uninitialized
 - (iii) A constant BELL, equal to 07H, (iv) A constant MSG equal to 'THIS IS A MESSAGE'
- Q.2. Tell whether each of the following instructions is legal or illegal. Explain why? 06
- (i) MOV DS, 1000H, (ii) MOV CS, ES, (iii) SUB 5, AL, (iv) ADD AL, 256
- Q.3. Write instructions to do the following: 08
- (i) Read an uppercase letter and display it at the next position on the new line in lower case.

Rajshahi University of Engineering & Technology

Dept. of ECE

3 rd Year Odd Semester	Subject Code: ECE 3107		
Subject: Electrical Machine II	CT-2	Time: 25 Min	Mark: 20

1. A 10 hp, 240 V DC motor has a full load current 20.4 A, field resistance 202 ohms, and armature resistance 0.91 ohms. Determine the amount of electrical power converted to mechanical power. **8**
2. Why the speed of the cumulative compound DC motor is lower than that of the shunt DC motor? **6**
3. Why do we need a starter to start a DC motor? **6**

ECE 3119 (CT-2)
Computer Architecture and Design

Marks: 20

Time: 25 min

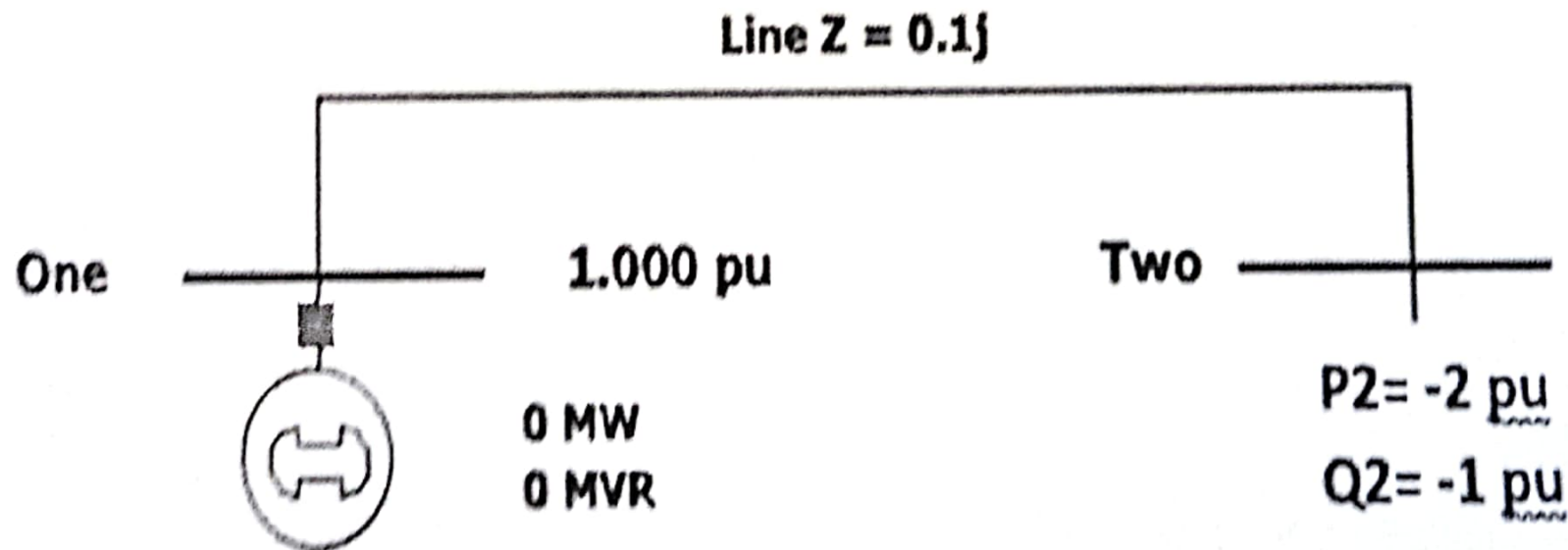
1. Can we use half adder to add the following values? If not, why? What is the solution? [2]
i) $2+5$ ii) $2+1$
2. Design a parallel adder to add the following values. [4]
 $x=101, y=111$
3. Which adder should we use to add the following number & why? [3]
i) Two 2-bit numbers ii) Two 64-bit number
4. Why do we prefer Booth's algorithm for multiplication and division? [3]
5. Multiply $(-5*7)$ using Booth's algorithm. [5]
6. Which Booth's division technique should we use for $(7/3)$? Justify your answer. [3]

CT-3 (ECE 3109)

Full Marks: 20

Time: 30 minutes

For the two-bus system shown below, use the Newton-Raphson power flow to determine the voltage magnitude and angle at bus two. Assume that bus one is the slack.



Department of Electrical & Computer Engineering

Course No: ECE- 3117 Course Title: Software engineering & Information system design

Marks: 20

Class Test# 3

Time: 30 minutes

1. Define system. Also, explain the basic elements of an open system. 5
2. Make a comparison between MIS and DSS. 5
3. What are the main considerations you need to take during feasibility study phase? What are the results of this phase? 5
4. Why new system doesn't meet user requirements. 5

CT-3. Time: 30 min, Marks: 20

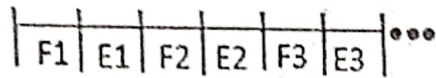
1. What are the differences between signed and unsigned overflow? Explain with example. 04
2. How the following instructions Affect the Flags (i) ADD AX, BX, Where AX contains FFFFH and BX contains FFFFH, (ii) SUB AL, BL Where AL contains 01H and BL contains FFH, (iii) DEC AL, where AL contains 00H and (iv) NEG AX, where AX contains 8000H. Suppose that the flags are initially 0 in each part of this question. 08
3. Read a character, and if it's an uppercase letter, display it. 04
4. Write some code to count the number of characters in an input line. 04

CT-4 (ECE 3109)

Full Marks: 20

Time: 20 minutes

- 1. Write short notes on: (i) Loop inductance (ii) Skin effect and (iii) Ferranti effect in transmission line. (3*4=12)**
- 2. Derive an expression for the inductance per phase for a 3-phase overhead transmission line when the conductors are symmetrically placed. (8)**



1. Some instructions were executed using the above procedure. The processor was slowing down to execute these programs. After speeding up the processor with different procedure, it faced a problem executing one of the programs given below

INC B

MOV A, B

[5]

- What was done to speed up the performance? Define. [2]
- What problem occurred while executing the instruction after speeding up the processor? How can you solve it? [3]

2. Answer the following question based on the table below. **Mention** the addressing mode for each answer. [7]

Address	2000	3000	5000
Data	12	23	

- Write the instruction to add the contents of 2000 and 3000 and put the result in BL. [2]
- MOV [5000], BL. Highlight the change in the above table. [2]
- Write the microinstruction for MOV BL, 20H. [3]

3. These are the grades of third-year students. Consider the roll as address and the grade as data. [4]

Roll	200	300	500
Grade	A	B	A-

- Write an instruction to get the data from location 3100. [1]
- Which addressing mode do you need to prefer the grade of students whose rolls are from (240-270). Write the instruction. [3]

4. What is the advantage of a two-way set associative cache mapping in terms of tag number, hit ratio, and the number of searches? [4]

Department of Electrical & Computer Engineering
Course Title: Software Engineering & Information System Design Course No: ECE-3117
Class Test# 4 Time: 25 minutes Full Marks: 20

1. How much technical and interpersonal skills an analyst does require during each phase of system development? 5
2. Which personal qualifications will you try to achieve to be a good system analyst? 5
3. Which questions will you consider to use on-site observation as an information gathering tool? 5
4. For which limitations humans have problems in specifying information requirements? 5

Rajshahi University of Engineering & Technology

Dept. of ECE

3 rd Year Odd Semester	Subject Code: ECE 3107		
Subject: Electrical Machine II	CT-4	Time: 25 Min	Mark: 20

1. A 200-kVA, 480-V, 50-Hz, Y-connected synchronous generator with a rated field current of 5 A was tested, and the following data were taken: 8
 - a) $V_{T,OC}$ at the rated I_F was measured to be 540 V.
 - b) $I_{L,SC}$ at the rated I_F was found to be 300 A.
 - c) When a dc voltage of 10 V was applied to two of the terminals, a current of 25 A was measured.Find the values of the armature resistance and the approximate synchronous reactance in ohms that would be used in the generator model at the rated conditions.
2. Why are synchronous generators operated in parallel? 4
3. Two generators are operating in parallel and supplying a real load totaling 2.5 MW at 0.8 pf lagging. 8
Generator 1 has no load frequency of 61.5 Hz and a slope of 1 MW/Hz. Generator 2 has no load frequency of 61.0 Hz and a slope of 1 MW/Hz. At what frequency is this system operating, and how much power is supplied by each of the two generators?

Marks: 20

1. Why nowadays CD, DVD are being replaced by pen drive? [2]
2. Write the application of both primary and secondary memory. Why both of them are necessary for our computer? [3]
3. What is address translation? If we want to find the given virtual address in main memory, will it be hit or miss? If hit, write the physical address. [5]

Page table

Frame no	Page no
12	34
14	23
15	45
11	34
16	45

Virtual address

a.	34	12
b.	34	5
c.	23	12
d.	44	16

4. How the hit ratio of processor is so high? [3]
5. What is DMA and what are the steps of DMA? [4]
6. Which DMA technique is used in our pc and why? [3]

CT-4, Marks: 20, Time: 20 min

- Q.1. If AL contains -15, give the decimal value of AL after execution of the following instructions 06
- MOV CL, 2
SAR AL, CL
- Q.2. Write instructions to count the number of 1 bits in BX, without changing BX. Put the answer in AX. 07
- Q.3. Write an assembly language program for reversing the bit pattern in a word. 07