(i) Printed Pages : 2 Roll No. .....

(ii) Questions : 7 Sub. Code : 6 9 2 3

Exam. Code : 0 9 3 0

B.Engg. (Electronics & Comm. Engg.) 6th Semester

1046

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Paper : EC–612

Time Allowed : Three Hours] **[Maximum Marks : 50**

Note :– **FIRST** question is compulsory. From sections A and B, attempt any **four** questions selecting at least **two** questions from each section. Use of scientific calculator is allowed.

I. (a) Why an ammeter should have low resistance ? 1

(b) Why is damping required for an electromechanical measuring instrument ? 2

(c) Why the secondary of a current transformer is never left open circuited ? 1

(d) How to prevent the loading of a circuit under test when a CRO is used ? 2

(e) List factors influencing the choice of a transducer. 2

(f) Differentiate between analog and digital signals. 1

(g) Differentiate between structures, arrays and clusters in Lab VIEW. 1

SECTION–A

II. (a) What is measurement ? What is its significance ? What are different methods of measurement ? 5

(b) Classify measuring instruments. 5

III. (a) Explain the working principle of moving iron type instruments. Derive general torque equation for such instruments. 5

(b) In case of a moving iron ammeter, the range of the instrument is to be extended from 0-10 A to 0-75 A by using a shunt. The resistance and inductance associated with the instrument are 0.1Ω and 60 μH respectively. Calculate the constants of shunt required for this extension. If the shunt is made non-inductive and the combination reads correctly on d.c., find out the full scale error at frequency 50 Hz. 5

IV. (a) Explain the principle of operation of an electronic volmeter. Is it more accurate than an ordinary voltmeter ? Explain in detail. 5

(b) Explain the working of CRO with the help of its block diagram. 5

SECTION–B

V. (a) What is piezo-electric transducer ? Explain its equivalent circuit. Derive an expression for output voltage. Make suitable assumptions. 5

(b) What are transducers ? Explain with the help of block diagram. Give their classifications. 5

VI. (a) Explain any two methods of analog to digital conversion. 5

(b) Describe the basic components of a magnetic tape recorder

(i) Printed Pages : 4 Roll No. .....

(ii) Questions : 7 Sub. Code : 6 9 0 2

Exam. Code : 9 2 7

B. Engg. Electronics & Comm. 3rd Semester

1124

SIGNAL AND SYSTEM

Paper-EC-317

Time Allowed : Three Hours] [Maximum Marks : 50

Note :— Question No. 1 is compulsory. Attempt any two questions each from other two sections.

1. (a) Determine the energy and power of the signal :

$$x(n)=\left(\frac{1}{2}\right)^{n} u(n).$$

(b) An LTIC system is defined by the equation :

$$(D^2 + 5D + 6)y(t) = (D + 1)x(t)$$

Find the zero-input component of the response, if the initial conditions are :

$$y(0^-) = 2, \quad \frac{dy(0^-)}{dt} = -1.$$

(c) Use the appropriate Fourier transform property to find the Fourier transform of signal : $x(t) = t.e^{-|t|}$.

(d) Find the DTFT of the following signal :

$$x(n) = (0.5)^n u(n) + 2^n u(-n-1).$$

(e) Determine the unilateral Laplace Transform of the signal : 5×2=10

$x(t) = e^{-t}\, u(t+1)$.

SECTION—A

2. (a) Describe the examples of Mechanical, Hydraulic, Thermal and Biomedical systems and represent them using differential equations.

(b) Find the exponential Fourier series of the signal shown in Fig. 1. 5

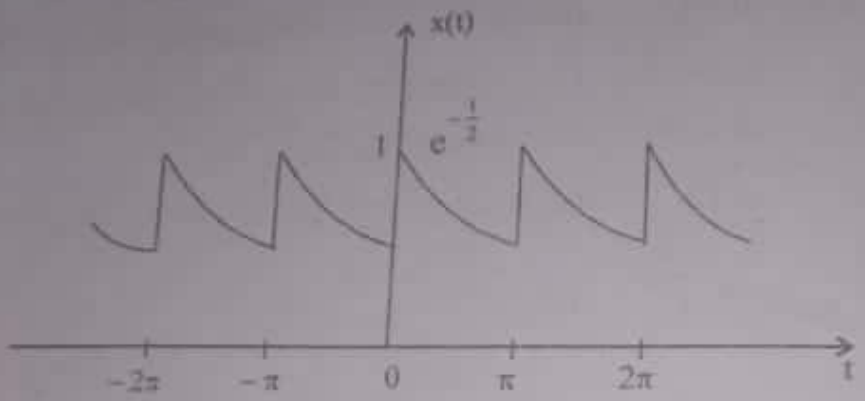


Fig. 1

3. (a) Find the Fourier transform of the sinusoidal signal shown in Fig. 2. 6

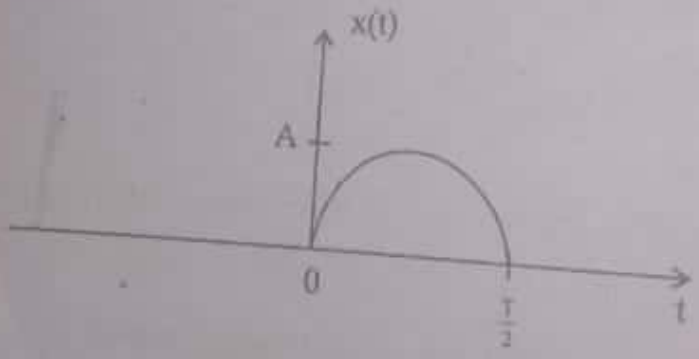


Fig. 2

(b) Describe the problem of Aliasing in sampling of continuous signals. How can it be avoided ? 4

4. (a) Find the Discrete Time Fourier series of the signal shown in Fig. 3. 5

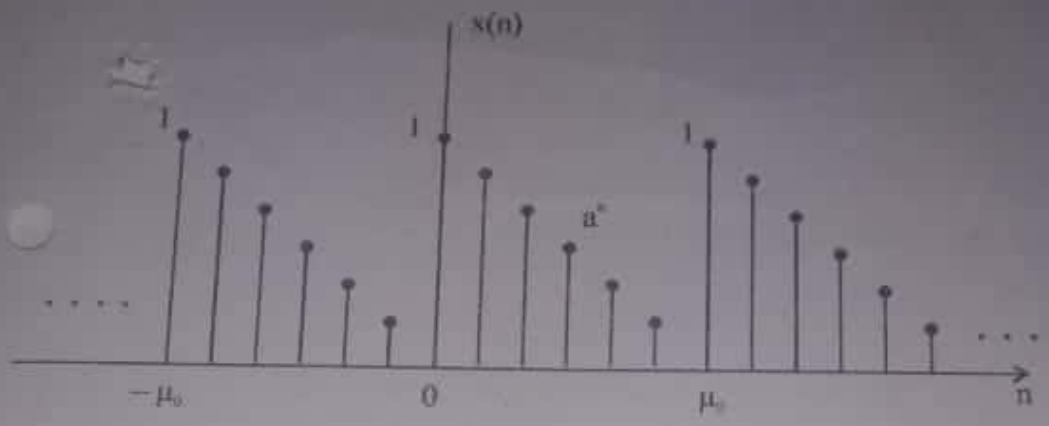


Fig. 3

(b) Determine the convolution of the following signals :

$x(t) = u(t-3) - u(t-5)$

$h(t) = e^{-3t}\, u(t)$ 5

SECTION—B

5. Given that x(n) has Fourier Transform X(ω), express the Fourier Transforms of the following signals in terms of X(ω) :

(a) $x_1(n) = x(1-n) + x(-1-n)$

(b) $x_2(n) = (n-1)^2\, x(n)$

(c) $x_3(n) = e^{j\left(\frac{\pi}{2}\right)n} \cdot x(n+2)$. 10

6. (a) An LTI system with impulse response

$$h(t) = e^{-at}\, u(t)$$

when excited by an input signal x(t), produces an output signal :

$$y(t) = (e^{-bt} - e^{-ct})\, u(t).$$

Determine the input signal x(t) using Laplace Transform. 5

(b) Determine the Hilbert Transform of the signal :

$$x(t) = \sin(\omega_c t).$$ 5

7. (a) Determine the inverse z-transform of the causal system :

$$H(z) = \frac{1}{\left(1 - \frac{1}{4}z^{-1}\right)}.$$ 5

(b) Find the z-transform of the signal

$$x(n) = \sum_{k=-n}^{n} a^{|k|},\ n \geq 0 \text{ and } x(n) = 0 \text{ for } n < 0.$$

Assume that $|a| < 1$. 5

(i) Printed Pages : 3 Roll No. .....

(ii) Questions : 7 Sub. Code : 6 9 1 1

Exam. Code : 9 2 8

B.Engg.(Electronics & Comm.) 4th Semester

1045

MICROPROCESSORS

Paper : EC–415

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– Students are required to attempt **five** questions in all selecting **two** from Part–A and **two** from Part–B. Question No. **1** is compulsory.

1. (a) What is the function of the RESET OUT signal ?

(b) What is memory–mapped I/O technique ?

(c) What is the function of the SUI instruction ?

(d) Give an example of an instruction which uses direct addressing.

(e) Differentiate between RRC and RAR instruction.

(f) What are the different methods of achieving time delay ?

(g) How is the beginning of a stack defined ?

(h) What are RST instructions ?

(i) What are the different modes of 8255A ?

(j) List any two functions of 8259. 10×1=10

(i) Printed Pages : 3

(ii) Questions : 7

Roll No. .....

Time Allc

7

PART–A

2. (a) Explain the bus structure of 8085 microprocessor. 3

(b) With the help of an example, explain the memory read machine cycle. 5

3. (a) Interface an 8–key input port to the 8085 such that the input port has address FFH. 5

(b) Write a program to load the bit pattern 91H in register B and 87H in register C. Mask all the bits except Do from register B and C. If Do is at logic 1 in both registers, turn on the light connected to the Do position of output port 01H, otherwise turn off the light. 5

4. (a) A set of six data bytes is stored starting from memory location 2050H. The string includes some blanks (bytes with zero value). Write a program to eliminate the blanks from the string. 5

(b) A set of ten bytes is stored in memory starting with the address XX50H. Write a program to check each byte and save the bytes that are higher than 60 and lower than 100 in memory locations starting from XX60H. 5

PART–B

5. (a) Write a program to generate a square wave with period of 400μs. Use bit Do to output the square wave. 5

(b) Write program a clear the initial flags. Load data byte FFH into the accumulator and add 01H to the byte FFH by using the instruction ADI. Mask all the flags except the CY flag and display the CY flag at PORT0. Repeat the program by replacing the ADI instruction with INR instruction and the byte 01H with the NOP instruction. Display the flag at PORT1. Explain the results. 5

6. (a) What are vectored interrupts ? What are the vectored interrupts of 8085 ? Explain each of them briefly. 5

(b) Interface an 8–bit A/D convertor to the 8085 using status check. 5

7. (a) Draw the block diagram of the 8254 programmable interval timer and explain its various blocks. 5

(b) Explain the signals associated with the transmitter and receiver section of the 8251 programmable communication interface. 5

from Sections–B and C. Section A is compulsory.

(i) Printed Pages : 4 Roll No. .....

(ii) Questions : 7 Sub. Code : 6 9 0 3

Exam. Code : 9 2 7

B.Engg. Electronics & Comm. 3rd Semester

1124

NETWORK SYNTHESIS AND FILTERS DESIGN

Paper—EC-318

Time Allowed : Three Hours] [Maximum Marks : 50

Note:— First question is compulsory. From Sections A and B, attempt any **four** questions selecting at least **two** questions from each Section. Use of scientific calculators is allowed.

I. (a) List the properties of an ideal voltage source and ideal current source. 2

(b) Explain clearly difference between loop-basis and node-basis of analysis of linear electrical networks. State the condition under which each one is advantageous. 2

(c) Differentiate clearly between network analysis and network synthesis. 2

(d) What are the drawbacks of constant-k filter ? Does m-derived filter overcome these drawbacks ? 2

(e) What are positive real functions ? 2

SECTION—A

II. (a) State under what condition/s, the concept of driving point and transfer function can be used. Calculate the voltage transfer

function, transfer impedance and driving point impedance of the network shown in fig. 1. 5

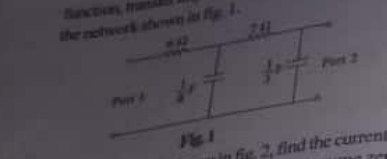


Fig. 1

(b) In the given network shown in fig. 2, find the current through the inductor L using Norton's theorem. Assume zero initial conditions in the circuit and switch is closed at $t = 0$. 5

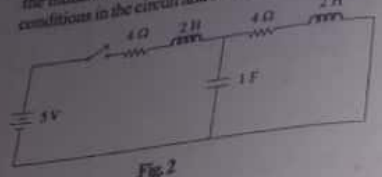


Fig. 2

III. (a) In the network shown in fig. 3, the capacitor C_1 is charged to 10 V in the polarity shown. Capacitor C_2 is initially uncharged. Find the current flowing through the resistor R_L.

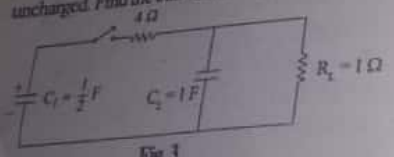


Fig. 3

(b) State and prove maximum power transfer theorem. 4

(c) A current transform $I(s)$ in a network is given by :

$$I(s) = \frac{2s}{(s+1)(s+2)}$$

SECTION–A

Draw the pole-zero plot and hence obtain current in time domain. 3

IV. (a) Explain giving reasons whether the following expression for driving point impedance is suitable for representing a passive one port network: 2

$$Z(s) = \frac{s^2 + s + 3}{s^4 + 5s^3 + 6s^2}$$

(b) For the network shown in fig. 4, write node equations and hence determine the node voltages. 4

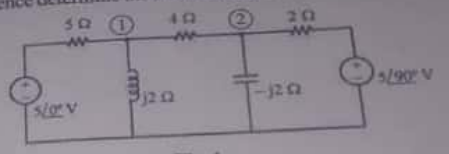


Fig. 4

(c) Define step and ramp functions. Explain how a gate function can be realized from shifted step functions. 4

SECTION—B

V. (a) What is a composite filter ? Explain the functions of each of the sections in it? 5

(b) Design a composite low pass filter to be terminated in 600 Ω. It must have a cut off frequency of 1 kHz, with very high attenuation at 1050 Hz, 1250 Hz and infinity. Draw the complete composite low pass T-section. 5

VI. (a) Prove that in a band pass filter, the resonant frequency is the geometric mean of the cut off frequencies. 3

(b) Determine the open circuit impedance parameters for the network shown in fig. 5.

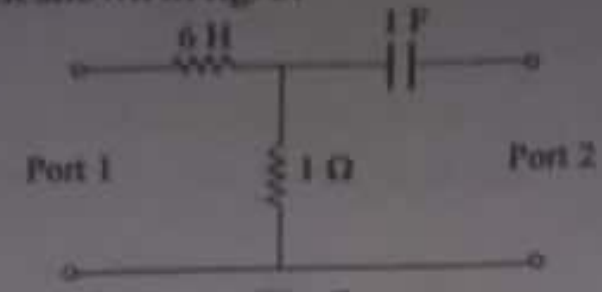
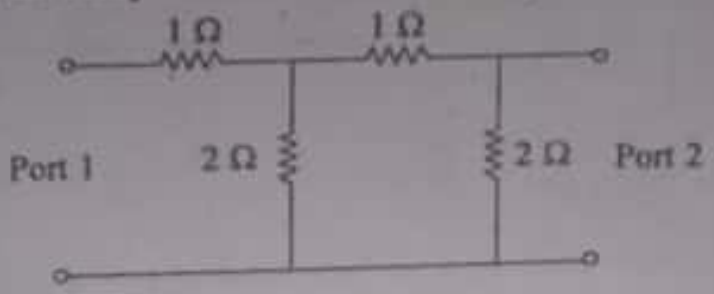


Fig. 5

Also determine whether the network is reciprocal and/or symmetric.

(c) Obtain the transmission parameters of the network shown in fig. 6 and verify that the circuit is reciprocal.



4

Fig. 6

VII. (a) Find the first and second Cauer forms of the network whose driving point function is given as: $Z(s) = \frac{s^4 + 10s^2 + 9}{s^3 + 4s}$ 4

ECE (Re-

Exam Code: 0928
Sub. Code: 6795

1056
B.E./B.E. MBA (Electronics and Communication)
Fourth Semester
EC-415: Microprocessors

Time allowed: 3 Hours | Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting atleast two questions from each Part

X-X-X

1. a. List any two operations that can be performed with data in a microprocessor. (10 X 1 = 10)

b. If an output and input port can have the same 8-bit address, how does the 8085 differentiate between the ports?

c. What is an operand?

d. Do the data copy instructions affect the flags?

e. Differentiate between RRC and RAR instructions.

f. Name any two errors that can come up in counters and time-delay programs.

g. What do you mean by nesting in subroutines?

h. How is the end of conversion verified in an A/D converter interfaced to 8085?

i. What is the function of the EI instruction?

j. What is the function of the control register in 8255A?

PART-A

2. a) With the help of diagram, explain the bus structure of 8085. (5)

b) The instruction code 0100 1111(4FH) is stored in memory location 2050H. Illustrate the data flow and list the sequence of events when the instruction code is fetched by the MPU.

3. a) Design a seven segment LED output port with the device address F4H, using a 3-to- 8 decoder. Write instructions to display digit 6 at the port. (5)

b) Write a program to find the larger of two numbers stored in memory locations 2501H and 2502H and store the result in 2503H. (5)

4. a) Write a program to divide a 16-bit number

is to be extended from 0-10 A to 0-75 A by using a shunt. The resistance and inductance associated with the instrument are 0.1Ω and 60 μH respectively. Calculate the constants of shunt required for this extension. If the shunt is made non-inductive and the combination reads correctly on d.c., find out the full scale error at frequency 50 Hz. 5

IV. (a) Explain the principle of operation of an electronic volmeter. Is it more accurate than an ordinary voltmeter ? Explain in detail.

5

(b) Explain the working of CRO with the help of its block diagram. 5

SECTION–B

V. (a) What is piezo-electric transducer ? Explain its equivalent circuit. Derive an expression for output voltage. Make suitable assumptions. 5

(b) What are transducers ? Explain with the help of block diagram. Give their classifications. 5

VI. (a) Explain any two methods of analog to digital conversion.

5

(b) Describe the basic components of a magnetic tape recorder using direct recording techniques. List its advantages and disadvantages. 5

VII. (a) Write short notes on :

(i) Palettes

(ii) Code debugging. 5

(b) State with an example for three loops method running consequently. Program virtual instrumentation in block diagram.

5

(i) Printed Pages : 4 Roll No. .....

(ii) Questions : 7 Sub. Code : 6 9 0 8

Exam. Code : 0 9 2 8

B.Engg. (Electronics & Comm. Engg.) 4th Semester

1046

MICROCONTROLLERS AND INTERFACING

Paper : EC-402

Time Allowed : Three Hours] **[Maximum Marks : 50**

Note : Students are required to attempt **five** questions in all selecting **two** from Part A and **two** from Part B. Question No. 1 is compulsory.

1. (a) Show that status of AC and Z flags after the addition of 9CH and 64H.

   (b) Upon reset, all ports contain which value ?

   (c) In 8051, how many bytes of internal RAM are bit addressable ?

   (d) In 8051, an LED is connected to P1.5. Write a program to toggle the LED forever.

   (e) Explain the following instructions for 8051 microcontroller :

   (i) DA

   (ii) SWAP.

   (f) What is the largest number (in hex) that can be loaded into WREG ?

ECE (Regular)

(i) Printed Pages : 3 Roll No. .....

(ii) Questions : 7 Sub. Code : 6 9 1 0

Exam. Code : 0 9 2 8

B.Engg. (Electronics & Comm. Engg.) 4th Semester

1046

ENGINEERING ANALYSIS AND DESIGN : VIRTUAL INSTRUMENTATION

Paper : EC–404

Time Allowed : Three Hours] [Maximum Marks : 50

Note :– FIRST question is compulsory. From sections A and B, attempt any four questions selecting at least two questions from each section. Use of scientific calculator is allowed.

I. (a) Why do we use a multiplier with a voltmeter ? 2

(b) Differentiate between spring control and gravity control. 2

(c) Differentiate between dual trace and dual beam CRO. 2

(d) What are active and passive transducers ? Give their examples. 2

(e) Describe applications of LEDs. 1

(f) Differentiate between structures, arrays and clusters in Lab VIEW. 1

PART–A

II. (a) Describe in detail the different type of errors common to measurements. 5

(b) What do you mean by absolute standards ? Give their broad classifications. What is their importance ? 5

III. (a) Derive expressions for actual transformation ratio, ratio error and phase angle error of a potential transformer. 5

1127

B.E. (Electronic and Communication Engineering)

Third Semester

EC-301 Electromagnetic Theory

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section

x-x-x

1	a) Define unit vectors in spherical coordinate system.	1
	b) Define scalar and vector quantity.	1
	c) State Coulomb's law.	1
	d) Write the two conditions of the field of symmetrical line charge.	1
	e) What will be magnetic field at the centre of a loop?	1
	f) Define displacement current.	1
	g) State Snell's law of refraction.	1
	h) Define propagation constant and phase shift factor.	1
	i) Compare group and phase velocity?	1
	j) What do you mean by distributed circuit?	1
	Section- A	
2	a) Write important properties of uniform electromagnetic plane wave in free space. Prove that in a uniform plane electromagnetic wave $\vec{E}$ and $\vec{H}$ are mutually perpendicular to each other.	5
	b) Given two dielectric media, medium 1 is free space and medium 2 has $\varepsilon_2 = 4\varepsilon_0$ and $\mu = \mu_0$. Determine the reflection coefficient for oblique incidence of $\theta_i = 30^\circ$ for parallel and vertical polarization.	5
3	a) Derive an equation of continuity for time varying fields; also discuss inconsistency of Ampere's law.	5
	b) A uniform plane wave in a medium having $\sigma = 10^{-3}$ s/m, $\varepsilon = 80\varepsilon_0$ and $\mu = \mu_0$ is having a frequency of 10 kHz. Calculate the different parameters of wave.	5
4	a) Use Poisson's equation to find V in the free region between two concentric right circular cylinders containing a uniform charge density ρ.	5
	b) In a perfect dielectric medium the electric field progressing in the z axis is given by the equation $\vec{E} = E_0 \cos(\omega t - \beta z)\,\vec{a_x}$ and the associated magnetic field by the equation $\vec{H} = \frac{E_0}{\eta}\cos(\omega t - \beta z)\,\vec{a_y}$ where E_0 is peak value of $\vec{E}$ at t=0 and z=0 and η is the intrinsic impedance of the dielectric. Prove that the average power flowing through any area 'A' normal to the z axis is given by $\overrightarrow{P_{av}} = \frac{1}{2}\frac{E_0^2}{\eta}A$.	5
	Section-B	
5	a) What is the transmission line? State the basic principles of transmission lines also give its equivalent circuit.	3
	b) An air filled rectangular waveguide with a cross section 4x2 cm transports energy in the TE_{10} mode at the rate of 1 hp. The impressed frequency is 30 GHz. What is the peak value of electric field occurring in the guide?	7
6	a) Define reflection coefficient for a transmission line. Give a relation between standing wave ratio (SWR) and reflection coefficient.	3
	b) Derive field equations when wave is propagating in a circular waveguide with TE mode of propagation.	7
7	a) Differentiate an open and short circuited line. Give an expression for impedance of lossless open and short circuited transmission line.	5
	b) Define quality factor of waveguide. Derive a relation between attenuation and quality factor.	5

x-x-x

(i) Printed Pages : 2 Roll No. .....

(ii) Questions : 7 Sub. Code : 6 9 2 3

Exam. Code : 0 9 3 0

B.Engg. (Electronics & Comm. Engg.) 6th Semester

1046

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Paper : EC–612

Time Allowed : Three Hours] **[Maximum Marks : 50**

Note :– **FIRST** question is compulsory. From sections A and B, attempt any **four** questions selecting at least **two** questions from each section. Use of scientific calculator is allowed.

I. (a) Why an ammeter should have low resistance ? 1

(b) Why is damping required for an electromechanical measuring instrument ? 2

(c) Why the secondary of a current transformer is never left open circuited ? 1

(d) How to prevent the loading of a circuit under test when a CRO is used ? 2

(e) List factors influencing the choice of a transducer. 2

(f) Differentiate between analog and digital signals. 1

(g) Differentiate between structures, arrays and clusters in Lab VIEW. 1

SECTION–A

II. (a) What is measurement ? What is its significance ? What are different methods of measurement ? 5

(b) Classify measuring instruments. 5

III. (a) Explain the working principle of moving iron type instruments. Derive general torque equation for such instruments. 5

Sub. Code: 6898

1126

B.E. (Electronics and Communication Engineering)

Third Semester

EC-302: Signals and Systems

Time allowed: 3 Hours | Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.*

x-x-x

Q.1. (a) Draw the time delay and advance operation for unit step function

$$u(t) = \begin{cases} 1 & \text{for } t \geq 0 \\ 0 & \text{for } t < 0 \end{cases}$$ (2)

(b) Show that the distinguishable range of digital frequency is of length 2π only. (1)

(c) Find out the Laplace transform of impulse function using differentiation property. (1)

(d) Determine poles and zeros of rational z-transform. (1)

(e) Classify inter-connections of two discrete-time LTI systems. (1)

(f) Construct an analogy between CTFS & DTFS. (1)

(g) Explain graphically mechanism of impulse-train sampling. (1)

(h) What is concept of reconstruction filter and what is pre alias filter. (2)

SECTION – A

Q.2. (a) Show that complex exponential sequence $x(n) = e^{j\omega_0 n}$ is periodic and find the fundamental frequency.

(b) Given $x(n) = \{ 1, 2, 3, 4, 5 \}$

$h(n) = \{ 1, 2, 3, 3, 2.1 \}$

Find $y(n) = x(n) * h(n)$

(3,7)

Q.3. (a) A signal $x(t) = \sin C (150 \pi t)$ is sampled at a rate of 100 Hz, 200 hz and 300 Hz. For each of these three cases, can you recover the signal x(t) from the sampled signal. Give reasons.

(b) Find Fourier series coefficient and plot the frequency spectra of following sequence

$$x[n] = \sum_{k=-\infty}^{\infty} \delta [n - 5k]$$

(3,7)

Q.4. Discuss the following :

(i) Linear interpolation.

(ii) Band-limited interpolation.

(iii) Effect of undersampling and how to eliminate it.

(2,4,4)

P.T.O

Exam. Code: 0927
Sub. Code:6899

1127

B.Engg. (Electronics & Comm. Engg.)
3rd Semester
EC-303: Microprocessor and Applications

Time allowed: 3 hours | Max. Marks: 50

Note: Attempt five questions in all, including question no. 1 which is compulsory and selecting two from each Unit.

o-o-o

I. Attempt the following:-

a) What indicates the data conditions after an arithmetic or logical operation?

b) Name any four frequently used machine cycles.

c) What is the function of the CMP R instruction? What flags does it affect?

d) Mention two points of difference between the CALL and RET; and PVSH and POP instructions.

e) What is the function of the EI and DI instruction? (5 x 2)

UNIT - I

II. a) The instruction code (YFH) is stored in memory location 2005H. Illustrate the date flow and list the sequence of events when the instruction code is fetched by the MPU.

b) Interface a 4096 X 8 EPROM memory chip to the 8085. The memory address of this chip should range from OOOH to OFFFH. (5,5)

III. a) Write a program in 8085 to load the data byte 9EH in register P and F8H in register E. Mask the high - order bits ($D_7 - D_4$) from both the data bytes, exclusive -0R the low – order bits ($D_3 - D_0$) and display answer.

b) Write instructions to clear the CY flag, to load number FFH in register B and increment (B). If the CY clag is set, display 01 at the output port otherwise display the contents of register C. (5,5)

IV. a) Write a program to add a set of six data bytes stored in memory locations starting from XX60H and display the sum at the output port if the sum does not generate a carry. If a result generates a carry, stop the addition and display 01H at the output port.

b) A set of ten bytes is stored in memory starting with the address XX50H. Write a program to check each byte and save the bytes that are higher than 50_{10} and lower than 100_{10} in memory locations starting from XX70H. (5,5)

P.T.O.

Exam. Code: 0927
Sub. Code: 6217

1126

B.E. (Electronics and Communication Engineering)

Third Semester

EC-318: Network Synthesis and Filters Design

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt five questions in all, selecting atleast two questions from each Part. Use of scientific calculator is allowed.*

x-x-x

Part- A

I. (a) Differentiate between active and passive filters. Which will you prefer and why? (2)

(b) Describe the concept of complex frequency. (3)

(c) What are characteristics of an ideal filter? Give classification of filters explaining their characteristics. (5)

II. (a) Define poles and zeros of a network function. What is their physical significance? (3)

(b) Define hybrid and transmission parameters of a two-port network. For the two port network shown in figure 1, determine these parameters and hence draw equivalent circuits. (7)

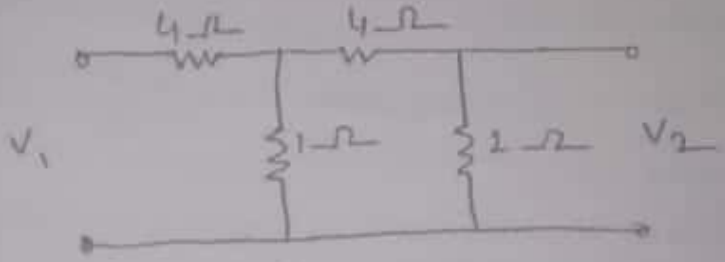


Fig-1

III. (a) For the given denominator polynomial of a network function, find the value of k for which the network is stable. (2)

$$Q(s) = s^3 - 2s^2 + 4s + k$$

(b)) A network function is given by: (4)

$$Z(s) = \frac{5s}{(s+1)(s+2)}$$

Draw the pole-zero plot and hence obtain the function in time domain.

P.T.O

(c) Express Y-parameters in terms of Z-parameters for a two port passive network. (4)

IV. (a) State the necessary conditions for a network function to be the transfer function of a one port passive network. (3)

(b) Explain whether the operations of band pass and band stop filters can be realized using combinations of low pass and high pass filters. (3)

(c) The switch in the circuit shown in figure 2 has been in position 1 for a long time. At $t = 0$, the switch is thrown to position 2. Find the transform network and hence the time domain current through 5 kΩ resistance. (4)

Part- B

V (a) Define propagation constant of a T-network. What is its significance? (2)

(b) Derive the relation between the resonant frequency and the two cut off frequencies of a band pass filter. (3)

(c) Realize the impedance function $Z(s) = \frac{4(s^2+1)(s^2+16)}{s(s^2+4)}$ in both forms of Foster networks. (5)

VI (a) Find the first and second Cauer forms of the function $Z(s) = \frac{(s+1)(s+3)}{s(s+2)}$ (5)

(b) Design T and π-sections of m-derived high pass filter having cut-off frequency of 2 kHz and infinite attenuation frequency of 1.8 kHz and design impedance of 900 Ω. (5)

VII (a) What do you mean by positive real functions? (3)

(b) Describe all pass filters. (3)

(c) What is a composite filter? Describe its working with the help of block diagram. (4)

VIII. (a) Why Butterworth filters are preferred? (2)

(b) What are drawbacks of constant-k filters? Explain whether these overcome in m-derived filters. (3)

(c) Describe the operation of state variable filter with the help of an example. (5)

×-×-×

Exam.Code:0928
Sub. Code: 6257

1057

B.E. (Electronics and Communication Engineering)

Fourth Semester

EC-415: Microprocessors

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No -1 which is compulsory and selecting two questions from each Section.

x-x-x

1. a) Why is the data bus bidirectional? 10 X 1 =10
   b) If an output and input port can have the same 8-bit address, how does the 8085 differentiate between the ports?
   c) What is the function of the JPE instruction?
   d) What is an assembler?
   e) Which instruction is used to set up conditional loops?
   f) Give an example of an instruction which does not affect the flags.
   g) How does the stack space grow?
   h) Which instructions are used to check whether any interrupt requests are pending?
   i) What do you mean by settling time of a DAC?
   j) List the operating modes of 8255A?

SECTION-A

2. a) Draw the logic pinout of the 8085 microprocessor. How are the signals classified? Explain the different classifications.
   b) With the help of timing diagram, explain the opcode fetch machine cycle. 2 X 5 =10

3. a) Design a seven-segment LED output port with the device address F6H, using a 3:8 decoder and a common-anode seven-segment LED.
   b) Write instructions to clear the CY flag, to load number FFH in register C, and to add 01 to (C). If the CY flag is set, display 01 at an output port, otherwise display the contents of register C. Explain your results. 2 X 5 =10

4. a) A set of eight data bytes is stored in the memory location starting at XX70H. Write a program to subtract two bytes at a time and store the result in a sequential order in memory locations starting from XX70H. If any of the results of the subtraction is in the 2's complement, it should be discarded.
   b) A bar code scanner scans the boxes being shipped from the loading dock and records all the codes in computer memory. The end of the data is indicated by the byte 00. The code 10100011(A3H) is assigned to 19"television sets. Write a program to count the number of 19"television stes that were shipped from the following data set.
   Data(H): FA, 67, A3,B8,A3, A3, FA,00 2 X 5 =10

P.T.O

Sub. Code: 6297

1057

B.E. (Electronics and Communication Engineering)

Sixth Semester

EC-612: Electronic Measurements and Instrumentation

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.*

x-x-x

1.

a) Define discrimination.

b) Differentiate precision and accuracy.

c) Differentiate reproducibility and repeatability?

d) A voltmeter 0-70 V is accurate within ± 2% of full scale. Calculate the limiting error when reading is 30V.

e) Enlist the merits and demerits of logic analyzer.

f) Define the principle of LVDT.

g) Write two applications of data acquisition.

h) Define the delayed sweep technique of CRO

i) State the working principle for Kelvin Bridge.

j) Define Lissajous Pattern.

Section-A

2. (a) Define the terms loading effect and hysteresis.
   (b) An analog indicating instrument with a scale range of 0- 5.0 V shows a voltage of 2.65V. The true value of a voltage is 2.70 V. What are the values of absolute error and correction.
   (c) Explain the various types of errors. (4,3,3)

3. (a) Derive a torque equation for Ballistic Galvanometer and also discuss the working of the same.
   (b)The discharge of a capacitor through a ballistic galvanometer produces a damped frequency of 0.125 Hz and successive swings of 120, 96 and 76.8 mm, calculate the damping ratio. Also calculate the logarithmic decrement. (5,5)

4. (a) Explain the working of general purpose CRO with the help of a block diagram.
   (b) Discuss the working of Electronic Multimeter for dc voltage and current readings. (5,5)

Section B

5. (a) Explain the working principle of LVDT with the help of a suitable diagram
   (b) Differentiate Piezo-electric crystal and Photoelectric transducers.
   (c) Describe the advantages and disadvantages of a thermocouple (4,3,3)

6. (a) Discuss the Block diagram of A/D converters. Also explain its applications.
   (b) Write short note on logarithmic amplifier. (6,4)

7. (a) Define Virtual instrumentation. Discuss its role in Electronic and Measurement with the help of suitable application.
   (b) Write short notes on LCD and Magnetic tape. (6,4)

x-x-x

SECTION – B

5. a) Write a program to generate a square wave with the period of 500 µs. Assume the system clock period is 325 ns and use bit D0 to output the square wave.
   b) Write a program to meet the following specs:
      i) Initialize the stack pointer register at XX99H.
      ii) Clear the memory locations starting from XX90H to XX9FH
      iii) Load register pairs B, D, and H with data 0237H, 1242H and 4087H respectively
      iv) Push the contents of the register pairs B, D and H on the stack. 2 X 5 =10

6. a) What are the different vectored interrupts of 8085? Describe each of them briefly.
   b) Illustrate the interfacing of an 8-bit D/A converter with the 8085. 2 X 5 = 10

7. a) Interface a temperature sensor using an A/D converter and port A of the 8255 with the 8085.
   b) Draw and explain the block diagram of the 8259 programmable interrupt controller.
   2 X 5 = 10

X-X-X

Exam.Code:0930
Sub. Code: 6297

1057

B.E. (Electronics and Communication Engineering)

Sixth Semester

EC-612: Electronic Measurements and Instrumentation

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section*

x-x-x

1.

a) Define discrimination.
b) Differentiate precision and accuracy.
c) Differentiate reproducibility and repeatability?
d) A voltmeter 0-70 V is accurate within ± 2% of full scale. Calculate the limiting error when reading is 30V.
e) Enlist the merits and demerits of logic analyzer.
f) Define the principle of LVDT.
g) Write two applications of data acquisition.
h) Define the delayed sweep technique of CRO
i) State the working principle for Kelvin Bridge.
j) Define Lissajous Pattern.

Section-A

2. (a) Define the terms loading effect and hysteresis.
(b) An analog indicating instrument with a scale range of 0- 5.0 V shows a voltage of 2.65V. The true value of a voltage is 2.70 V. What are the values of absolute error and correction.
(c) Explain the various types of errors. (4,3,3)

3. (a) Derive a torque equation for Ballistic Galvanometer and also discuss the working of the same.
(b)The discharge of a capacitor through a ballistic galvanometer produces a damped frequency of 0.125 Hz and successive swings of 120, 96 and 76.8 mm, calculate the damping ratio. Also calculate the logarithmic decrement. (5,5)

4. (a) Explain the working of general purpose CRO with the help of a block diagram.
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Section B

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(b) Write short note on logarithmic amplifier. (6,4)

7. (a) Define Virtual instrumentation. Discuss its role in Electronic and Measurement with the help of suitable application.
(b) Write short notes on LCD and Magnetic tape. (6,4)

x-x-x

Section A

1	a) Discuss in detail the conditions at boundary surface. Also write short notes on perfect conductor.	(5)
	b) Prove the transverse nature of uniform plane wave.	(5)
2	a) Discus the horizontal and vertical polarization of wave when incident obliquely on a perfect insulator.	(5)
	b) Derive an expression for intrinsic impedance when wave is propagating in good conductor.	(5)
3	a) Derive Maxwell's field equation in differential and integration form, also write their physical interpretation.	(5)
	b) State Poynting theorem for an electromagnetic field. Using Maxwell's equations derive expression for power flow: also write physical significance of Poynting vector.	(5)
4	a) Explain the term polarization in context of electromagnetic wave propagation. Discus different types of polarization.	(5)
	b) A wave is travelling normally out of phase towards the reader has two linearly polarized components $E_x = 2\cos\omega t$ and $E_y = 3\cos(\omega t + \pi/2)$. (a) What is the tilt angle of major axis of the polarized ellipse (b) Does E rotates clockwise or counter clockwise.	(5)

Section B

5	a) A copper waveguide has dimensions a=2.286 cm, b= 1.016 cm and is operating at 10 a GHz frequency in TE_{10} mode. For a guide of 1 m length, find the attenuation in dB	(4)
	b) Define the quality factor. Derive the quality factor of a rectangular waveguide.	(6)
6	a) Derive the field component of TE mode when wave is propagating between two parallel conducting planes.	(5)
	b) Use Maxwell's equations to show that it is impossible for the TEM wave to exist within any single conductor waveguide such as an ordinary rectangular and circular guide.	(5)
7	a) Determine the ratio of the cross-section of a circular waveguide to that of a rectangular waveguide if each is to have the same cut-off wavelength for its dominant mode.	(5)
	b) When the dominant H mode is propagated in an air filled rectangular waveguide, the guide wavelength for a frequency of 9 GHz is 4 cm. calculate the breadth of the guide.	(5)
	a) Derive the field components when wave is propagating inside circular waveguide with TM mode of propagation.	(7)
	b) Discuss the characteristics of TE mode of propagation.	(3)

(11)

(i) Printed Pages : 3 Roll No.....

(ii) Questions : 8 **Sub. Code : 3051**

B.Engg. 4th Semester (Electronics & Comm.)

2048

EC-403 Microprocessors

Time allowed : 3 Hours **Max. Marks : 100**

Note : Attempt any 5 questions selecting at least two questions from **Part – A** and two from **Part – B**.

PART – A

1. (a) Draw pin configuration of 8085 showing all the signals present on the pins and explain following signals. 12

   $Io/\overline{M}$, AD0 – AD7, $R\overline{D}$, $\overline{MEMW}$, $\overline{MEMR}$

   (b) Draw bus structure of 8085 and discuss the role of address bus, data bus & control bus. 8

2. (a) Explain following commands 10

   ADC H
   DAA
   PUSH PSW
   RRC
   ANA E

(a) Express the Boolean function $F = A + B'C$ as sum of minterms.
(b) Obtain the simplified expression in SOP form: $F(A, B, C$ ...
(c) Differentiate level triggering and edge trigg...
(d) In an 8-bit counter type A/D c...
conversion time, and ...
(e) Desig...

x-x-x

...which is compulsory.

(b) Draw and explain the circuit diagram for displaying of 8 bit binary data using LED's. 10

3. (a) Assume the memory location 2075 H has data byte 47 H. Specify the contents of the address bus $A_{15} - AD_8$ and the multiplexed AD7–AD0 when the processor assets the $\overline{RD}$ signal. 6

(b) Write a program to count from 0 – 20 H with the delay of 100 ms between each count. After the count 20H, the counter should reset itself and repeat the sequence. Assume clock frequency as 1 MHz. 14

4. (a) List the sequence of events that occur when 8085 reads from memory. 10

(b) Draw circuit diagram to connect 2K byte ROM memory from address F000 to F7FF & explain its working. 10

PART – B

5. (a) Discuss conditional CALL and RET instructions. 6

(b) Draw circuit diagram of 3 bit D/A converter. Explain its working and define following terms : 14

(i) Resolution

(ii) Setting time

6. (a) Explain how instructions EI, DI and RST are used in the interrupt process. 10

(b) Describe features of 8257 DMA controller. 10

7. (a) Draw block diagram of 8255 programmable peripheral interface and explain its various operating modes. 15

(b) Write initialization instruction for 8255 to set up 5

(i) Port A as an O/P port in mode 0

(ii) Port B as an O/P port in mode 1

8. Draw schematic diagram for interfacing RS-232 terminal with 8085 system using 8051 USART and explain how data is received and transmitted by RS-232 serial interface. 20

Exam.Code:0906
Sub. Code: 6241

1057

B.E., Second Semester

EE-E-201: Basic Electrical Engineering

Time allowed: 3 Hours

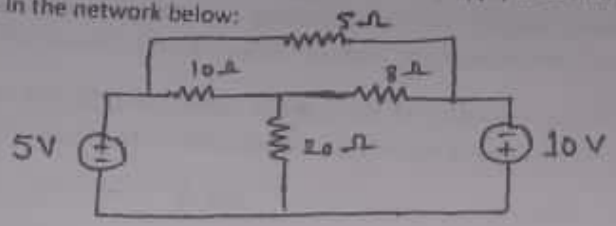
Max. Marks: 50

NOTE: *Attempt <u>five</u> questions in all, selecting atleast two questions from each Section.*

x-x-x

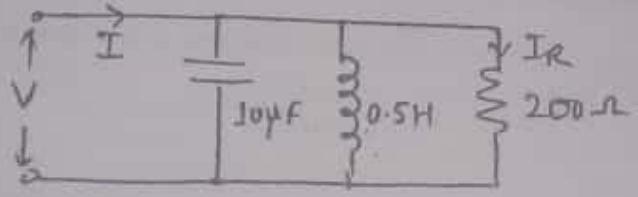
SECTION-A

Q.1 a) Explain the concept of nodal analysis and hence apply it to find power across 20Ω resistance as shown in the network below: (5)



b) Prove maximum power transfer theorem and hence find the efficiency of the circuit during maximum power transfer. (5)

Q.2 (a) In the parallel circuit shown , find I if $I_R = 0.02\angle 30°$ and $\omega = 200\ rad/sec$ and hence draw the phasor for the circuit. (5)



(b) Describe the terms related to the waveform: i) Frequency ii) Phase iii) Peak factor iv) Crest factor v) RMS value. (5)

Q.3. (a) In a 3-phase balanced delta-connected load supplied from a balanced -3-phase voltage source, what is the angle between the line and phase currents as two three phase sets. Use phasor analysis to explain the concept. (5)

(b) Explain the concept of resonance in series RLC circuit. Hence plot the variations of net impedance, current, resistance, and reactances with respect to frequency of the supply. (5)

P.T.O.

Sub. Code: 62-41

Q.4. With the help of a neat circuit diagram and phasor diagram explain how can power factor in a balanced three phase load be measured using 2- wattmeters methods? (10)

SECTION-B

Q.5 a) Prove that the area under the B-H curve of any magnetic material gives the hysteresis losses of that material. Hence discuss the importance of retentivity and coercivity. (5)

(b) A magnetic circuit has a mean core length of 1600cm and uniform cross-section of 5 cm^2. It has an air-gap of 0.8mm and is wound with a coil of 1000 turns. Determine the self inductance of the coil if the core material has a relative permeability of 1500. (5)

Q.6 (a) Draw the phasor diagram for the transformer under lagging power factor load. Hence clearly show the relationship between the load current and the primary current. (4)

(b) Find the voltage regulation of the 1 phase 2200/220 V, 50 kVA transformer at 0.8 power factor lagging when following test results are obtained for the transformer. (6)

O.C. Test	: 220 V	5 A	405 W
S.C. test	: 95 V	20.2 A	805 W

Q.7. (a) Explain the working principle of a 3-phase induction motor and hence discuss the concept of rotating magnetic field in it. (5)

(b) Differentiate the operation of a DC motor from that of a DC generator. Hence elaborate the role of commutator in it. (5)

Q.8. Write short notes of any two:

i) Approximate equivalent circuit diagram of the transformer

ii) Comparison of electric and magnetic circuits

iii) Condition for maximum efficiency in a transformer (2*5 = 10)

X-X-X

Exam.Code:0928
Sub. Code: 6907

1058

B.E. (Electronics and Communication Engineering)

Fourth Semester

EC-404: Engineering Analysis and Design Virtual Instrumentation

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Attempt the following:-

a) Why calibration is required?

b) A voltmeter having sensitivity 2000Ω/V is used for measurement of voltage across a circuit having a output resistance of 10kΩ. The open circuit voltage is 6V. Find the reading on voltmeter when it is set at 10V scale.

c) Calculate and comment on the resolution of6bit and 12 bit DAC.

d) What is loading effect? How it can be minimized?

e) What are different elements of data acquisition and control system? (5x2)

UNIT – I

II. Derive a torque equation for D'Arsonaval Galvanometer and also discuss the dynamic response of the same. A ballistic galvanometer has a resistance of 150 Ω and an undamped period of 7.5s. A steady emf of 3.5 mV produces a deflection of 210 mm. Determine the quantity of electricity discharged from a capacitor if the deflection produced is 750 mm. The relative damping is 0.8. (10)

III. Explain how Wein's bridge can be used for experimental determination of frequency. derive the expression for frequency in terms of bridge parameters. Differentiate the Schering and Anderson's bridge in terms of its merits, demerits and applications. (10)

IV. How phase and frequency are measured with the help of Lissajous Pattern? Explain Draw a Lissajous pattern for equal frequency, equal voltage and 90 degree phase shift. With help of block diagram explain the various working modes of Dual trace CRO. How it is different from a dual beam CRO. (10)

P.T.O.

B.E. (Electronics and Communication)
Fourth Semester
EC-404: Engineering Analysis and D...

...e allowed: 3 Hours

NOTE: Attempt five questi...
and selecting two

Sub. Code: 6907

UNIT – II

V. Explain the working principle of Strain Gauge. Also establish the relation between the Gauge factor and Poisson's ratio? State the principle of Piezo-electric. Also state the merits and demerits of LVDT. (10)

VI. Compare virtual instrument with the traditional instrument. Is VI uses the data flow programming? Justify. Create a VI which converts a decimal number to a binary number using for loop. (10)

VII. Discuss working and applications of differential instrumentation amplifier? Differentiate analog DAS and digital DAS. Enlist the various factors influencing the choice of transducer. (10)

x-x-x

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NO:

Exam Code:930
Sub Code: 6930

1015

B.E./B.E. MBA (Electronics and Communication) Sixth Semester

EC-612: Electronic Measurement and Instrumentation

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, selecting at least two questions from each section.

x-x-x

Section-A

1. a. Differentiate Accuracy and Precision with the help of suitable examples.
   b. Define the term hysteresis.
   c. Explain the various types of errors. (4,2,4)

2. a. Derive a torque equation for D'Arsonaval Galvanometer.
   b. Define the principle of operation of ballistic galvanometer.
   c. A ballistic galvanometer has a resistance of 150 Ω and an undamped period of 7.5s. A steady emf of 3.5 mV produces a deflection of 210 mm. Determine the quantity of electricity discharged from a capacitor if the deflection produced is 750 mm. The relative damping is 0.8. (5,5)

3. a. Differentiate the Schering and Andeson's bridge in terms of its merits, demerits and applications.
   b. Explain how Wein's bridge can be used for experimental determination of frequency. derive the expression for frequency in terms of bridge parameters. (5,5)

4. a. A voltmeter 0-70 V is accurate within ± 2% of full scale. Calculate the limiting error when reading is 30V.
   b. Define the principle of operation of ballistic galvanometer. Explain its working, advantages and disadvantages. (3,7)

Section-B

5. a. Compare the working of wave analyzer and spectrum analyzer.
   b. Discuss the various functions of electronic multimeter. (5,5)

6. a. Explain the working principle of LVDT with the help of a suitable diagram.
   b. State the principle of Piezo-electric transducers. Also explain the factors influencing the choice of transducers. (5,5)

7. a. Explain the function of CRT with the help of a block diagram.
   b. How phase and frequency are measured with the help of Lissajous Pattern? Explain. (5,5)

8. a. Differentiate analog DAS and digital DAS.
   b. Explain the various type of telemetry system. (5,5)

x-x-x

Exam.Code:0928
Sub. Code: 6257

1057

B.E. (Electronics and Communication Engineering)
Fourth Semester
EC-415: Microprocessors

Time allowed: 3 Hours | Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

1. a) Why is the data bus bidirectional? 10 X 1 =10
   b) If an output and input port can have the same 8-bit address, how does the 8085 differentiate between the ports?
   c) What is the function of the JPE instruction?
   d) What is an assembler?
   e) Which instruction is used to set up conditional loops?
   f) Give an example of an instruction which does not affect the flags.
   g) How does the stack space grow?
   h) Which instructions are used to check whether any interrupt requests are pending?
   i) What do you mean by settling time of a DAC?
   j) List the operating modes of 8255A?

SECTION-A

2. a) Draw the logic pinout of the 8085 microprocessor. How are the signals classified? Explain the different classifications.
   b) With the help of timing diagram, explain the opcode fetch machine cycle. 2 X 5 =10

3. a) Design a seven-segment LED output port with the device address F6H, using a 3:8 decoder and a common-anode seven-segment LED.
   b) Write instructions to clear the CY flag, to load number FFH in register C, and to add 01 to (C). If the CY flag is set, display 01 at an output port, otherwise display the contents of register C. Explain your results. 2 X 5 =10

4. a) A set of eight data bytes is stored in the memory location starting at XX70H. Write a program to subtract two bytes at a time and store the result in a sequential order in memory locations starting from XX70H. If any of the results of the subtraction is in the 2's complement, it should be discarded.
   b) A bar code scanner scans the boxes being shipped from the loading dock and records all the codes in computer memory. The end of the data is indicated by the byte 00. The code 10100011(A3H) is assigned to 19"television sets. Write a program to count the number of 19"television stes that were shipped from the following data set.
   Data(H): FA, 67, A3,B8,A3, A3, FA,00 2 X 5 =10

P.T.O

Sub. Code: 6257

SECTION – B

5. a) Write a program to generate a square wave with the period of 500 μs. Assume the system clock period is 325 ns and use bit D0 to output the square wave.
   b) Write a program to meet the following specs:
      i) Initialize the stack pointer register at XX99H.
      ii) Clear the memory locations starting from XX90H to XX9FH
      iii) Load register pairs B, D, and H with data 0237H, 1242H and 4087H respectively
      iv) Push the contents of the register pairs B, D and H on the stack. 2 X 5 =10

6. a) What are the different vectored interrupts of 8085? Describe each of them briefly.
   b) Illustrate the interfacing of an 8-bit D/A converter with the 8085. 2 X 5 = 10

7. a) Interface a temperature sensor using an A/D converter and port A of the 8255 with the 8085.
   b) Draw and explain the block diagram of the 8259 programmable interrupt controller. 2 X 5 = 10

X-X-X

(i) Printed Pages : 3 Roll No. 0105 21

(ii) Questions : 8 Sub. Code : 6223

Exam. Code :

B. Engg. 4th Semester (Electronics and Communication)

2042

MICROPROCESSORS

Paper : EC–409

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– Attempt any **five** questions in all, by taking at least two from each Section.

SECTION–A

1. (i) Draw the 8085 microprocessor pinout and explain its control and status signals. 6

   (ii) Calculate the number of memory chips needed to design a 8K-byte memory if the memory chip size is 1024 × 1. 2

   (iii) Why are the program counters and stack pointer 16-bit registers ? 2

2. (i) Define a MPU. List and explain its various operations using appropriate diagrams. 5

   (ii) The instruction LDA 2050H copies the contents of the memory location 2050H into the accumulator. It is a 3-byte instruction with four machine cycles and thirteen T-states. Identify the fourth machine cycle and its control signal. Also, identify the contents of the demultiplexed address bus $A_{15} - A_0$ and the data bus in the fourth machine cycle when the control signal is asserted. 5

a) What is the need of modulation? Derive the mathematical representation and frequency spectrum of AM wave.

b) Draw the block diagram of "third" (weaver) generator method and explain how the carrier and unwanted sideband are

3. (i) Draw the block diagram to interface an I/O device. Also, show a practical and cost-effective decoding circuit for an output device with an address of 01H. 5

(ii) Write a program to sort a set of three readings (87, 56, 42) stored in memory, starting at XX50H in ascending order. 5

4. (i) Write a program to do the following :

(a) Load the number 30H in register B and 39H in register C

(b) Subtract 39H from 30H

(c) Display the answer at port 1. 5

(ii) What are the various types of addressing modes in 8085 ? 5

SECTION–B

5. (i) Write a program to count from 0 to 9 with a one-second delay between each count. At the count of 9, counter should reset itself to 0 and repeat sequence continuously. Use register pair HL to set up the delay, and display each count at one of the output ports. Assume the clock frequency of the microprocessor is 1MHz. 6

(ii) Compare PUSH/POP and CALL/RET. 4

6. (i) Explain how the contents of the flag register can be displayed and how a given flag can be set or reset. 4

(ii) Write a program to generate a continuous square wave with a period of 500 μs. Assume system clock period is 325 ns and use bit D_0 to output the square wave. 6

7. (i) Explain the process of Direct Memory Access (DMA) and the functions of various elements of 8257. 5

(ii) Design an interfacing circuit to set up 8255 A in handshake mode (Mode 1) and write the instructions to transfer data under status check I/O and interrupt I/O. 5

8. Write short notes on the following :

(i) 8251 A programmable communication interface. 4

(ii) Memory-mapped and Peripheral I/O. 3

(iii) Maskable and non-maskable interrupts. 3

Exam.Code:0928
Sub. Code: 6907

1057

B.E. (Electronics and Communication Engineering)

Fourth Semester

EC-404: Engineering Analysis and Design Virtual Instrumentation

Time allowed: 3 Hours Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 (Section –A) which is compulsory and selecting two questions each from Section B-C.

x-x-x

Section-A

Q-1

a) What is the difference between accuracy and precision?

b) What is the function of the *triggering circuit* in CRO?

c) Differentiate between a DC and an AC Voltmeter.

d) Why a digital instrument is considered better as compared to an analog instrument?

e) What functions does a spectrum analyzer perform?

Section -B

Q-2. a) How to measure inductance using an Anderson Bridge? Discuss in detail.

b) A Maxwell inductance bridge uses a standard capacitor of C3 = 0.1μF and operates at a supply frequency of 100Hz. Balance is achieved when R1=1.26 kΩ, R3=470 Ω and R4=500 Ω. Calculate the inductance and resistance of the measured inductor, and determine its Q factor.

Q.3- (a) Draw neat diagram and explain the working of instrumentation amplifier.

(b) How instrumentation plays a vital role in biomedical? Explain in context of ECG and EEG measurements.

Q.4 (a) Explain LabVIEW based virtual instrumentation

(b)How to manipulate structure in LabView and also explain different structures available.

Section-C

Q.5- a) What are resistive transducers? Explain how a strain gauge can be used to measure the strain.

b) Explain capacitive and inductive transducers.

Q.6- (a)Compare virtual instrument with the traditional instrument.

(b)What are the different palettes available in VI and explain tool palette.

Q.7- a) Draw and explain the block diagram of a function generator.

b) Explain the principle of operation of a CRO.

x-x-x

Exam. Code: 0927
Sub. Code:6899

1127
B.Engg. (Electronics & Comm. Engg.)
3rd Semester
EC-303: Microprocessor and Applications

Time allowed: 3 hours

Max. Marks: 50

Note: Attempt five questions in all, including question no. 1 which is compulsory and selecting two from each Unit.

o-o-o

I. Attempt the following:-

a) What indicates the data conditions after an arithmetic or logical operation?

b) Name any four frequently used machine cycles.

c) What is the function of the CMP R instruction? What flags does it affect?

d) Mention two points of difference between the CALL and RET; and PVSH and POP instructions.

e) What is the function of the EI and DI instruction? (5 x 2)

UNIT - I

II. a) The instruction code (YFH) is stored in memory location 2005H. Illustrate the date flow and list the sequence of events when the instruction code is fetched by the MPU.

b) Interface a 4096 X 8 EPROM memory chip to the 8085. The memory address of this chip should range from OOOH to OFFFH. (5,5)

III. a) Write a program in 8085 to load the data byte 9EH in register P and F8H in register E. Mask the high - order bits ($D_7 - D_4$) from both the data bytes, exclusive -0R the low – order bits ($D_3 - D_0$) and display answer.

b) Write instructions to clear the CY flag, to load number FFH in register B and increment (B). If the CY clag is set, display 01 at the output port otherwise display the contents of register C. (5,5)

IV. a) Write a program to add a set of six data bytes stored in memory locations starting from XX60H and display the sum at the output port if the sum does not generate a carry. If a result generates a carry, stop the addition and display 01H at the output port.

b) A set of ten bytes is stored in memory starting with the address XX50H. Write a program to check each byte and save the bytes that are higher than 50_{10} and lower than 100_{10} in memory locations starting from XX70H. (5,5)

P.T.O.

UNIT II

V. (a) Explain with examples the different techniques of generating time delays.

(b) Write a 20MS time delay subroutine using register pair BC. Clear the Z flag without affecting any other flags in the flag register and return to the main program. (5,5)

VI. (a) What are RST instructions? How many RST instructions are there in 8085? How are these instructions executed? Explain with suitable diagrams.

(b) With the help of a schematic diagram, explain how an 8–bit A/D converter is interfaced with 8085 using status check. (5,5)

VII. Write short notes on:-

(a) Control word format of 8255 for I/O mode.

(b) Different modes of 8254. (2 x 5)

o–o–o

Third Semester

EC-301: Electromagnetic Theory

Time allowed: 3 Hours | Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.*

x-x-x

I Attempt the following:-

a) State Ampere's Law.

b) Discuss the inconsistency defined by Maxwell in Ampere's law.

c) Define Poynting vector?

d) Comment. "TEM mode exists in waveguide."

e) Differentiate group velocity and phase velocity.

f) Write an expression for characteristic impedance of transmission line.

g) Define skin effect.

h) Define guide wavelength?

i) What is a Cavity resonator?

j) What is meant by dominant mode in waveguide? (10x1)

UNIT – I

II. a) State and explain Divergence Theorem as applied to an electrostatic field.

b) Calculate the skin depth, propagation constant and wave velocity at a frequency of 1.6 MHz in aluminium where conductivity is 38.2 MS/m, relative permittivity is 1.

c) Write down the Maxwell equations in differential form, integral form and for free space. (4,3,3)

III. a) Discuss the analogies between Electric and Magnetic fields.

b) E and H are mutually perpendicular to each other in uniform plane wave . Justify.

c) Explain the concept of Reflection and transmission of the wave in regard with conductors and dielectrics. (4,3,3)

IV. a) What is the "polarization" of the electric field vector of a uniform plane traveling in the z-direction represented by $E = E_0 (x + jy) e^{j\omega t}$. Justify your answer.

b) Derive a relation for intrinsic impedance for conducting medium. (5,5)

UNIT – II

V a) Differentiate waveguide and transmission line.

b) Define Standing wave ratio. Derive a relation between SWR and Reflection Coefficient for a transmission line. (5,5)

VI. a) A wave is propagated in a parallel plane waveguide. The frequency is 6 GHz and the plane separation is 0.03metres, Find for the dominant mode:-

i) The cut-off wavelength

ii) The guide wavelength

iii) Group and Phase velocities

b) Write short note on circular waveguide. (6,4)

VII a) Write the characteristics of TE and TM mode.

b) A rectangular waveguide is propagating in TE mode. Derive an expression for magnetic and electric field inside the guide. (4,6)

x-x-x

Exam Code: 0928
Sub. Code: 6260

1057

B.E. (Electronics and Communication Engineering)
Fourth Semester
EC-420: Electromagnetic Theory

Time allowed: 3 Hours. Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.*

x-x-x

1. a. In what context did Maxwell include the concept of displacement current? Discuss.
   b. What is a Poynting vector and what does it signify?
   c. Define the term relaxation time.
   d. Find the velocity of a plane wave in a lossless medium having a relative permittivity of 5 and relative permeability of unity.
   e. Calculate the depth of penetration for copper at 1MHz. The conductivity for copper is 58Mmhos/m and permeability is 1.26 μH/m.
   f. Differentiate group velocity and phase velocity.
   g. Write an expression to relate SWR and reflection coefficient.
   h. What is meant by "matching of transmission line"?
   i. What is meant by dominant mode in waveguide?
   j. Differentiate the terms wave impedance and characteristics impedance. (10)

Section A

2. a. Write the Maxwell equations in integral and differential form.
   b. Write down the properties of uniform plane waves.
   c. A plane wave in free space has an average Poynting vector of 1.5 W/m^2. Find the average energy density. (3,4,3)

3. a. E and H are mutually perpendicular to each other in uniform plane wave". Justify. Derive a relation for intrinsic impedance for conducting medium.
   b. Show that the power per unit area of a uniform plane wave is $P = E \times H$. (5,5)

4. a. What is the "polarization" of the electric field vector of a uniform plane traveling in the z-direction represented by $E = E_0 (x + jy) e^{jwt}$. Justify your answer.
   b. What is meant by the polarization of a wave? When is the wave linearly polarized and circularly polarized? (5,5)

Section B

5. a. What do you understand by Dominant mode? Explain in context with rectangular and circular waveguide.
   b. A wave is propagated in a parallel plane waveguide. The frequency is 6 GHz and the plane separation is 0.03metres, Find for the dominant mode
      (i) The cut-off wavelength (ii) the guide wavelength
      (iii) Group and Phase velocities (5, 5)

6. a. A open wire transmission line having a characteristic impedance of 550Ω is terminated by a resistive load of 700 Ω. Calculate the standing wave ratio.
   b. Deduce an expression for the characteristic impedance of transmission line and show that it is resistive at radio frequencies. (4,6)

7. a. Write the characteristics of TE and TM mode.
   b. Differentiate between the transmission line and waveguide. (5,5)

x-x-x

Library

Exam Code: 0930
Sub. Code: 6297

1057

B.E. (Electronics and Communication Engineering)

Sixth Semester

EC-612: Electronic Measurements and Instrumentation

Max. Marks: 50

Time allowed: 3 Hours

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

1.

a) Define discrimination.
b) Differentiate precision and accuracy.
c) Differentiate reproducibility and repeatability?
d) A voltmeter 0-70 V is accurate within ± 2% of full scale. Calculate the limiting error when reading is 30V.
e) Enlist the merits and demerits of logic analyzer.
f) Define the principle of LVDT.
g) Write two applications of data acquisition.
h) Define the delayed sweep technique of CRO
i) State the working principle for Kelvin Bridge.
j) Define Lissajous Pattern.

Section-A

2. (a) Define the terms loading effect and hysteresis.
(b) An analog indicating instrument with a scale range of 0- 5.0 V shows a voltage of 2.65V. The true value of a voltage is 2.70 V. What are the values of absolute error and correction.
(c) Explain the various types of errors. (4,3,3)

3. (a) Derive a torque equation for Ballistic Galvanometer and also discuss the working of the same.
(b)The discharge of a capacitor through a ballistic galvanometer produces a damped frequency of 0.125 Hz and successive swings of 120, 96 and 76.8 mm, calculate the damping ratio. Also calculate the logarithmic decrement. (5,5)

4. (a) Explain the working of general purpose CRO with the help of a block diagram.
(b) Discuss the working of Electronic Multimeter for dc voltage and current readings. (5,5)

Section B

5. (a) Explain the working principle of LVDT with the help of a suitable diagram.
(b) Differentiate Piezo-electric crystal and Photoelectric transducers.
(c) Describe the advantages and disadvantages of a thermocouple (4,3,3)

6. (a) Discuss the Block diagram of A/D converters. Also explain its applications.
(b) Write short note on logarithmic amplifier. (6,4)

7. (a) Define Virtual instrumentation. Discuss its role in Electronic and Measurement with the help of suitable application.
(b) Write short notes on LCD and Magnetic tape. (6,4)

x-x-x

B.E. (Electronics and Communication Engineering)
Sixth Semester
EC-612: Electronic Measurements and Instrumentation

Time allowed: 3 Hours | Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

1.
a) Define discrimination.
b) Differentiate precision and accuracy.
c) Differentiate reproducibility and repeatability?
d) A voltmeter 0-70 V is accurate within ± 2% of full scale. Calculate the limiting error when reading is 30V.
e) Enlist the merits and demerits of logic analyzer.
f) Define the principle of LVDT.
g) Write two applications of data acquisition.
h) Define the delayed sweep technique of CRO
i) State the working principle for Kelvin Bridge.
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Section-A

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7. (a) Define Virtual instrumentation. Discuss its role in Electronic and Measurement with the help of suitable application.
(b) Write short notes on LCD and Magnetic tape. (6,4)

x-x-x

Sub. Code: 0216

1126

B.E (Electronics and Communication Engineering)

Third Semester

EC-317: Signals and Systems

Time allowed: 3 Hours | Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. 1 (Part-A) which is compulsory and selecting two questions each from Part B-C*

x-x-x

Part-A

1. (a) Find the z-transform of signal: $x[n] = ne^{-2n}u[n-m]$

   (b) Determine the energy and power of the signal: $x[n] = \cos(\frac{\pi}{4}n)$

   (c) For the LTI system with impulse response $h(t) = \delta(t) - 2e^{-2t}u(t)$, determine the frequency response.

   (d) Specify the Nyquist rate and Nyquist interval for the signal:

   $$x(t) = sinc(200t) + sinc^2(200t)$$

   (e) Find the Laplace transform and ROC of the signal $g(t) = t^n e^{-at}u(t)$. (5×2=10)

Part-B

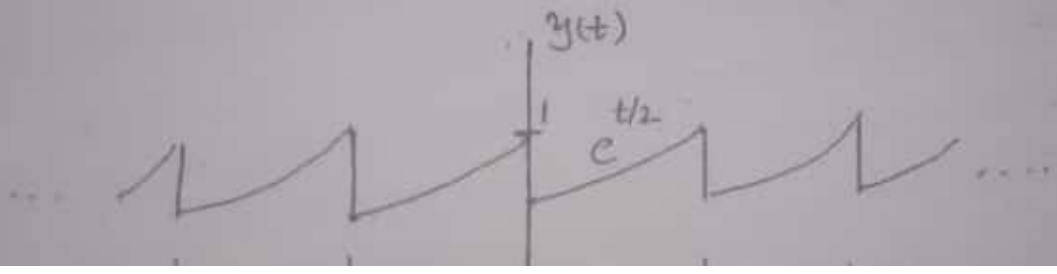
2. (a) Find the unit impulse response of the system $y(n) + 2y(n-1) = x(n)$. (5)

   (b) Use the classical method to solve

   $$(D^2 + 2D)y(t) = (D+1)x(t)$$

   for the initial conditions of $y(0^+) = 2, \frac{dy(0^+)}{dt} = 1$, and the input of $x(t) = u(t)$. (5)

3. (a) Find the compact trigonometric Fourier series for the signal shown in Fig 1. (5)



4. (a) Draw the following signal and evaluate the Fourier series : (5)

$$x(n) = \sum_{m=-\infty}^{+\infty} [4\delta(n-4m) + 8\delta(n-1-4m)]$$

(b) Find whether the following systems are Memory-less, Time- invariant, Linear, Causal, and Stable. Justify your answer (5)

a. $y(t) = \int_{-\infty}^{2t} x(\tau)\, d\tau$

b. $y(n) = \frac{x(n-1)+x(-n-1)}{2}$

Part-C

5. Use discrete time fourier transform (DTFT) method to find the zero state response y(n) of a causal system with frequeny response (10)

$$H(\omega) = \frac{e^{j\omega} + 0.32}{e^{j2\omega} + e^{j\omega} + 0.16}$$

And the input

$$x[n] = -0.5^n u[n]$$

6. (a) Determine the Hilbert transform of the signal: $x(t) = \cos(\omega_c t)$. (5)

(b) Describe the reconstruction of signals using interpolation. What is Aliasing and how can it be avoided in the sampled signals? (5)

7. (a) Determine the Laplace transform of the signal: $x(t) = (1 + 0.5\sin(t))\sin(1000t)\, u(t)$ (5)

(b) Determine the signal x(n) whose z-transform is given by (5)

$$X(z) = \log(1 + az^{-1}), \qquad |z| > |a|$$

X-X-X

Exam Code:
Sub. Code: 6917

1015

B.E./B.E. MBA (Electronics and Communication) Fourth Semester

EC-417: Electromagnetic Theory (Old)

Time allowed: 3 Hours

Max. Marks: 50

NOTE *Attempt five questions in all, selecting at least two questions from each Section.*

x-x-x

1	a) Discuss the boundary conditions at the surface of medium. Give the concept of perfect conductor.	5
	b) Evaluate the power that is being converged along the coaxial cable direct current I which flows along the inner-conductor and returns through the sheet, making use of the Poynting vector and which part of the cable carries the energy?	5
2	a) Define a plane wave. Establish a relation between electric field and magnetic field in a uniform plane.	5
	b) A 6.5 GHz uniform plane wave is propagating in polystyrene. If the amplitude of electric filed intensity is 20 V/m and the material is assumed to be lossless. Find velocity of propagation and the propagation constant.	5
3	a) Explain the term polarization in the context of electromagnetic wave propagation. Distinguish between linear, circular and elliptical polarization.	5
	b) Explain the term 'skin depth' and calculate its value for copper at one megahertz; assume the conductivity of 5.8x10 mhos/meter.	5
4	a) Derive the Maxwell's equation in differential and integral form, also give their physical significance.	5
	b) A wave travelling normally out of phase (towards the reader) has two linearly polarized components, $E_x = 2\cos\omega t$ and $E_y = 3\cos(\omega t + \frac{\pi}{2})$. (a) what is the axial ratio (b) what is the tilt angle of the major axis of the polarization ellipse?	5

Section-B

5	a) A loss-less transmission line of characteristics impedance $50\angle 0^0$ ohms and half wavelength long is left open circuited at far end. The rms value of the open circuited voltage is 10 volts. Calculate the rms value of voltage and current at a distance of eight wavelengths away from the open circuit.	5
	b) Derive the field components of TM wave when propagating through two infinite conducting parallel planes.	5
6	a) Give the basic theory of a transmission line. Draw the equivalent circuit of a transmission line.	5
	b) Derive the field components when wave is propagating inside a circular waveguide with TE mode of propagation.	5
7	a) Derive an expression for input impedance when transmission line is terminated with any load impedance.	5
	b) Discuss the characteristics of TE and TM waves by calculating their wavelength and velocity of propagation for two parallel conducting planes.	5
8	a) Compare TE, TM and TEM mode. Prove that TEM does not exist in a waveguide.	5
	b) Define quality factor of a waveguide, derive a relation between quality factor and attenuation factor of a waveguide.	5

X-x-X

(i) Printed Pages : 3 Roll No. .....

(ii) Questions : 8 Sub. Code : 6 2 2 3

Exam. Code : | | | |

B. Engg. 4th Semester (Electronics and Communication)

2042

MICROPROCESSORS

Paper : EC–409

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– Attempt any **five** questions in all, by taking at least two from each Section.

SECTION–A

1. (i) Draw the 8085 microprocessor pinout and explain its control and status signals. 6

   (ii) Calculate the number of memory chips needed to design a 8K-byte memory if the memory chip size is 1024 × 1. 2

   (iii) Why are the program counters and stack pointer 16-bit registers ? 2

2. (i) Define a MPU. List and explain its various operations using appropriate diagrams. 5

   (ii) The instruction LDA 2050H copies the contents of the memory location 2050H into the accumulator. It is a 3-byte instruction with four machine cycles and thirteen T-states. Identify the fourth machine cycle and its control signal. Also, identify the contents of the demultiplexed address bus $A_{15} - A_0$ and the data bus in the fourth machine cycle when the control signal is asserted. 5

Total No. of Sheets used..... SHEET NO. 1
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Name of the Examination....B.E. (ECE)....Year...2016....Session....May....
Course.....Subject...E.M.T.....
Paper....EC-301.....Option.....

B.E. (Electronics & Communication Engineering) 3rd Semester
EC-301: Electromagnetic Theory

Note: Attempt five questions in all. Q.1 is compulsory. Attempt two questions from each section.

Time allowed: 3 Hours Max. Marks: 50

a. State Ampere's Law.
b. Discuss the inconsistency defined by Maxwell in Ampere's law.
c. Define Poynting vector?
d. Comment. "TEM mode exists in waveguide."
e. Differentiate group velocity and phase velocity.
f. Write an expression for characteristic impedance of transmission line.
g. Define skin effect.
h. Define guide wavelength?
i. What is a Cavity resonator?
j. What is meant by dominant mode in waveguide? (10)

Section A

2. a. State and explain Divergence Theorem as applied to an electrostatic field.
b. Calculate the skin depth, propagation constant and wave velocity at a frequency of 1.6 MHz in aluminium where conductivity is 38.2 MS/m, relative permittivity is 1.
c. Write down the Maxwell equations in differential form, integral form and for free space.(4,3,3)

3. a. Discuss the analogies between Electric and Magnetic fields.
b. E and H are mutually perpendicular to each other in uniform plane wave". Justify.
c. Explain the concept of Reflection and transmission of the wave in regard with conductors and dielectrics. (4,3,3)

4. a. What is the "polarization" of the electric field vector of a uniform plane traveling in the z-direction represented by $E = E_0 (x + jy) e^{j\omega t}$. Justify your answer.
b. Derive a relation for intrinsic impedance for conducting medium. (5,5)

Section B

5. a. Differentiate waveguide and transmission line.
b. Define Standing wave ratio. Derive a relation between SWR and Reflection Coefficient for a transmission line. (5,5)

6. a. A wave is propagated in a parallel plane waveguide. The frequency is 6 GHz and the plane separation is 0.03metres, Find for the dominant mode
(i) The cut-off wavelength (ii) the guide wavelength
(iii) Group and Phase velocities
b. Write short note on circular waveguide. (6,4)

7. a. Write the characteristics of TE and TM mode.
b. A rectangular waveguide is propagating in TE mode. Derive an expression for magnetic and electric field inside the guide. (4,6)

3. (i) Draw the block diagram to interface an I/O device. Also, show a practical and cost-effective decoding circuit for an output device with an address of 01H. 5

(ii) Write a program to sort a set of three readings (87, 56, 42) stored in memory, starting at XX50H in ascending order. 5

4. (i) Write a program to do the following :

(a) Load the number 30H in register B and 39H in register C

(b) Subtract 39H from 30H

(c) Display the answer at port 1. 5

(ii) What are the various types of addressing modes in 8085 ? 5

SECTION–B

5. (i) Write a program to count from 0 to 9 with a one-second delay between each count. At the count of 9, counter should reset itself to 0 and repeat sequence continuously. Use register pair HL to set up the delay, and display each count at one of the output ports. Assume the clock frequency of the microprocessor is 1MHz. 6

(ii) Compare PUSH/POP and CALL/RET. 4

6. (i) Explain how the contents of the flag register can be displayed and how a given flag can be set or reset. 4

(ii) Write a program to generate a continuous square wave with a period of 500 μs. Assume system clock period is 325 ns and use bit D_0 to output the square wave. 6

7. (i) Explain the process of Direct Memory Access (DMA) and the functions of various elements of 8257. 5

(ii) Design an interfacing circuit to set up 8255 A in handshake mode (Mode 1) and write the instructions to transfer data under status check I/O and interrupt I/O. 5

8. Write short notes on the following :

(i) 8251 A programmable communication interface. 4

(ii) Memory-mapped and Peripheral I/O. 3

(iii) Maskable and non-maskable interrupts. 3