

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,

LONERE – RAIGAD -402 103

Semester Winter Examination – Dec. - 2019

Branch: Electronics and Telecommunication Engineering

Subject with Subject Code:- Electromagnetic Field Theory [BTEXC501]

Date:- 09/12/2019

Sem:- V

Marks: 60

Time:- 3 Hr.

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and **should mention it** clearly

(Marks)

Q.1. a) What is importance of boundary conditions? Derive expressions (06)
for **E** and **H** in static electric field at following interfaces

(i) Dielectric-Dielectric

(ii) Conductor-Dielectric

b) Three field quantities are given by (06)

$$\mathbf{P} = 5\mathbf{a}_x - \mathbf{a}_z$$

$$\mathbf{Q} = 4\mathbf{a}_x - \mathbf{a}_y + \mathbf{a}_z$$

$$\mathbf{R} = 5\mathbf{a}_y + \mathbf{a}_z$$

Determine: $(\mathbf{P}+\mathbf{Q}) \times (\mathbf{P}-\mathbf{Q})$, $\mathbf{P} \times (\mathbf{Q} \times \mathbf{R})$ and component of **P** along **Q**.

Q.2. a) State and prove Poynting Theorem. (12)

OR

b) Derive expressions for attenuation constant, phase constant, (12)
phase velocity, wave velocity, wavelength and intrinsic
impedance for the wave propagation in lossy dielectric.

Q.3. a) Obtain the expression for the general line equations that give (12)
voltage and current at any distance **x** from source on a
transmission line not terminated into **Z₀**.

Q.4. a) Determine the amplitudes of reflected and transmitted **E** and **H** (06)
at the interface between two dielectrics at $Z = 0$.

b) For an ideal dielectric medium state derive Helmholtz equations. (06)

Q.5. a) What are various types of modes in waveguide? Explain them in (12)
detail with field patterns.

OR

b) Derive an Expression for attenuation in waveguide. (12)

Q.6. Define the terms: Field radiation pattern, Power radiation (12)
pattern, Beam width, Bandwidth, Isotropic antenna, Directivity,
Gain, HPBW, Isotropic antenna.

Paper End

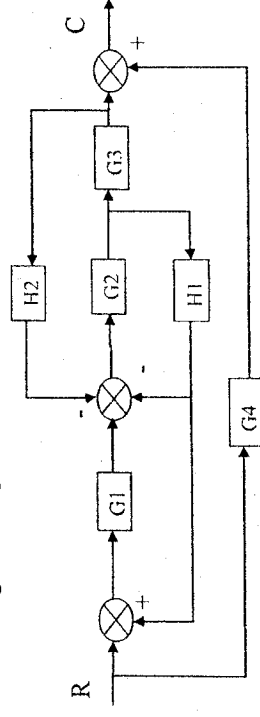
Branch: Electronics & Telecommunication Engineering Sem.: Fifth
 Subject:- Control System Engg (BTExc 502) Marks: 60
 Date:- 11/12/2019 Time:- 3 Hr.

Instructions to the Students

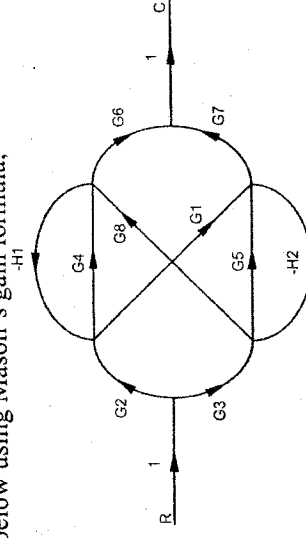
1. Each question carries 12 marks.
2. Attempt any five questions of the following.
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Q.1. a) Explain Open and Closed Loop Control System. (06)

Also Find the transfer function(C/R) for the block diagram shown in figure using Block Diagram Reduction Rule.



b) Determine the overall transfer function from signal flow graph shown below using Mason's gain formula, (06)



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2. a) For $G(S) = \frac{N}{S(1+aS)(bS^2+cS+d)}$ Find the Position error constant, Velocity error constant, Acceleration error constant and steady state error for unity feedback system for step input $R_0u(t)$, Ramp input $R_1tu(t)$. (06)
- b) Define the term Rise time, Delay time and calculate all time domain specifications for the system having transfer function given by $T.F. = \frac{8}{S^2+4S+8}$ (06)
3. a) Find value of 'K' by Routh's Criterion for unity feedback system having $G(S) = \frac{K}{S(S^2+4S+5)(S+2)}$ for which roots with zero real parts. (06)
- b) For Unity feedback system with $G(S)$ as given below, Draw the complete Root Locus for the system $\frac{S(S+3+j2)(S+3-j2)}{K}$. Calculate the values of asymptote, Centroid, No. of asymptote and the value of damped frequency at which locus crosses imaginary axis (06)
4. a) For the system having $G(S)/H(S) = \frac{K}{S(S+3)(S+5)}$ find the ranges of K for stability, instability and the value of gain for marginal stability by Nyquist criterion. (06)
- b) Sketch the Bode Plot and Show that System is Conditionally Stable for unity feedback system characterized by OLTF (Assume k = 1) (06)
5. a) Explain in details Feedback Characteristics of control system. Also discuss the effect of PID control action on second order system. (06)
- b) List out the various compensation schemes used in practices. Consider a type 1 unit feedback system with an OLTF (06)

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- $G(S) = \frac{K}{S(S+1)}$, specified that $K_v = 12 \text{Sec}^{-1}$ and $\phi_{PM} = 40^\circ$
- Design lead compensator to meet the specifications
- Q.6. a) Find state transition Matrix of system define by following state model also find transfer function of the system (06)

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

$$y = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

- b) Comment on Controllability and Observability for the system represented by (06)

$$x = \begin{bmatrix} -3 & 1 & 1 \\ -1 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix} x + \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 2 & 1 \end{bmatrix} u$$

$$y = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix} x$$

Paper End

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE –
RAIGAD -402 103**

Winter Semester Examination – December - 2019

Branch: EXTC

Sem.:- V

Subject with Subject Code:- Computer Architecture (BTETC503) Marks: 60

Date:- 13/12/2019

Time:- 3 Hr.

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

- Q.1**
- a. Why you should do performance testing? What is the purpose, advantages, challenges of software performance test? [06]
 - b. Explain the following section with respect to assembly basic syntax? [06]
 - 1.The data section
 - 2.The BSS section
 - 3.The Text Section
- Q.2**
- a. With a neat diagram explain the internal organization of a processor [06]
 - b. How computer handles the information? Describe the following number format with examples –Binary, Hexadecimal, Boolean, date, integer, fixed point, general , exponential , suffix [06]
- Q.3**
- a. Describe the design of a hardwired control unit of a computer [06]
 - b. Explain the steps to perform the floating point multiplication operation with examples [06]

- Q.4** **a.** Differentiate between RAM and ROM with respect to Devices characteristics (max. ten characterises expected) [06]
- b.** What are the different functions performed by the memory management unit [06]
-
- Q.5.** **a.** What is the purpose of input-output interface? With neat diagram explain Programmed I/O Mode [06]
- b.** With a neat sketch explain the block diagram of DMA Controller. [06]
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- Q.6** **a.** What is the basic concepts of pipelining [06]
- b.** Describe the data path and control considerations for pipelining [06]

Paper End

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD -402 103
Winter Semester Examination – December - 2019**

Branch: Electronics and Telecommunication Engineering	Sem.:- V
Subject: - Digital Signal Processing [BETXC504]	Marks: 60
Date: - 16/12/2019	Time: - 3 Hr.

Instructions to the Students

1. Each question carries 20 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

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| | (Marks) |
| Q.1. a) Explain the advantages of digital signal processing over analog signal processing. | (06) |
| Q.1. b) State the sampling theorem for low pass signals. Explain the instantaneous sampling procedure with neat diagrams of signal before and after sampling and their respective spectra. | (06) |
| Q.2. a) (i) Determine the DTFT of the following sequence
$y(n) = n.a^n u(n), \text{ where } a < 1$ | (06) |
| (ii) Perform circular convolution (4-point) of the following sequences using matrix method.
$x_1(n) = \{1, 2, 2\}$ $x_2(n) = \{1, 2, 3, 4\}$ | |
| Q.2. b) Compute 8-point DFT of the following sequence using DIT-FFT method.
$x(n) = \{0, 1, 2, 3, 4, 5, 6, 7\}$ | (06) |
| Q.3. a) Determine the inverse Z-transform of the following function using power series expansion (long division) method.
$X(z) = 1/(1-0.5z^{-1}) \quad z > 0.5$ | (06) |

Q.3. b) A causal discrete LTI system is described by the following equation, (06)

$$y(n) - (3/4)y(n-1) + (1/8)y(n-2) = x(n)$$

where $x(n)$ and $y(n)$ are the input and the output of the system respectively. Determine the system transfer function $H(z)$ and impulse response $h(n)$ of the system.

Q.4. a) Transform the given analog transfer function into a digital filter $H(z)$ (06)
using the impulse invariant method(IIM) at $f_s = 2\text{Hz}$.

$$H(s) = (4s + 7) / (s^2 + 5s + 4)$$

Q.4. b) Determine the equation of order (N) and the cut-off frequency (Ω_c) (06)
of Butterworth filter from the expression of magnitude response of
the Butterworth filter.

Q.5. a) Explain Gibbs phenomenon with neat diagram. (06)

Q.5. b) Consider a causal LTI system with system function given by, (06)

$$H(z) = 1 - (1/3)z^{-1} + (1/6)z^{-2} + z^{-3}$$

Draw the direct form and transposed form structure of the system.

Q.6. a) Explain downsampling with neat diagrams. Consider a sequence $x(n)$ (06)
with its Fourier pair $X(e^{j\omega})$ bandlimited to $(\pi/3)$ as shown in the
figure 1 below. Let $y(n) = x(3n)$. Write the equation for $Y(e^{j\omega})$. Draw
the input signal spectrum $X(e^{j\omega})$ as well as the downsampled signal
spectrum $Y(e^{j\omega})$.

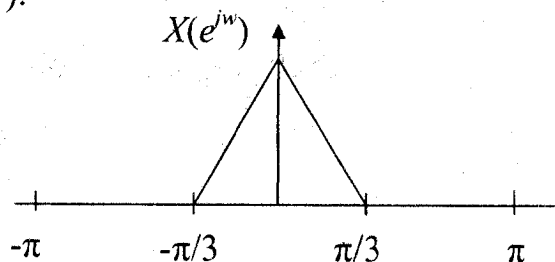


Fig.1

Q.6. b) Explain the aliasing effect of downsampling in frequency domain (06)
and importance of decimator with neat diagrams.

*****End Paper*****

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE –
RAIGAD -402 103**

Winter Semester Examination – December - 2019

Branch: Electronics and Telecommunication Engineering
Subject:- Microcontroller and its Applications (BTEXC505)
Date:-18/12/2019

Sem.:- V
Marks: 60
Time:- 3 Hr.

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
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(Marks)

- Q.1. a) Explain any three different addressing modes used in 8051 microcontroller with suitable examples of each. (06)
- b) Draw pin diagram of 8051 microcontroller and state functions of all pins of Port 3. (06)
- Q.2. a) Draw interfacing diagram to interface an LCD to 8051 microcontroller and write a program to display message "*There are only 10 types of people in the world: those who understand binary, and those who don't.*" on LCD. (06)
- b) Draw interfacing diagram to interface a seven segment display to port 1 of 8051 microcontroller. Write a program to display all even numbers between 0-9 repeatedly. (06)
- Q.3. a) Explain function of each bit of TMOD of 8051 microcontroller. (06)
- b) Write a program in which the 8051 gets data from P1 and sends it to P2 continuously while incoming data from the serial port is sent to P0. Assume that XTAL = 11.0592MHz. Set baudrate at 9600. (06)
- Q.4. a) Explain MOVWF, ADDWF, COMF instructions with suitable examples of each. (06)
- b) Explain function of each bit of T0CON register of PIC microcontroller. (06)

- Q.5. a) Assume that PORTC is connected to 8 switches and PORTD to 8 LEDs. Write a program to generate a square wave on pin PORTB.5 using Timer 0, while at the same time transfer data from PORTC to PORTD. (06)
- b) Draw interfacing diagram to interface unipolar stepper motor to PIC18 microcontroller. Write a program to rotate motor in clockwise direction continuously. (06)
- Q.6. a) Define Baudrate. Write function of any five pin of RS232 DB-9 connector. (06)
- b) Assume that $F_{osc} = 10 \text{ MHz}$. Find values to be loaded into SPBRG register to have the following baudrates. (06)
- 19200
 - 9600
 - 4800

*****PAPER END*****

Semester Examination – December - 2019

Sem.:-V

Marks: 60

Time:- 3 Hr.

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2. Attempt **any five** questions of the following.
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		(Marks)
Q1. A)	Explain data abstraction and different data models in DBMS	6M
B)	Explain different advantages of DBMS over file processing systems	6M
Q2. A)	From given tables, write relational algebra expressions for following branch (branch_name, branch_city, assets) customer (customer_name, customer_street, customer_city) account (account_number, branch_name, balance) loan (loan_number, branch_name, amount) depositor (customer_name, account_number) borrower (customer_name, loan_number)	1*5=6M
	<ul style="list-style-type: none"> a. Find all loans of over Rs.6000 b. Find the loan number for each loan of an amount greater than Rs.50000 c. Find the names of all customers who have a loan, an account, or both, from the bank d. Find the names of all customers who have a loan and an account at the bank e. Find names of customer who have an account in all branches located at Aurangabad. f. Find name of customer who lives in pune 	
B)	Explain unary and binary operations in relational algebra.	6M
Q3. A)	Explain DDL, DML and DCL commands with suitable examples.	6M
B)	From given tables , write SQL queries for following Salesman(s_id, name, city, commission) Customer(c_id, c_name, city, grade, s_id) Orders(o_no, amount, date_of_order, customer_id)	1*5=6M
	<ul style="list-style-type: none"> a. Find out name of customer for each order b. Find out name of customer, who has placed 2nd highest amount of order c. Find out names of customers who have who have placed order of higher amount than Ram. d. Find out city wise count of customers. e. Find out names of customers who lives in same city as that of salesman f. Find c_id,s_id and date for each order. 	

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|--------|--|----|
| Q4. A) | Explain RAID in detail | 6M |
| B) | Explain normalization with different normal forms with suitable example. | 6M |
| Q5. A) | Explain ACID properties of transaction using suitable examples | 6M |
| B) | Explain different aggregate functions in SQL with suitable examples. | 6M |
| Q6. A) | Explain different concurrency control protocols | 6M |
| B) | Write short note on backup and recovery systems | 6M |

Paper End
