MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. V Semester End Examinations
(Electronics and Communication Engineering)
(Model Question Paper)

MR-22

Subject Title: Microcontrollers　　　　　　　　　　　**Subject Code: EC501PC**
Time: 3 hours　　　　　　　　　　　　　　　　　　　　　Max. Marks　: 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	List the dedicated interrupts of 8086 microprocessor.	1	1	1	1,2
1. b)	Define macro with example.	1	1	1	1,2
	Unit-II				
1. c)	What is the difference between microprocessor and microcontroller?	1	2	2	1,2
1. d)	Write the structure of PSW of 8051 microcontroller.	1	1	2	1,2
	Unit-III				
1. e)	List out the important features of the A/D converter.	1	1	3	1,2
1. f)	What is the significance of EA pin?	1	1	3	1,2
	Unit-IV				
1. g)	What is 'Thumb' in ARM processor?	1	1	4	1,2
1. h)	Differentiate between CPSR and SPSR.	1	2	4	1,2
	Unit-V				
1. i)	Write two features of Cortex processors.	1	1	5	1,2
1. j)	Write any two applications of OMAP processors	1	1	5	1,2

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Explain the concept of segmented memory. What are the advantages?	5	2	1	1,2
2. b)	Describe the implementation of pipelined process of 8086.	5	3	1	1,2
	OR				
2. c)	Discuss the following addressing modes with examples: i) Direct ii) Register indirect iii) Base plus index iv) immediate v) Scaled Base plus index.	5	2	1	1,2
2. d)	Write an ALP to add two16bit numbers with carry.	5	3	1	1,2
	Unit-II				
3. a)	Explain I/O port structure of 8051 with the help of internal diagram.	5	3	2	1,2
3. b)	List out the important futures of 8051 Microcontroller along with its applications.	5	2	2	1,2
	OR				
3. c)	State various modes available for timers in 8051.	5	3	2	1,2
3. d)	Explain how interrupts are prioritized in 8051?	5	3	2	1,2
	Unit-III				
4. a)	Draw the interface circuit diagram of Matrix keyboard with 8051 and explain its operation in detail.	5	3	3	1,2
4. b)	Interface a 8K RAM consecutively with microcontroller, starting with ROM interfacing at address 8000H.	5	4	3	1,2
	OR				
4. c)	Explain the different Serial data transfer schemes used in serial communication.	5	2	3	1,2

P.T.O.

		M	L	CO	PO
4. d)	Write short notes on USB.	5	2	3	1,2
Unit-IV					
5. a)	Draw the frame format of CPSR and explain the function of each bit in detail.	5	3	4	1,2
5. b)	List out different Data processing instruction of ARM processor.	5	2	4	1,2
OR					
5. c)	List out different Thumb instructions used in ARM processor.	5	3	4	1,2
5. d)	What is the need of branch instructions? Explain how branching take place in ARM processors.	5	3	4	1,2
Unit-V					
6. a)	Explain Memory processing and commands used in CORTEX Processor.	5	3	5	1,2
6. b)	Explain the different applications of CORTEX Processor in detail.	5	4	5	1,2
OR					
6. c)	Draw and explain the internal architecture of OMAP Processor.	5	3	5	1,2
6. d)	Explain the different applications of OMAP Processor in detail	5	4	5	1,2

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. V Semester End Examinations
(Electronics and Communication Engineering)
(Model Question Paper)

MR-22

Subject Title: Digital Signal Processing **Subject Code: EC502PC**
Time: 3 hours Max. Marks : 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Check whether the system, $y(n) = x(2n)$ is time-invariant or time variant.	1	2	1	1,2
1. b)	Find the Z- Transform of $u(-n-1)$	1	3	1	1,2
	Unit-II				
1. c)	List any two properties of DFT.	1	1	2	1
1. d)	Obtain circular convolution of $x(n) = \{1,1,2,1\}$ and $h(n) = \{3,1,2,0\}$	1	3	2	1,2
	Unit-III				
1. e)	What are the advantages and disadvantages of Chebyshev filters	1	1	3	1
1. f)	Write the expression for Butterworth analog filter transfer function	1	1	3	1
	Unit-IV				
1. g)	List three methods commonly used for designing FIR filters.	1	1	3	1
1. h)	What is the necessary and sufficient condition for the linear phase characteristic of a FIR filter?	1	1	3	1
	Unit-V				
1. i)	Find $x(3n)$, if $x(n) = \{2,1,-1,4,5\}$	1	3	4	1
1. j)	Differentiate rounding-off and truncation with example.	1	2	4	1

Part-B (5 x 10 = 50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Check the Stability and Causality of the following i) $h(n) = 2^n u(n)$ ii)$y(n) = x(n^2)$	5	2	1	1,2
2. b)	Find impulse response of the system described by the difference equation $y(n) + y(n-1) - 0.2y(n-2) = x(n) + 0.3x(n-1)$.	5	2	1	1
	OR				
2. c)	Obtain the frequency response of the system described as, $y(n) = 0.5y(n-1) + x(n)$.	5	2	1	1,2
2. d)	Explain briefly about digital resonator.	5	1	1	1
	Unit-II				
3. a)	Compute the DFT of the given sequence $x(n) = \{1,2,0,4,0,3,2,1\}$ using Radix-2 Decimation-In-Frequency Fast Fourier Transform (DIF-FFT) algorithm.	5	3	2	1,2
3. b)	Find 8-point FFT of x(n) = [3, 2, -1, 4, 3]	5	1	2	1
	OR				
3. c)	State and prove any three properties of DFT	5	1	2	1
3. d)	Find the circular convolution of $x(n) = \{2,4,1,2\}$ and $h(n) = \{1,2,3\}$	5	2	2	1,2
	Unit-III				
4. a)	Design an analog Chebyshev filter using with a maximum passband attenuation of 2.5dB at $\Omega_p = 20\,rad/sec$ and the stopband attenuation of 30dB at $\Omega_s = 50\,rad/sec$.	5	4	3	1,2
4. b)	Compare Impulse invariant and bilinear transformation techniques.	5	1	3	1
	OR				
4. c)	Determine order and poles o lowpass Butterworth filter that has 3dB attenuation at 500 Hz and an attenuation of 30 dB at 1200Hz.	5	2	3	1,2,3

P.T.O.

		M	L	CO	PO
4. d)	Find the digital filter transfer function H(z) using Impulse Invariant Technique for $H(s) = \frac{2}{(S+1)(S+2)}$ T=1sec.	5	2	3	1,2
Unit-IV					
5. a)	Design a band pass filter which approximates the ideal filter with cut-off frequencies at 0.2rad/sec and 0.3rad/sec. The filter order is M=5. Use the Hamming window function	5	3	3	1,2,3,4
5. b)	What are the desirable features of the window functions and explain the effects of it.	5	2	3	1
OR					
5. c)	Distinguish between IIR and FIR Filters	5	1	3	1
5. d)	Determine the coefficients of a linear phase FIR filter of length M=15 has a symmetric unit sample response and a frequency response that satisfies the conditions $H\left(\frac{2\pi k}{15}\right) = \begin{cases} 1; k = 0,1,2,3 \\ 0; k = 4,5,6,7 \end{cases}$	5	4	3	1,2,3,4
Unit-V					
6. a)	Find impulse response of the system described by the difference equation $y(n) + y(n-1) - 0.2y(n-2) = x(n)$.	5	2	4	1,2
6. b)	Discuss the finite word length effects in FIR filters.	5	1	4	1
OR					
6. c)	How the sampling rate conversion can be implemented? Explain briefly.	5	2	4	1,2,3
6. d)	What is Round-off Noise in IIR Digital Filters? Discuss its effects in IIR filters	5	1	4	1

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MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. V Semester End Examinations
(Electronics and Communication Engineering)
(Model Question Paper)

MR-22

Subject Title: Control Systems   **Subject Code: EC503PC**
Time: 3 hours   Max. Marks : 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	What are the different types of control systems	1	1	1	1
1. b)	What is the effect of feedback on sensitivity	1	2	1	2
	Unit-II				
1. c)	What is the difference between type and order of a system	1	1	2	2
1. d)	Define centroid in Rootlocus	1	2	2	2
	Unit-III				
1. e)	Define Polar Plot	1	1	3	1
1. f)	Define Resonant frequency	1	1	3	1
	Unit-IV				
1. g)	What is the function P and I controller	1	1	4	2
1. h)	What is phase lag compensator	1	2	4	2
	Unit-V				
1. i)	What is meant by state of a control system	1	1	5	1
1. j)	Define Controllability	1	2	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Contrast differences between open loop and closed loop control systems	5	1	1	1
2. b)	Develop the differential equations governing the mechanical system as shown in below figure. Also find the transfer function X1(s)/F1(s)	5	3	1	3
	OR				
2. c)	Define signal flow graph and explain Mason's Gain formula	5	1	1	2
2. d)	Find C/R for the given block diagram	5	3	1	3
	Unit-II				
3. a)	Derive the time domain specifications of second order system with unit step input	5	2	2	2

P.T.O.

		M	L	CO	PO
3. b)	A unity feed-back system is characterized by an open loop T.F $G(s) = K/ s(s+10)$ Determine the gain K so that the system will have a damping ratio of 0.5. For this value of K, determine Ts, Tp and Mp for a unit step input.	5	4	2	3
	OR				
3. c)	The characteristic polynomial of a system is $s^7+9s^6+24s^5+24s^4+24s^3+24s^2+23s+15=0$. Determine the location of roots on s-plane and hence the stability of the system	5	4	2	3
3. d)	Elucidate Root Locus techniques with suitable example	5	2	2	2
	Unit-III				
4. a)	Define Gain Margin and Phase Margin with respect to Bode plot	5	2	3	4
4. b)	Sketch the Bode plot of the given system $$G(s)= \frac{20\ (0.1s+1)}{S^2(0.2s+1)(0.02s+1)}$$	5	4	3	4
	OR				
4. c)	Explain relation between time and frequency response analysis	5	2	3	2
4. d)	Sketch the polar plot for the following transfer function, Determine phase margin and gain margin. $$G(s) = \frac{k}{s^2(1+s)(1+2s)}$$	5	4	3	4
	Unit-IV				
5. a)	What are the advantages and disadvantages in frequency domain analysis?	5	3	4	3
5. b)	Draw the electrical circuit diagram that represents the Lead-Lag compensator and explain in detail.	5	3	4	3
	OR				
5. c)	What is compensation? What are the different types of compensators?	5	1	4	2
5. d)	Discuss the procedural steps of lag compensation design in frequency domain	5	2	4	2
	Unit-V				
6. a)	Explain about diagonalization with an example	5	2	5	2
6. b)	Obtain the state model of the given transfer function $$\frac{Y(S)}{U(S)} = \frac{5}{s^2 +6s+7}$$	5	3	5	3
	OR				
6. c)	State the properties of state transition matrix	5	2	5	2
6. d)	The state equations of a system are given by $$x = \begin{bmatrix} -3 & 1 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & 1 \end{bmatrix} x + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u, \ y = [\ 1\ 0\ 1]x.$$ Find the property of controllability and observability	5	4	5	3

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MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. V Semester End Examinations
(Common to CE, EEE, ME, ECE, MCT, MME & CSM)

(Model Question Paper)

Subject Title: Business Economics and Financial Analysis   **Subject Code: MS501HS**

Time: 3 hours   Max. Marks: 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Define Business Economics	1	1	1	1
1. b)	What is meant by National Income?	1	1	1	7
	Unit-II				
1. c)	Describe Cross Elasticity of Demand	1	2	2	12
1. d)	What are the Determinants of supply?	1	1	2	7
	Unit-III				
1. e)	Explain Monopolistic Competition	1	2	3	7
1. f)	What is meant by Marginal Cost?	1	1	3	11
	Unit-IV				
1. g)	Describe Accounting Equation	1	2	4	11
1. h)	What is meant by Materiality Convention?	1	1	4	8
	Unit-V				
1. i)	Explain Liquidity	1	2	5	11
1. j)	List Profitability ratios	1	1	5	11

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Explain different sources of capital.	5	2	1	1
2. b)	Describe the advantages and disadvantages of sole proreitorship.	5	2	1	7
	OR				
2. c)	Explain the nature and scope of Business Economics.	5	2	1	7
2. d)	Differentiate between Private Limited Companies and Public Limited Companies	5	4	1	7
	Unit-II				
3. a)	Describe Law of Demand and its exceptions	5	2	2	11
3. b)	Explain the Determinants of Supply and supply function.	5	2	2	7
	OR2				
3. c)	The quantity demanded for the product X is 30 units, when the price is Rs.15. The quantity demanded increased to 40 units, as price decreased to Rs. 10. Compute Price Elasticity of demand.	5	3	2	2
3. d)	Explain different methods of Demand Forecasting	5	2	2	12
	Unit-III				
4. a)	How can a producer determine the least-cost combination of inputs?	5	1	3	3
4. b)	Differentiate between perfect competition and monopoly competition.	5	4	3	8
	OR				
4. c)	Explain Law of Variable Proportions with the help of graph.	5	2	3	7
4. d)	Describe various Pricing strategies used by modern business organizations.	5	2	3	5
	Unit-IV				
5. a)	Classify the following accounts into various (Personal, Real or Nominal) types of accounts. 　　i)　　Salary account 　　ii)　　Outstanding wages account 　　iii)　　Rent account	5	2	4	11

	iv) Bank account v) Insurance prepaid vi) Drawings account vii) Bad debts account viii) Machinery account ix) Furniture account x) Patents account					
5. b)	Journalise the following transactions: Jan 1, 2021 Commenced with Cash Rs. 8,00,000 Jan 3, 2021 Purchased Goods worth Rs. 1,50,000 Jan 8, 2021 Sold Goods to Mr. Ramu Rs. 1,10,000 Jan 30, 2021 Salaries paid Rs. 40,000 Jan 30, 2021 Rent paid Rs. 20,000	5	3	4	11
	OR					
5. c)	Explain Double Entry System and its advantages	5	2	4	11
5. d)	Prepare Trading and Profit and Loss account from the following information.	5	3	4	11

Trial Balance as on 31.03.2021

Particulars	Debit(₹)	Credit(₹)
Capital		1,00,000
Purchases	40,000	
Furniture	30,000	
Interest received		3,000
Cash	15,000	
Debtors	27,000	
Office Stationery	3,000	
Machinery	70,000	
Bank Loan		5,000
Bills Payable		2,000
Opening Stock	10,000	
Sales		90,000
Wages paid	600	
Salaries paid	2,500	
Electricity charges	1,200	
Insurance paid	700	
Total	2,00,000	2,00,000

Adjustments:
i) Closing Stock ₹ 12,000
ii) Depreciate Machinery @10% p.a.
iii) Salaries outstanding ₹ 500

Unit-V

6. a)	How accounting ratios are useful in the inter-firm comparison.	5	1	5	10
6. b)	From the given Balance Sheet calculate: a) Debt-equity ratio b) Liquidity ratio c) Fixed assets to current assets ratio and d) Fixed assets to Net worth ratio.	5	3	5	10

Balance Sheet

Liabilities	Rs.	Assets	Rs.
Share Capital	1,00,000	Goodwill	60,000

		Retained Earnings	10,000	Machinery	1,00,000					
		Profit and loss a/c	40,000	Stock	30,000					
		Secured loans	80,000	Debtors	70,000					
		Creditors	40,000	Furniture	10,000					
		Provision for taxation	30,000	Cash	30,000					
			3,00,000		3,00,000					

OR

			M	L	CO	PO
6. c)	Differentiate Liquidity ratios and leverage ratios.		5	4	5	11
6. d)	The Balance Sheet of ABC Limited as on 31-03-2018 was as follows:		5	3	5	11

Liabilities	Amount (₹)	Assets	Amount (₹)
Equity Share Capital	1,40,000	Plant and Machinery	1,24,000
Reserves and Surplus	1,28,000	Land and Buildings	1,30,000
Debentures	1,32,000	Furniture & Fixtures	26,000
Creditors	26,000	Stock	2,000
Bank overdraft	4,000	Debtors	22,000
Provision for Taxation:	6,000	Investments (Short-term)	4,000
Outstanding Expenses	2,000	Cash	12,000
Bills payable	2,000	Cash at Bank	65,000
			55,000
	440,000		440,000

From the above, compute and interpret
a) Current Ratio b) Quick Ratio c) Absolute Liquid Ratio d) Debt-Equity Ratio e) Proprietary Ratio.

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MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B. Tech. V Semester End Examinations
(Electronics and Communication Engineering)
(Model Question Paper)

MR-22

Subject Title: Data Communications and Networking **Subject Code: EC512PE**
Time: 3 hours Max. Marks : 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Name the layers in the OSI Model.	1	1	1	1
1. b)	Provide examples of criteria that are commonly used in network assessment.	1	2	1	2
	Unit-II				
1. c)	List the services provided by the Data Link Layer	1	2	2	2
1. d)	Differentiate between error detection and error correction	1	3	2	3
	Unit-III				
1. e)	What is Random Early Detection?	1	2	3	3
1. f)	List the types of switching used inside a Router	1	1	3	4
	Unit-IV				
1. g)	Explain the functionalities of Transport Layer	1	2	4	4
1. h)	What is Socket address? Explain how it is related to IP address	1	1	4	3
	Unit-V				
1. i)	Briefly explain about DNS protocol.	1	2	4	4
1. j)	What is an SMTP protocol?	1	2	3	2

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Explain the functionality of the Data Link layer and the Network Layer in the OSI model.	5	2	1	1
2. b)	Explain about the TCP/IP architecture with a suitable diagram	5	3	1	2
	OR				
2. c)	Compare and contrast the star and mesh network topologies.	5	4	1	2
2. d)	Discuss about the characteristics and challenges encountered in a Wireless Link.	5	2	1	1
	Unit-II				
3. a)	What are the different types of error detection methods?	5	2	2	2
3. b)	Explain the CRC error detection technique using generator polynomial x^4+x^3+1 and data 11100011.	5	3	2	2
	OR				
3. c)	Differentiate between Pure ALOHA and Slotted ALOHA	5	2	2	2
3. d)	What is controlled access? Explain with an example.	5	3	2	1
	Unit-III				
4. a)	Explain about the various Network Service Models.	5	2	3	3
4. b)	Compare and contrast the Virtual Circuit and Datagram networks	5	3	3	2
	OR				
4. c)	Explain the format of the IPv4 datagram.	5	2	3	2
4. d)	Describe the addressing scheme used in IPv4	5	3	3	3
	Unit-IV				
5. a)	Explain how flow control and buffering would be handled by transport layer	5	3	2	4
5. b)	Demonstrate three way handshake connection establishment in TCP.		2	3	3
	OR				
5. c)	Differentiate between UDP and TCP.	5	2	3	3

P.T.O.

5. d)	What is purpose of ICMP? Explain its messages in detail.	5	1	1	4
Unit-V					
6. a)	Explain the salient features and functionality of the SMTP protocol.	5	2	2	4
6. b)	Write a short note on HTTP.	5	3	3	4
OR					
6. c)	What is FTP? What are the three transmission modes in FTP? Discuss.	5	3	3	3
6. d)	Write a short note on SMTP.	5	2	2	4

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