Code No: RT32043 **R13** SET - 1

III B.Tech II Semester Regular Examinations, April - 2016
DIGITAL COMMUNICATIONS
(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Discuss about the different noise effects in Delta Modulation.	[4M]
	b)	Explain the non-coherent detection of binary FSK signals.	[4M]
	c)	What is the ambiguity in the decoded output in the case of PSK systems? Explain.	[4M]
	d)	Calculate the amount of information if binary digits occur with equal likelihood in binary PCM systems.	[4M]
	e)	What are discrete memory less channels?	[3M]
	f)	Explain about BCH codes.	[3M]

PART -B

2	a)	Explain quantization error and derive an expression for maximum SNR in PCM system that uses Linear quantization.	[10M]
	b)	In a binary PCM system, the output signal to quantizing noise ratio is to be held to a minimum value of 40dB. Determine the number of levels and find the corresponding signal to quantizing noise ratio.	[6M]
3	a)	Determine the bandwidth required for M-ary FSK system. Draw the geometrical representation of M-ary FSK signals and find out the distance between the signals.	[10M]
	b)	Sketch the QPSK waveform for the sequence 1101010010, assuming the carrier frequency equal to bit rate.	[6M]
4	a)	Draw and explain the coherent system of signal reception.	[10M]
	b)	Binary data is transmitted over a telephone line with usable bandwidth of 2400 Hz using the FSK signaling scheme. The transmit frequencies are 2025 and 2225 Hz, and the data rate is 300 bits/Sec. The average signal to noise power ratio at the output of the channel is 6dB. Calculate Pe for the coherent and non coherent demodulation schemes.	[6M]

5 a) Explain the mutual information and its properties. [8M]

b) A code is composed of dots and dashes. Assume that the dash is three times as long as the dot and has one-third the probability of occurrence. [8M]
(i) Calculate the information in a dot and that in a dash
(ii) Calculate the average information in the dot-dash code.
(iii) Assume that a dot lasts for 10 ms and that this same time interval is allowed between symbols. Calculate the average rate of information transmission.

6 a) Explain the tradeoff between bandwidth and signal to noise ratio. [8M]

b) A DMS X has five symbols x1, x2, x3, x4 and x5 with respective probabilities 0.2, 0.15, 0.05, 0.1 and 0.5. Construct Huffman code and calculate the code efficiency. [8M]

7 a) Explain sequential decoding for convolutional codes. [8M]

b) Draw the state diagram, tree diagram, and trellis diagram for k=3, rate 1/3 code generated by $g_1(x) = 1+x^2$, $g_2(x) = 1+x$ and $g_3(x) = 1+x+x^2$. [8M]

Code No: RT32043 **R13** SET - 2

III B. Tech II Semester Regular Examinations, April - 2016
DIGITAL COMMUNICATIONS
(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1	a)	Give the block diagram representation of DPCM.	[4M]
	b)	What are the types of digital modulation techniques? Explain briefly.	[4M]
	c)	Compare a correlator and matched filter.	[4M]
	d)	What is average information? What does it mean?	[4M]
	e)	Verify that I(X;Y)=I(Y;X).	[3M]
	f)	Compare linear block codes and cyclic codes.	[3M]

PART –B

2	a)	Explain delta modulation in detail with suitable diagram.	[10M]
	b)	Given a sine wave of frequency f_m and amplitude A_m applied to a delta modulator having step size Δ. Find the condition on A_m for which slope overload distortion will occur.	[6M]
3	a)	Explain with neat block diagram the generation and recovery of BPSK.	[8M]
	b)	What are power spectra? Explain power spectra of BPSK and BFSK signals along with graphs.	[8M]
4	a)	Explain about ASK system and derive the relation for error probability of binary ASK.	[10M]
	b)	A binary receiver system receives a bit rate of 1Mbps. The waveform amplitude is 5mV and the noise power spectral density is 0.5×10^{-11} W/Hz. Calculate the average bit error probability if the modulation schemes are ASK, FSK and PSK.	[6M]

5 a) Explain the concept of entropy and its properties. [8M]

b) An analog signal band limited to 10kHz is quantized in 8 levels of a PCM system with probabilities of 1/4, 1/5, 1/5, 1/10, 1/10, 1/20, 1/20 and 1/20 respectively. Calculate the entropy and the rate of information. [8M]

6 a) Explain about Huffman coding. [8M]

b) A discrete memory less source has five symbols x1, x2, x3, x4 and x5 with probabilities 0.4, 0.19, 0.16, 0.15 and 0.15 respectively attached to every symbol. Construct a Shannon – Fano code for the source and calculate code efficiency. [8M]

7 a) Briefly describe about the Code tree, Trellis and State Diagram for a Convolution Encoder. [8M]

b) The generator polynomial for a (15,7) cyclic code is $g(x) = 1+x^4 +x^6 +x^7 +x^8$. Find the code vector (in systematic form) for the message polynomial $D(x) = x^2+x^3 +x^4$. Assume that the first and last bits of the code vector V(x) for $D(x) = x^2+x^3 +x^4$ suffer transmission errors. Find the syndrome of V(x). [8M]

Code No: RT32043 **R13** SET - 3

III B. Tech II Semester Regular Examinations, April - 2016
DIGITAL COMMUNICATIONS
(Electronics and Communication Engineering)

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2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1	a)	Discuss about the different noise effects in Pulse Code Modulation.	[4M]
	b)	Explain how carrier synchronization is done in QPSK.	[4M]
	c)	Explain the condition of orthogonality of two BFSK systems.	[4M]
	d)	If I(x1) is the information carried by message x1 and I(x2) is the information carried by message x2, then prove that the amount of information carried compositely due to x1 and x2 is I(x1,x2) = I(x1)+I(x2).	[4M]
	e)	Explain about binary symmetric channel.	[3M]
	f)	What is the use of syndromes?	[3M]

PART -B

2	a)	What is slope overload distortion and granular noise in Delta Modulation? How is it removed in ADM?	[10M]
	b)	A speech signal of maximum frequency 3.4KHz is applied to a delta modulator whose bit rate is 20Kbps. Determine minimum step size for the delta modulation so that there is no slope overload.	[6M]
3	a)	Explain the generation of M-ary ASK with a neat block diagram.	[10M]
	b)	Explain the principle of QPSK system. Compare binary PSK and QPSK schemes.	[6M]
4	a)	Explain about coherent binary PSK transmitter and receiver. Assuming channel noise to be additive white Gaussian obtain expression for probability of error.	[10M]
	b)	Calculate the transfer function of the Optimum filter.	[6M]
5	a)	Explain the concept of amount of information and its properties.	[8M]

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b) A discrete source emits one of five symbols once every millisecond. The symbol probabilities are 1/2, 1/4, 1/8, 1/16 and 1/16 respectively. Find the source entropy and information rate. [8M]

6 a) Discuss in brief about continuous channel capacity. [8M]

b) Calculate the capacity of the discrete channel shown in Fig.1. Assume r_s=1 symbol/sec [8M]

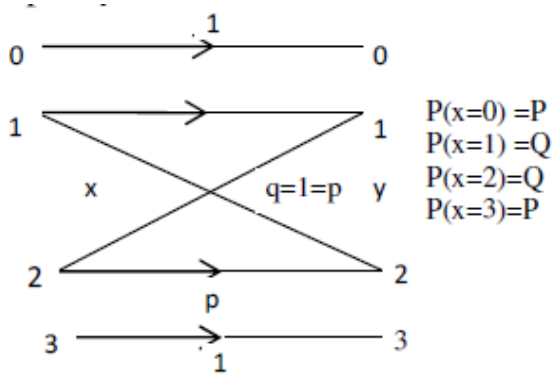

Fig -1

7 a) Explain the viterbi algorithm for the decoding of convolutional codes. [8M]

b) The parity check bits of a (8,4) block code are generated by [8M]
c5= d1+d2+d4
c6=d1+d2+d3
c7=d1+d3+d4
c8=d2+d3+d4
where d1, d2, d3 and d4 are the message digits.
(i) Find the generator matrix and parity check matrix for this code
(ii)Find the minimum weight of this code
(iii)Find the error detecting capabilities of this code.

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III B. Tech II Semester Regular Examinations, April - 2016
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(Electronics and Communication Engineering)

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2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1	a)	Explain the importance of prediction in DPCM.	[4M]
	b)	What are the drawbacks of BPSK? How can they be overcome?	[4M]
	c)	What type of synchronization is used in QPSK system? Explain.	[4M]
	d)	What is entropy? What does it mean?	[4M]
	e)	For a noiseless channel with 'm' input symbols and 'm' output symbols, prove that H(X)=H(Y).	[3M]
	f)	What is constraint length for convolutional encoders? Explain.	[3M]

PART -B

2	a)	What is the necessity of non-uniform quantization and explain companding.	[10M]
	b)	If m_p = 20V and 256 quantizing levels are employed, what is the voltage between levels when there is no compression? For μ = 255, what is the smallest and what is the largest effective separation between levels?	[6M]
3	a)	Draw the block diagram of DPSK modulator and explain how synchronization problem is avoided for its detection.	[10M]
	b)	Write the power spectral density of BPSK and QPSK signals and draw the power spectrum of each.	[6M]
4	a)	What is matched filter? How it differs from optimum filter? Derive an expression for impulse response of matched filter	[10M]
	b)	In a binary PCM system on/off signaling is used. The matched filter receiver is used for detection of signal. Calculate the probability of error if signaling rate is doubled.	[6M]

5 a) Explain the concept of amount of information. [8M]

b) An analog signal is band limited to B Hz, sampled at the nyquist rate, and the samples are quantized into 4 levels. The quantization levels Q1, Q2, Q3 and Q4 (messages) are assumed independent and occur with probabilities p1= p4=1/8 and p2= p3=3/8. Find the information rate of the source. [8M]

6 a) Consider five messages given by the probabilities 1/2, 1/4, 1/8, 1/16, 1/16. [10M]
(i) Calculate H
(ii) Use Shannon-Fano algorithm to develop an efficient code and for that code, calculate the average number of bits/message. Compare with H.

b) Explain the tradeoff between bandwidth and signal to noise ratio. [6M]

7 a) Explain matrix description of linear block codes. [8M]

b) Design an encoder for the (7,4) binary cyclic code generated by $g(x) = 1 + x + x^3$ and verify its operation using the message vector (0 1 0 1). [8M]

Code No: RT32042 **R13** SET - 1

III B. Tech II Semester Regular Examinations, April - 2016

DIGITAL SIGNAL PROCESSING

(Electronics and Communication Engineering)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A**is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1 a) Find the power of the given signal below? [4M]

$$x[n] = \begin{cases} 3(-1)^n, & n \geq 0 \\ 0 & n < 0 \end{cases}$$

b) Compare overlap-add method and overlap-save method [4M]

c) Compare direct form I and direct form II realization of IIR systems. [4M]

d) What conditions are to be satisfied by the impulse response of an FIR system in order to have a linear phase? [3M]

e) What is the need for multirate signal processing? [3M]

f) What are the differences between fixed type processors and floating type processors? [4M]

PART –B

2 a) Find the solution to the following linear constant coefficient difference equation [10M]

$$y(n) - \frac{3}{2}\, y\,(n-1) + \frac{1}{2} y(n-2) = \left(\frac{1}{2}\right)^n \; for \; n \geq \; 0$$

With initial conditions y(-1) = 4 and y(-2) = 10.

b) Derive the relationship between impulse response and frequency response of a discrete time system. [6M]

3 a) Compute the DFT of the sequence x(n) = sin[nπ/4], where N=8 using DIT FFT algorithm [8M]

b) Determine the IDFT of the sequence [8M]

$$X(K) = (6, -\sqrt{2} - j4.8284, -2 + j2, \sqrt{2} - j0.8284, -2, \sqrt{2} + j0.8284, -2 - j2, -\sqrt{2} - j4.8284$$

4 Obtain the cascade and parallel realisation structures for the following signals. [16M]

$$H(z) = \frac{2(1 - z^{-1})(1 + \sqrt{2}z^{-1} + z^{-2})}{(1 + 0.5z^{-1}(1 - 0.9z^{-1} + 0.81z^{-2}))}$$

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5 a) The desired frequency response of a low pass filter is

$$H_d(e^{jw}) = \begin{cases} e^{-j3w} & \frac{-3\pi}{4} \le w \le \frac{3\pi}{4} \\ 0 & elsewhere \end{cases}$$ [10M]

Determine $H(e^{jw})$ for M =7 using a rectangular window.

b) What are the effects of windowing? [6M]

6 a) Derive an expression for the spectrum of output signal of an decimator. [8M]

b) What are the applications of multirate system? [8M]

7 a) What is MAC? Explain its operation in detail. [10M]

b) What are the various addressing modes used in the TMS320C5X processor? [6M]

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Code No: RT32042 **R13** SET - 2

III B. Tech II Semester Regular Examinations, April - 2016

DIGITAL SIGNAL PROCESSING

(Electronics and Communication Engineering)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1 a) Show that the following systems are nonlinear and time invariant. [4M]
$y(n) – x(n)y(n-1) = x(n)$

b) Write computation efficiency of FFT over DFT. [3M]

c) What are the basic building blocks of realization structures? [4M]

d) Obtain the mapping formula for the impulse invariant transformation. [4M]

e) Write some examples of multirate digital systems. [3M]

f) What are the advantages of DSP processors in relation to general purpose processors? [4M]

PART –B

2 a) Determine the frequency response, magnitude and phase responses and time delay of the systems given by [10M]

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

b) Explain causality and stability of a linear time invariant system. [6M]

3 a) Find the DFT of the following sequence using FFT DIF? [8M]
X(n) = {1,2,3,5,5,3,2,1}

b) Compute the DFTs of the sequence $x(n) = 2^{-n}$, where N = 8 using DIT algorithm [8M]

4 Develop the cascade and parallel forms of the following causal IIR transfer functions. [16M]

$$H(z) = \frac{(3 + 5z^{-1})(0.6 + 3z^{-1})}{(1 - 2z^{-1} + 2z^{-2})(1 - z^{-1})}$$

5 a) Convert the analog filter to a digital filter whose system function is [10M]

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

Use bilinear transformation.

b) What is a Kaiser window? In what way is it superior to other window functions? [6M]

||''|'''|''|'|''''||

6 a) Draw the block diagram of a multistage interpolator and explain it [8M]

b) A one stage decimator is characterized by the following Decimator factor = 3. Anti-aliasing filter coefficients h(0) = -0.06 = h(4), h(1)=0.3 =h(3), h(2) =0.62. Given the data, s(n) with successive values [6,-2,-3,8,6,4,-2], calculate and list the filtered output and the output of the decimator [8M]

7 a) Draw and explain the memory architecture of the TMS320C3X processor. [10M]

b) What are the major advantages of having on-chip memory? [6M]

Code No: RT32042 **R13** SET - 3

III B. Tech II Semester Regular Examinations, April - 2016

DIGITAL SIGNAL PROCESSING

(Electronics and Communication Engineering)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A**is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1	a)	Show that the following system is nonlinear and time invariant. $y(n+2) + 2y(n) = x(n+1) + 2$	[4M]
	b)	State all properties of DFT	[4M]
	c)	Distinguish the canonic and non-canonic structures.	[4M]
	d)	Discuss the stability of the impulse invariant mapping technique.	[3M]
	e)	What is meant by aliasing? How to avoid it?	[4M]
	f)	List the basic characteristics of digital signal processor.	[3M]

PART –B

2	a)	Determine the frequency response, magnitude and phase responses and time delay of the systems given by $y(n) = x(n) – x(n-1) + x(n - 2)$	[10M]
	b)	State and explain the transfer function of an LTI system.	[6M]
3	a)	Find the N-point DFT for $x(n) = a^n$ for $0 < a < 1$?	[8M]
	b)	Given x(n) = {1,2,3,4,4,3,2,1}, find X(k) using DIF FFT algorithm.	[8M]
4		Realize the following IIR system functions in the direct form I and II and also parallel form. $$H(z) = \frac{1}{(1 + az^{-1})(1 - bz^{-1})}$$	[16M]
5	a)	Design a digital Butterworth filter that satisfies the following constraint using bilinear transformation. Assume T=1sec. $$0.9 \le \left\|H\left(e^{jw}\right)\right\| \le 1 \qquad 0 \le w \le \frac{\pi}{2}$$ $$\left\|H\left(e^{jw}\right)\right\| \le 2 \qquad \frac{3\pi}{4} \le w \le \pi$$	[10M]

b) What is a Hamming window function? Obtain its frequency domain characteristics. [6M]

6 a) Draw the block diagram of a multistage decimator and explain it [8M]

b) Discuss the computationally efficient implementation of decimator in an FIR filter. [8M]

7 a) Draw and explain the major block diagram of the TMS320C3X. [10M]

b) Explain the function of Barrel Shifter in the digital signal processor. [6M]

Code No: RT32042 **R13** SET - 4

III B. Tech II Semester Regular Examinations, April - 2016

DIGITAL SIGNAL PROCESSING

(Electronics and Communication Engineering)

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2. Answering the question in **Part-A**is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1 a) What is BIBO stability? What are the conditions for BIBO system? [4M]

b) How FFT is more efficient to determine DFT of sequence? [3M]

c) Distinguish between the methods of realization namely, block diagram representation and signal flow graph for implementing the digital filter transfer function. [4M]

d) What is the impulse invariant technique? [4M]

e) What are the drawbacks in multistage implementation? [3M]

f) Mention various generations of digital signal processors. [4M]

PART –B

2 a) Determine frequency, magnitude and phase responses and time delay for the system. [10M]

$$y(n) + \frac{1}{4}\, y(n-1) = x(n) - x(n-1)$$

b) Define the terms : linearity, time invariance and causality for a discrete time system. [6M]

3 a) Compute the FFT for the sequence x(n) = n+1 where N =8 using DIT algorithm [8M]

b) State and prove the periodicity property in DFT. [8M]

4 Realize the following IIR system functions in the direct form I and II and also parallel form. [16M]

$$H(z) = \frac{1}{(1-az^{-1})^2} + \frac{1}{(1-bz^{-1})^2}$$

5 a) What are the requirements for converting a stable analog filter into a stable digital filter? [6M]

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b) The desired frequency response of a low pass filter is [10M]

$$H_d(e^{jw}) = \begin{cases} 1; & \frac{-\pi}{2} \le w \le \frac{\pi}{2} \\ 0; & \frac{\pi}{2} \le w \le \pi \end{cases}$$

Determine $h_d(n)$ for M =7 using a rectangular window.

6 a) How can sampling rate be converted by a rational factor M/L? [8M]

b) Draw and explain the polyphase structure of a interpolator. [8M]

7 a) Explain the purpose of six registers used in the TMS320C2X processor. [10M]

b) What are the limitations of pipelining in Digital Signal Processor? [6M]

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Code No: RT32041 **R13** **SET - 1**

III B. Tech II Semester Regular Examinations, April - 2016

MICRO PROCESSORS AND MICRO CONTROLLERS

(Common to ECE, EIE and E.Comp.E)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1	a)	Draw the flag register of 8086 microprocessor and explain the function of each flag.	[4M]
	b)	Define interrupt and explain the different interrupts presented in 8086 microprocessor.	[4M]
	c)	Explain the differences between synchronous and asynchronous serial communication.	[4M]
	d)	List out the salient features of 80386 processor.	[3M]
	e)	Explain the concept of addressing modes used in 8051 microcontroller	[4M]
	f)	List out the salient futures of PIC 16C61 controller.	[3M]

PART -B

2	a)	Draw the minimum mode pin diagram and explain the function of each pin in detail.	[8M]
	b)	Explain any six assembler directives used in 8086 microprocessor.	[4M]
	c)	Draw the timing diagrams of minimum mode write operation and explain in detail.	[4M]
3	a)	Write an assembly language program to find the largest number of an array 8-bit array.	[8M]
	b)	Explain different maskable and non maskable interrupts of 8086 microprocessor.	[8M]
4	a)	Draw the internal architecture of 8259 PIC and explain the operation of each block in detail.	[8M]
	b)	Explain ICW's and OCW's of 8259 Priority interrupt controller.	[8M]
5	a)	Explain the Real mode and protected mode concepts of 80386 Microprocessor.	[8M]
	b)	Draw the EFLAG register of 80386 processor and explain the function of each flag with example.	[8M]
6	a)	Draw the pin diagram of 8051 microcontroller and explain the function of each pin in detail.	[8M]
	b)	Explain the differences between microprocessor and microcontroller.	[8M]
7	a)	Explain different I/O ports presented in PIC controller and draw the necessary diagram for it.	[8M]
	b)	Explain the feature of ARM controller in detail.	[8M]

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Code No: RT32041 **R13** SET - 2

III B. Tech II Semester Regular Examinations, April - 2016

MICRO PROCESSORS AND MICRO CONTROLLERS

(Common to ECE, EIE and E.Comp.E)

Time: 3 hours Maximum Marks: 70

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2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1	a)	List different registers of 8086 microprocessor.	[3M]
	b)	Define interrupt and explain the different software interrupts presented in 8086 microprocessor.	[4M]
	c)	Explain the methods of serial communications with examples.	[4M]
	d)	List out the different data types of 80386 processor.	[3M]
	e)	Explain the different features of 8051 microcontroller.	[4M]
	f)	List out the salient features of PIC 16F8XX Flash controller.	[4M]

PART -B

2	a)	Draw the timing diagrams of minimum mode read operation and explain in detail.	[4M]
	b)	Define addressing mode and explain different addressing modes presented in 8086 microprocessor.	[8M]
	c)	Explain the data transfer instructions with examples.	[4M]
3	a)	Write an Assemble language program to find number of even and odd numbers in an 8- Bit array.	[8M]
	b)	Draw the interrupt vector table of 8086 microprocessor and explain its operation in detail.	[8M]
4	a)	Interfacing of a two 4X4 PROM and two 8X4 RAM with 8086 CPU, draw the memory map and interfacing diagram for it, the RAM address follows the ROM address.	[8M]
	b)	Draw the Inter facing diagram of 8257 DMA with 8086 CPU and explain its operation.	[8M]
5	a)	Draw the internal architecture of 80386 processor and explain its operation in detail.	[8M]
	b)	Explain the terms segmentation and paging of 80386 processor.	[8M]
6	a)	Draw the architecture of 8051 Microcontroller and explain its futures in detail.	[8M]
	b)	Explain the interrupt structure of 8051 Microcontroller.	[8M]
7	a)	Explain the different Thumb programming model of ARM controller with examples.	[8M]
	b)	Draw and Explain different timers presented in PIC controller.	[8M]

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Code No: RT32041 **R13** SET - 3

III B. Tech II Semester Regular Examinations, April - 2016
MICRO PROCESSORS AND MICRO CONTROLLERS
(Common to ECE, EIE and E.Comp.E)

Time: 3 hours Maximum Marks: 70

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2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1	a)	Explain the different minimum mode pins of 8086 microprocessor.	[3M]
	b)	Explain the concept of nested interrupts of 8086 microprocessor.	[4M]
	c)	Differentiate between BSR and I/O modes of 8255 PPI.	[4M]
	d)	List out the different addressing modes of 80386 processor.	[3M]
	e)	Explain the differences between microprocessor and microcontroller.	[4M]
	f)	List out the salient futures of ARM controller.	[4M]

PART -B

2	a)	Define assembler and explain the different assembler directives used in 8086 microprocessor.	[4M]
	b)	Draw the 8086 microprocessor internal architecture and explain the operation of each block.	[8M]
	c)	Draw the flag register of 8086 microprocessor and explain the function of each flag.	[4M]
3	a)	Write an Assemble language program to print the given string "JNTU KAKINADA".	[8M]
	b)	Define interrupt and explain the interrupt service routines in 8086 microprocessor programming.	[8M]
4	a)	Draw the 8257 DMA architecture and explain its operation along with register organization of DMA.	[8M]
	b)	Draw the 8251 USART architecture and explain the operation of each block in it.	[8M]
5	a)	Draw and explain the virtual 8086 mode of 80386 processor in detail.	[8M]
	b)	Explain different data types used in 80386 processor.	[8M]
6	a)	Explain the timer and counter operations of 8051 Microcontroller.	[8M]
	b)	Write short notes on (i) PSW (ii) SCON (iii) PCON (iv) TMOD.	[8M]
7	a)	Draw the architecture of PIC 16C61 controller and explain the operation of each block in it.	[8M]
	b)	Draw the flag register of PIC 16C71 controller and explain the function of each flag in detail.	[8M]

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Code No: RT32041 **R13** SET - 4

III B. Tech II Semester Regular Examinations, April - 2016
MICRO PROCESSORS AND MICRO CONTROLLERS
(Common to ECE, EIE and E.Comp.E)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Explain the different maximum mode pins of 8086 microprocessor.	[3M]
	b)	Explain the concept of stack structure of 8086 microprocessor.	[4M]
	c)	Draw the ICW's of 8259 Programmable interrupt controller.	[4M]
	d)	Define paging and explain its importance in 80386 processor.	[3M]
	e)	Draw the PSW register of 8051 microcontroller and explain function of each pin.	[4M]
	f)	List out the interrupts of PIC 16C61 controller.	[4M]

PART -B

2	a)	Draw the minimum mode pin diagram of 8086 microprocessor and explain each pin in detail.	[8M]
	b)	Define addressing mode and explain different addressing modes presented in 8086 microprocessor.	[8M]
3	a)	Write an Assemble language program to find the sum of squares of first ten numbers.	[8M]
	b)	Draw the interrupt cycle of 8086 microprocessor and explain its operation in detail.	[8M]
4	a)	Draw the Interfacing diagram of D/A Converter with 8086 Microprocessor along with 8255 PPI and explain its operation.	[8M]
	b)	Draw the 8255 PPI architecture and explain its operation of each block along with modes of it.	[8M]
5	a)	Explain the different addressing modes of 80386 processor with examples.	[8M]
	b)	Explain the concept of protected mode of 80386 processor in detail.	[8M]
6	a)	Draw the 8051 Microcontroller architecture and explain its operation in detail.	[8M]
	b)	Explain the following registers (i) IP (ii)IE (iii) PCON (iv)TMOD.	[8M]
7	a)	Draw the architecture of ARM controller and explain the operation of each block in it.	[8M]
	b)	Explain the Power on reset and watch dog timers operation in PIC controller in detail.	[8M]

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Code No: RT32044 **R13** SET - 1

III B. Tech II Semester Regular Examinations April - 2016
MICROWAVE ENGINEERING
(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A**is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	What are the various applications of Microwaves?	[4M]
	b)	How to find Q of resonant rectangular cavity?	[4M]
	c)	How to use matched load in microwaves?	[3M]
	d)	What are the limitations of conventional tubes?	[4M]
	e)	How separate the π mode in Magnetron?	[4M]
	f)	Why isolator is used in microwave bench set up?	[3M]

PART –B

2	a)	Derive the field equations of rectangular waveguide in TM mode, starting from Maxwell's equations.	[10M]
	b)	Calculate the guide wavelength (in cm) at 7 and 12GHz for an air filled waveguide with a=2.54 cm , b=1.5cm .	[6M]
3	a)	Explain how TEM propagate in circular waveguides.	[8M]
	b)	A cubic shaped cavity is required to resonate at 7500MHz in the TE_{101} mode. Calculate its dimensions and unloaded Q if the cavity is air filled.	[4M]
	c)	Determine the strip width of a Teflon filled balanced strip line for Zo = 50Ω if the ground plane spacing is 0.25 inch and the strip thickness is 4 mils.	[4M]
4	a)	What are the different types of attenuators? Explain them with neat diagrams	[8M]
	b)	Derive S-matrix of Magic Tree and also draw its structure.	[8M]
5	a)	Explain the bunching process of two cavity klystron and how to convert velocity modulation into current modulation and also derive the equation for efficiency?	[12M]
	b)	How to change the frequency of oscillations in reflex klystron?	[4M]
6	a)	What are the different propagation constants TWT? How to calculate them?	[8M]
	b)	What is Hartree condition in Magnetron? Derive the equation for Hartree voltage of it.	[8M]
7	a)	Draw the characteristics of Gunndiode and explain how negative region is obtained in it?	[8M]
	b)	What is bolometer? How it is used for microwave measurements?	[8M]

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Code No: RT32044 **R13** SET - 2

III B. Tech II Semester Regular Examinations April - 2016
MICROWAVE ENGINEERING
(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	What are the advantages waveguides have compared to coaxial transmission lines?	[3M]
	b)	What are the applications of Microstrip line?	[4M]
	c)	How to use tunning screws and posts in microwaves?	[4M]
	d)	How to tune the reflex klystron oscillator?	[3M]
	e)	What the effects are of cross field in Magnetron?	[4M]
	f)	What is mean by transferred electron devices? Give some examples	[4M]

PART –B

2	a)	Derive the field equations of rectangular waveguide in TE mode, starting from Maxwell's equations.	[10M]
	b)	Prove that the cutoff frequency is same for both TE and TM modes.	[6M]
3	a)	Calculate the cutoff frequency of the dominant mode in a 1 inch diameter, Teflon filled circular waveguide. What is its maximum operating frequency if the possibility of higher mode propagation is to be avoided? Include a 5 percent safety factor, what would be the value of f_{max} if the possibility of TM_{01} propagation was excluded?	[10M]
	b)	Compare rectangular and circular waveguides	[6M]
4	a)	Explain the working of Rotary Vane type phase shifter with neat diagram.	[8M]
	b)	What are the properties of S-matrix? Derive the S-matrix of Circulator.	[8M]
5	a)	Derive the equation of optimum output power of two cavity Klystron amplifier.	[8M]
	b)	Draw and explain the mode characteristics of Reflex Klystron.	[8M]
6	a)	Draw the structure of TWT and explain its amplification process.	[8M]
	b)	What is Hull cut off condition? Derive the equation for Hull cut off voltage.	[8M]
7	a)	Explain how Gunn diode is used as an oscillator? Explain with the help of circuit diagram.	[8M]
	b)	Explain the method of measurement of low and high VSWR with neat diagrams.	[8M]

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Code No: RT32044 **R13** SET - 3

III B. Tech II Semester Regular Examinations April - 2016
MICROWAVE ENGINEERING
(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A**is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Draw the field patterns of rectangular waveguide in TE_{10} and TM_{11} modes.	[4M]
	b)	Define effective dielectric constant of micro strip line and derive its equation.	[4M]
	c)	What is waveguide Iris? Where it is used?	[4M]
	d)	What are reentrant cavities? How these are used?	[3M]
	e)	Draw the different types of slow wave structures.	[4M]
	f)	Explain the function of slotted section in microwave measurements?	[3M]

PART –B

2	a)	Why the TEM wave is not possible in rectangular waveguide?	[6M]
	b)	A rectangular waveguide has the following characteristics: b=1.5cm, a=3.0cm, $\mu_g = 1$,and $\varepsilon_g=2.25$ Calculate cutoff wavelength, frequency, λ_g, Zo and attenuation constant at 3.0 GHz.	[10M]
3	a)	What is meant by degenerative modes?	[4M]
	b)	Derive the field equation for rectangular cavity resonator in TM_{mnp} mode, starting from wave equation.	[12M]
4	a)	What are the different types of Directional couplers? Explain the working of two hole directional coupler.	[8M]
	b)	Derive the S-matrix of E plane Tee and also write its characteritics.	[8M]
5	a)	Explain the bunching process of reflex klystron and also derive the equation for efficiency?	[10M]
	b)	Why multi cavities are used in Klystron amplifiers?	[6M]
6	a)	Derive the equation for gain of TWT amplifier.	[8M]
	b)	Draw the structure of 8 cavity magnetron and explain its bunching process	[8M]
7	a)	Explain the principle of working of IMPATT diode with suitable structure and characteristics.	[8M]
	b)	What are the different precautions have to be made while measuring parameters at Microwave range?	[8M]

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Code No: RT32044 **R13** SET - 4

III B. Tech II Semester Regular Examinations April - 2016
MICROWAVE ENGINEERING
(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Define and derive the equation for guide wave length of rectangular waveguide.	[4M]
	b)	How to find the Z_0 of Micro strip line?	[4M]
	c)	Compare coupling mechanisms using loop and probe in all aspects.	[4M]
	d)	Classify the microwave tubes.	[3M]
	e)	Why slow wave structures are used in TWT?	[3M]
	f)	What are different methods of measurement of microwave frequency?	[4M]

PART –B

2	a)	Calculate the cutoff frequencies of air-filled wave guide with a=3.24cm and b=2.2cm, for the TE_{10}, TE_{20}, TE_{01}, and TM_{11} modes.	[8M]
	b)	Determine the power loss in rectangular waveguide.	[8M]
3	a)	Derive the characteristic equation of circular waveguide.	[6M]
	b)	Derive the field equation for rectangular cavity resonator in TE_{mnp} mode, starting from wave equation.	[10M]
4	a)	What is the principle of Faraday's rotation? How this is used in isolator?	[8M]
	b)	Derive the s-matrix of Hybrid ring.	[8M]
5	a)	Explain the bunching process in two cavity klystron amplifier with Apple gate diagram.	[6M]
	b)	Explain how oscillations are generated in reflex klystron? How to calculate its electronic admittance?	[10M]
6	a)	Explain how gain of TWT amplifier is more compared to Klystron amplifiers?	[8M]
	b)	Explain how cross field is used to generate oscillations in Magnetron?	[8M]
7	a)	Explain the principle of working of TRAPATT diode with suitable characteristics.	[8M]
	b)	Explain the method of measurement of impedance at microwave frequencies with suitable block diagram.	[8M]

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