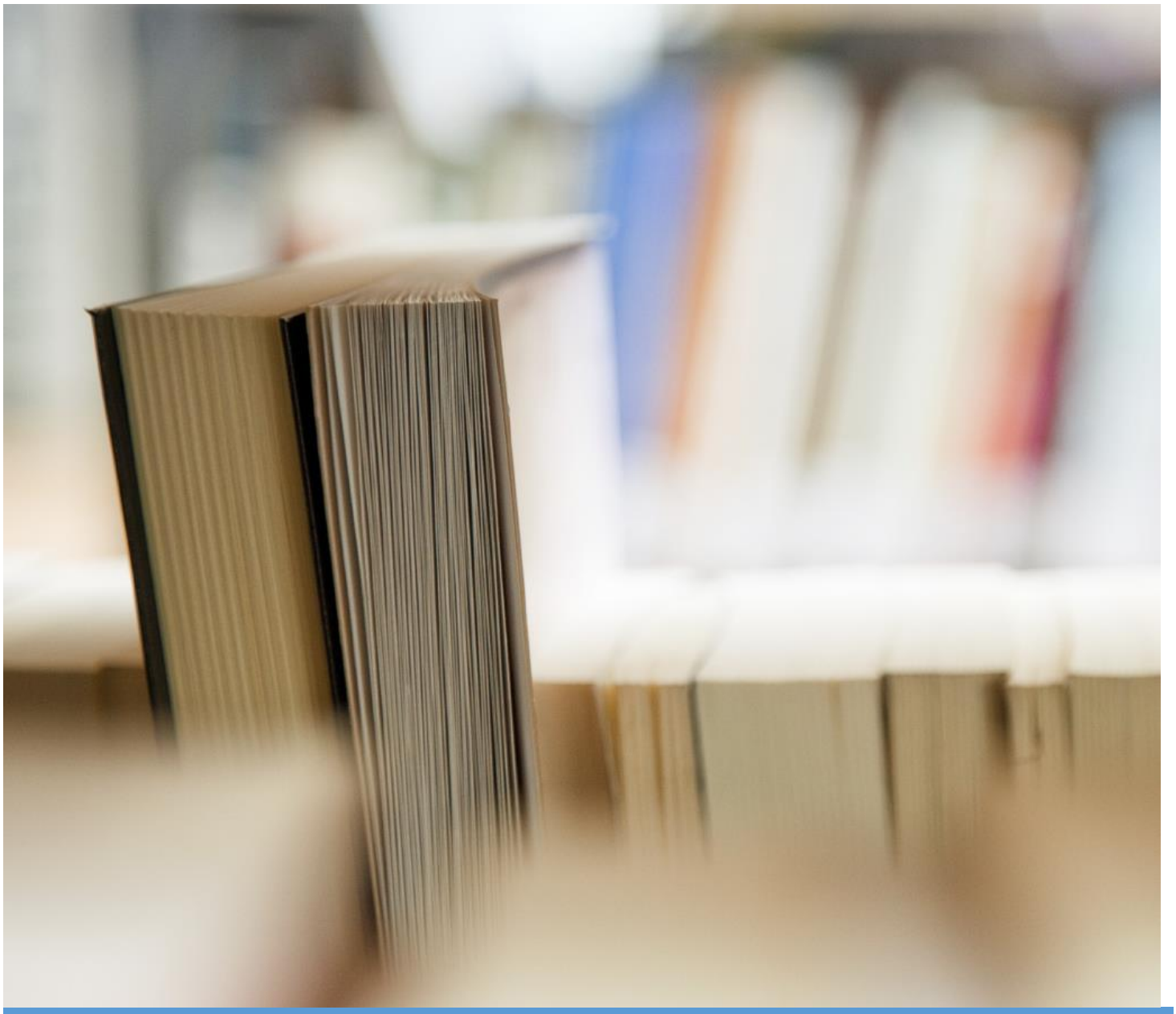


2017 BATCH QUESTION BANK

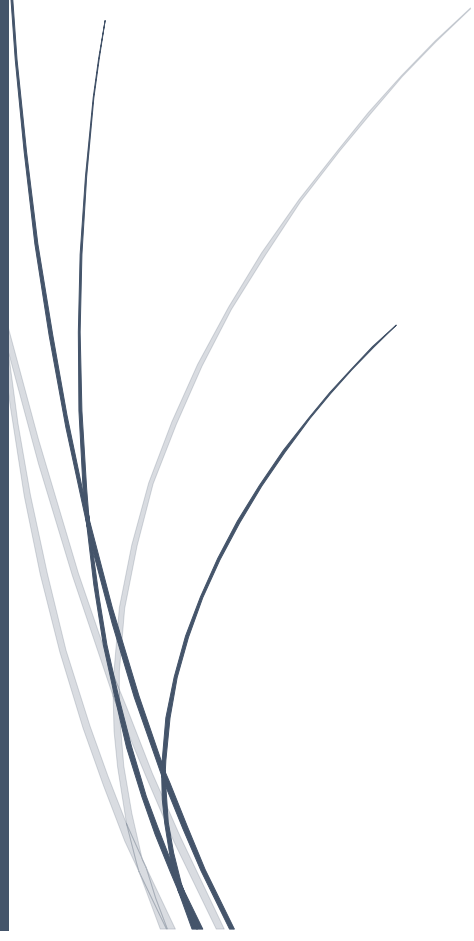
SEMESTER 5, 2019-2020

Staff Advisors:- Ms. Shilpa Das and Mr. Chandu C B

2017 Batch Semester-5
2019-20

EC 301 DIGITAL SIGNAL PROCESSING

Faculty- Ms. Sreejitha S G



SUBJECT: EC 301 DIGITAL SIGNAL PROCESSING

MODULE 1

1	a) Explain, how DFT and IDFT can be expressed as Linear Transformation	3
	b) Derive the relationship of OFT to Z-transform	3
	c) Find the circular convolution of x[n] = {I, 2, -1, 3, 4} and h[n] = {2, -I, 4, 1, 3}	5
	d) Explain overlap add method for filtering of long data sequences.	4
2	a) Define Stable And Unable System?	2
	b) Define Discrete Time Signal? Define Dynamic And Static System?	6
	c) How to Obtain the Output Sequence Of Linear Convolution Through Circular Convolution?	7
3	a) Difference between DFT and DTFT. What is the convolution?	
	b).What is SISO system and MIMO system?	10
4	Find the convolution of the signals x(n) = 1 for n=-2,0,1 = 2 for n=-1 = 0 elsewhere.	10
5	Determine the solution of the difference equation y(n) = 5/6 y(n-1) – 1/6 y(n-2) + x(n) for x(n) = 2nu(n)	10
6	a) Find the 4 point DFTs of two sequences g(n) and h(n) defined below, using a single 4 point DFT. g(n)={1,2,0,1} and h(n)={2,2,1,1}.	10
7	Prove if x(n) is a real valued sequence, then its DFT X(K) =X* (N-K).	10
8	a) Show that, if x[n] is a real and even sequence, then its OFT X[k] is also real and even	3
	b) Find linear convolution of x[n] = {2, 3, -1} and h[n] = {1, -1, 2}, using circular convolution.	5
	c) Find the number of complex multiplications involved in the calculation of a 1024 point DFT using i) direct computation(ii) radix-2 FFT algorithm	3
	d) Explain, how N point DFTs of two real-valued sequences can be found by computing a single N point OFT.	4
9	Determine the response y(n), n>=0 of the system described by the second order difference equation y(n)– 4y(n-1) + 4y(n-2) = x(n) – x(n-1) when the input is x(n) = (-1)nu(n) and the initial condition are y(-1) = y(-2)=1	10
10	a) Find the convolution of the signals x(n) = 1 n=-2,0,1= 2 n=-1= 0 elsewhere	
	b) Show that the discrete time system described by the input-output relationship y[n] = n x [n] is linear	10
11	Given x(n) : { l, -2, 3, -4,5, -6 } without calculating DFT find the following quantities? a) X(0) b) $\sum_{K=0}^{5} X(K)$ c) X(3) d) $\sum_{K=0}^{5} \lvert X(K)\rvert^2$ e) $\sum_{K=0}^{5} -1^k X(K)$	5

MODULE II

1	a) Find 8 point OFT of x[n] = {2, I, -I, 3, S, 2, 4, I} using radix-2 decimation in time FFT algorithm	10
	b) Explain, how a 2N point DFT of a 2N point real-valued sequence can be found by computing a single N point OFT	5
2	a) How many multiplicationterms are required for b) doing DFT by expressional method and FFT method expression – N /2 log N	10
3	a) Find the DIF FFT of x[n]={1,1,1,1,0,0,0,0}	8
	b) Find the DIF FFT of x[n]={1,4,1,4,0,4,0,2}	8
4	a).State the properties of DFT.	10
	b) Define DFT and IDFT (or) What are the analysis and synthesis equations of DFT?	5
	c) .How to obtain the output sequence of linear convolution through circular convolution?	5
5	a) What is zero padding? What are its uses?	5
	b) .Define sectional convolution.	5
	c) What is overlap-add method?	5
6	a) What is overlap-save method?	5
	b) What are the applications of FFT algorithm?	5
	c) What are differences between overlap-save and overlap-add methods.	5
7	Derive the DFT of the sample data sequence x(n) = {1,1,2,2,3,3}and compute the corresponding amplitude and phase spectrum	10
8	Given x(n) = {0,1,2,3,4,5,6,7} find X(k) using DIT FFT algorithm	10
9	Given X(k) = {28,-4+j9.656,-4+j4,-4+j1.656,-4,-4-j1.656,-4-j4,-4-j9.656} ,find x(n)using inverse DIT FFT algorithm.	10
10	Find the inverse DFT of X(k) = {1,2,3,4}	5
11	Derive the DFT of the sample data sequence x(n) = {1,1,1,2,2,3,3,2}and compute the corresponding amplitude and phase spectrum	10

MODULE III

1	Distinguish between FIR filters and IIR filters.	10
2	What are the design techniques of designing FIR filters? What is Gibb's phenomenon?	10
3	List the steps involved in the design of FIR filters using windows.	6
4	a) Prove that, if z! is a zero of a linear phase FIR filter, then $\sum z!$ is also a zero.	10
	b) Design a linear phase FIR low pass filter having length M = 15 and cut-off Frequency COc = *1£16.* Use Hamming window.	10
5	a) Explain the design of linear phase FIR filters by the frequency sampling method.	15
	b) Explain the frequency transformations in the analog domain	5
6	Find the transfer function of the realizable filter (N-1)/2H(z)=z-(N-1)/2	10
	$[h(0)+\sum h(n)(z^{n}+z^{-n})]n=0$	
7	What are the desirable characteristics of the window function?	5
8	Give the equations specifying the following windows.	15
	a. Rectangular window b. Hamming window c. Hanning window d. Bartlett window e. Kaiser window	
9	a) What is the necessary and sufficient condition for linear phase characteristic in FIR filter?	10
	b) What is the principle of designing FIR filter using frequency sampling method?	10

MODULE IV

1	Design a digital Butterworth low pass filter with cop = *1£16,* COs = *1£14,* minimum pass band gain = -2dB and minimum stop band attenuation = 8dB. Use bilinear transformation. (Take T = 1)	15
2	a) Write the steps in designing chebyshev filter?	10
	b).Write down the steps for designing a Butterworth filter?	10
	c).State the equation for finding the poles in chebyshev filter	10
3	a) What is the reason that FIR filter is always stable?	10
	b) Under what conditions a finite duration sequence h(n) will yield constant group delay in its frequency response characteristics and not the phase delay?	10
	c) When cascade form realization is preferred in FIR filters?	5
4	a) Find the DFT of a sequence x(n)={1,2,3,4,4,3,2,1}using radix-2 DIT algorithm.	10
	b) Find the IDFT of the sequence X (K)= {10,-2+2j,-2,-2-2j}.	10
5	In an LTI system the input sequence x(n)={1,1,1}and the impulse response h(n)={-1,1}.Find the response of the LTI system by using DFT –IDFT method.	10
6	Derive the time reversal property of DFT.	10
7	Design an analog Butterworth filter that has a 2dB pass band attenuation at a frequency of 20 rad/sec and at least 10dB stop band attenuation at 30rad/sec	10
8	8) Compare FIR and IIR filters.	10

MODULE V

1	a) Find the lattice structure implementation of FIR filter h[n] = {I, 0.5, 0.75, -0.6}	6
	b) Draw the direct form II structure and transposed direct form II structure of He) *1+0.5z-1-O.75z-2*	
	Z = 1+0.6z-1+O.4z-2-O.2z-3	*5*
	c) Draw the block diagram of TMS320C67XX and briefly explain the function of each block	9
2	a) Draw the direct form realization of linear phase FIR filter h[n] = {I, 0.5, 0.25, -0.5, 0.8, -0.5,0.25,0.5, I} using minimum multipliers.	15
	b) Draw the signal flow graphs of direct form IT and cascade form structures	5
	H(e) *(0.8+0.2z-1+O.6z-2)(1-0.6z-1)*of *z* = (1-0.6z-1+O.8z-2)(1+0.8z-LO.7z-2)	5
	c) Explain the effects of coefficient quantization in ITR and FIR filters.	10
3	Given X(k) = {1,1,1,1,1,1,1,1,} ,find x(n) using inverse DIT FFT algorithm	15

4	Consider the transfer function H(Z)=H1(Z)H2(Z) where H1(Z) =1/1-a1Z-1H2(z) =1/ 1-a2Z-1Find the o/p Round of noise power Assume a1=0.7 and a2= 0.8and find o/p round off noise power.	10
5	Design a filter with H d (e^{jw})=e^{-j3w} ,$-\pi/4\leq w\leq\pi/4$ 0 ,$\pi/4<|w|<\pi$ Using Hanning window with N=7 .	10
6	Explain the relevance of window function and explain each window.	10
7	a) For the constraints $0.8\leq|H(e^{jw})|\leq1$, $0\leq w\leq0.2\pi$ $|H(e^{jw})|\leq0.2$,$0.6\pi\leq w\leq\pi$ With T=1sec.Determine system function H(z) for a Butterworth filter using impulse invariant method.	10
8	Explain the bilinear transformation method of IIR filter design	10

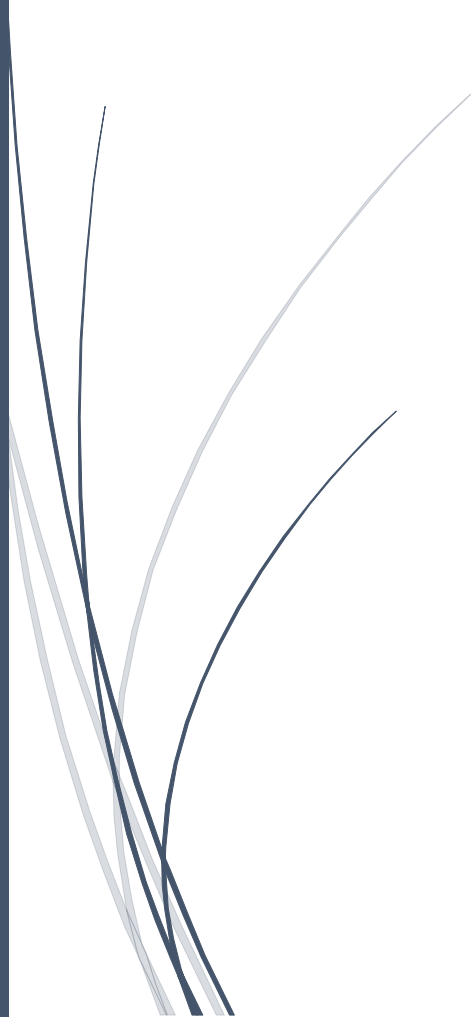
MODULE VI

1	Obtain the direct form I, direct form II, cascade and parallel form realization for the system y(n)=−0.1y(n−1)+0.2y(n−2)+3x(n)+2.6x(n−1)+0.6x(n−2).	12
2	Filter is given by the system function H(z)=1+ (1/3)z^{-1} +(1/4) z^{-2} +(1/4) z^{-3} +(1/3) z^{-4} + z^{-5}. Implement the filter with minimum number of multipliers. Will the filter have linear phase characteristics?	10
3	What are the factors involved with finite word length effects in digital filters. Explain any two effects in detail.	12
4	Find the steady state variance of the noise in the output due to quantization of input for the first order filter y(n)=ay(n-1)+x(n).	10
5	a) Give the output of decimation by M system in time domain. Explain output frequency spectrum. What is the importance of low pass filtering prior to downsampling?	10
	b) How does a floating-point number represented in a processor? Explain the operations of addition and multiplication of two floating point numbers with examples.	5
	c) Derive the variance of quantization noise in ADC with step size fl. (Assume quantization noise has uniform distributed pdf with zero mean)	5
6	The output signal of an A/D converter is passed through a low pass filter with transfer function is given by H(z)=(1-a)z/(z-a) for 0<a<1.Find the steady state output noise power due to quantization at the output of the digital filter.	12
7	List out any two features of a fixed point processor that distinguishes it from a floating point processor.	10

2017 Batch Semester-5
2019-20

EC305 MICROPROCESSOR AND MICROCONTROLLER

Faculty- Prof. Saheeda P A



Subject EC305 Microprocessor and Microcontroller (S5 ECE)

MODULE I

		Marks
1.	With the help of a block diagram explain the 8085 architecture.	10
2.	What are the functions of the following pins of 8085? (a)IO/M (b) HOLD (c) AD0-AD7 (d) READY (e) INTR	5
3.	The internal architecture of 8085 Microprocessor has internal units capable to Execute a program stored in external memory. Justify with relevant features and diagram.	10
4.	Explain the sequence of control signals generated while doing the following operations: (a)Fetch (b) Memory Read (c) I/O Write	6
5.	What are the control signals in an 8085 Processor? With respect to the internal Architecture of 8085, explain how the control signals are generated.	10
6.	What are the functional blocks of a microprocessor? What are the building blocks of a microcomputer?	6
7.	State the relation between the number of address pins and physical memory space. What is the size of physical memory which can be addressed by 8085 and 8086 Microprocessors?	6
8.	What are the registers in 8085? What are their functions?	8
9.	How are the Address/data lines demultiplexed in an 8085.(Or Draw and explain the schematic of latching low order address bus in 8085)	8

MODULEII

1.	Define Machine cycle and Instruction cycle. What are the Machine cycles generated for execution of the following instructions: (a) MOV A, B (b) MVI A, 05H (c) LDA 2000H (d) STA 2000H.	8
2.	What are the flags in 8085? What are their uses? How can they be tested?	8
3.	Differentiate between Register addressing and Register indirect addressing in 8085 microprocessor and illustrate with examples	4
4.	Illustrate with relevant Timing diagram, the sequence of operations involved for fetching and executing the instruction MVI C, 08H in 8085 microprocessor	10

5.	Explain the different addressing modes of 8085 with examples.	8
6.	Compare Mode 0, Mode 1 and Mode 2 operations of 8255	8
7.	With the help of a block diagram explain the operation of the 8279 Keyboard/ Display interface	10
8.	Give the advantage of using 8279 for keyboard/display interface? What are scan lines used for? Explain (i) Encoded scan mode and (ii) Decoded scan mode	10
9.	Suggest a suitable peripheral interface to input the status of 4 switches (ON/OFF) connected to 8085 microprocessor and indicate their status by 4 LEDs connected to 8085. Illustrate the above with schematic	10
10.	How many modes of operation are possible in 8253 IC? List out the different functions which can be achieved in these modes.	7
11.	Explain with the help of a block diagram, how 8251 IC can be interfaced to 8085 for serial communication.	7

MODULE III

1.	How does the internal architecture of 8086 microprocessor enable high speed execution of instructions	5
2.	Compare the features of 8086 processor with 80486 processor.	4
3.	Explain how 80386 is suited for a multitasking application.	5
4.	Compare 80286, 80386, 80486 and Pentium processors	6
5.	What are the different segments of memory with which 8086 can work? List the advantages of segmented memory. With an example illustrate the physical address generation in 8086?	7
6.	What is the difference between a Microprocessor and a Microcontroller, What are the different types of Microcontrollers?	6
7.	With the help of a functional block diagram, explain the 8051 microcontroller	10
8.	Draw the memory map and briefly explain the memory organization for 128 byte internal RAM of 8051 Microcontroller.	10
9.	Explain the I/O ports 0f 8051? What are the alternate uses of port pins? How can P1 be used as both input and output?	8

MODULEIV

1.	Compare the various addressing modes of 8051 microcontroller and illustrate with examples.	8
2.	Explain the following 8051 instructions: 1) MOV A, @R1 2) MOVX A, @DPTR 3) MOVC A, @A+DPTR 4) DJNZ R0, BACK 5) DAA	5
3.	Explain the Special Function Register PSW in 8051	4
4.	What are the conditional branch instructions of 8051	7
5.	Write an Assembly Language Program for 8051 to clear the upper half of internal RAM with the help of DJNZ instruction	7
6.	Fifteen bytes of data are stored from location 6CH of internal RAM of 8051. Write an ALP to count the number of locations which contain data 11H and to store the result to RAM location 6BH	7
7.	An array of 10 numbers is stored in the internal data RAM starting from location 30 H. Write an Assembly Language Program to sort the array in ascending order starting from location 40H	10
8.	Write an ALP to multiply the data in RAM location 22H by the data in 23H and to put the result in RAM locations 24H (low byte) and 25H (high byte)	5
9.	Write an ALP to transfer 20 bytes of data stored in internal RAM locations starting at 20H to another location (starting from 40H)	10

MODULE V

1.	What is an interrupt? List the interrupt sources of 8051 and their priority	8
2.	Draw and explain the formats of TMOD, TCON, SCON, IE and IP registers of 8051 Microcontroller	5
3.	Explain the SFRs SCON, SBUF and PCON	6
4.	Explain the different modes of operations of 8051 Timers	8
5.	A 12 MHz crystal is connected as clock to an 8051 Microcontroller. Develop an ALP to generate a delay of 20 ms. Use Timer 0 in Mode 1	10
6.	An LED is connected to port pin P1.0 of 8051. Develop a program to blink the LED continuously at a rate of 2 seconds	10
7.	Assuming a Crystal frequency of 22MHz, write a program to generate a square wave of frequency 1 KHz on pin P1.2	8
8.	Illustrate how mode setting of counters/timers of 8051 can be done. How can you	6

	program the Timer/Counter for Counter operation?	
9.	Write notes on Serial Communication in 8051	5
10.	Write a program to receive the data which has been sent in serial form on RxD pin and send it out to port 1 in parallel form	7
11.	Write a program to continuously read the data in port 0 and to transfer it serially on the TxD pin	8
12.	What is meant by vectored interrupts? Describe the interrupt vector table for 8051. How can you enable/ disable interrupts in 8051?	6

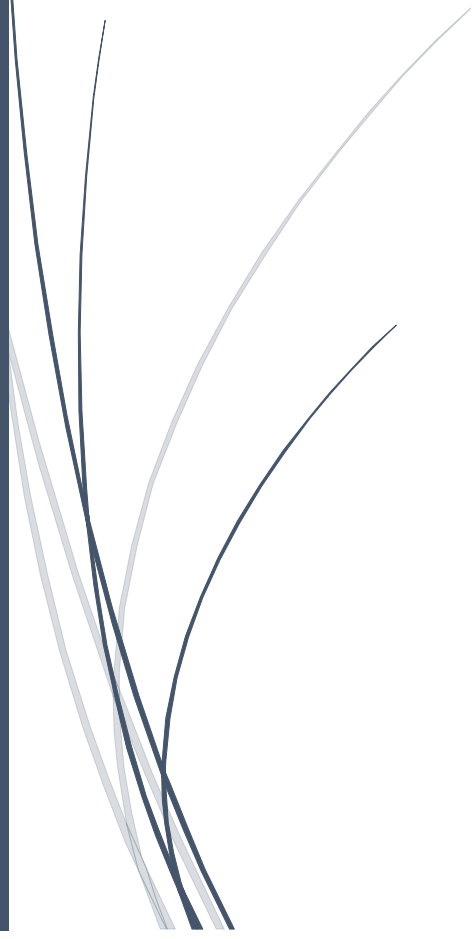
MODULE VI

1.	Draw a block diagram to interface a stepper motor to 8051 with a step angle of 1.8degrees. Also write an ALP to run the motor alternately in slow and high speeds in clockwise direction	12
2.	Illustrate with a schematic, how an 8 bit ADC of 8 channel input is interfaced to 8051.	8
3.	Draw the schematic of DAC interface to 8051. Develop an ALP to generate a square wave of 2 KHz frequency with 40 percent duty cycle using a DAC	10
4.	Write a program to transfer the message “KTU” serially at 4800 baud rate, 8 bit data, 1 stop bit	10
5.	Explain how an LCD display can be interfaced to 8051	7
6.	Show the schematic diagram of interfacing a 4 digit dynamic LED display system to 8051 Microcontroller	10
7.	Draw the schematic and write an ALP for 8051 to generate a staircase waveform with15 steps using a DAC	10
8.	Write an ALP to rotate a stepper motor interfaced to 8051 microcontroller clockwise continuously	10
9.	Show how a DIP switch can be interfaced to 8051? Write the program segment to check whether a key is pressed or not.	8
10.	Explain with necessary diagrams, how a 4-winding stepper motor can be interfaced and rotated in steps. Assume normal 14-step sequence data as 09H, 0CH, 06H and 03H respectively	10

2017 Batch Semester-5
2019-20

EC 365 BIOMEDICAL ENGINEERING

Faculty- Ms. Anagha A S



EC 365 BIOMEDICAL ENGINEERING

MODULE-1

1. Explain Nernst relation (2)
2. What are the essential features of a biopotential amplifier? (3)
3. What is bio-electric potential? Explain with necessary illustration. (6)
4. With necessary illustration, explain any two basic ECG lead configurations. (9)
5. Explain the construction of any two of them with necessary illustration
   - Microelectrodes
   - Skin surface electrodes
   - Needle electrodes
6. What is an isolation amplifier? What is its significance? Illustrate any one methods(7)
7. Explain the following (3)
   a. Half-cell potential
   b. Ag - AgCl electrode
8. Explain with neat diagram how action potential is created in human body and writ the Nernst equation for resting membrane potential. (5)
9. The intracellular k^+ concentration of a group of cells averages 140×10^{-6} moles/cm3. The extracellular concentration of k^+ averages 4×10^{-6} moles/cm^3. Find concentration ratio and diffusion potential for k^+
10. What is the need for a biomedical instrument? With a neat block diagram explain the significance of each basic component in it. (8)
11. What is a chopper amplifier? What is its significance? (6)
12. How does depolarisation and repolarisation occur in a cell? (9)
13. What is ECG? With a neat sketch explain the various segments of an ECG Waveform. (8)
14. What is a chopper amplifier? What is its significance? (6)

MODULE- 2

1. Explain electro conduction system of the heart with illustration. (8)
2. Explain the working of ultra sonic blood flow meter, with illustration. (7)
3. Explain Heart and cardiovascular system with the help of a neat sketch (7)
4. Briefly explain resting potential and action potential (7)
5. Explain about bio potential electrodes. (3)

6. Explain the principle, lead configuration and recording system of ECG. (6)
7. With the help of a neat diagram explain any one direct method for measurement of Blood Pressure. (7)
8. With a neat sketch explain the working of human heart. (6)
9. With the help of a neat diagram explain any one indirect method for measurement of Blood Pressure. (7)
10. Explain electromagnetic blood flow meter with a neat sketch. (5)
11. A patient was subjected to non-invasive method of blood pressure measurement. Which is the method used? What is the principle behind the method and how is it done? (10)
12. Compare direct and indirect blood pressure measurement. What is Korotkoff sound in blood pressure measurement? (8)

MODULE III

1. List the different waves of EEG recording and explain the 10-20 lead system used to record EEG. (4)
2. With a neat sketch explain any two types of electrodes used in EEG recording. (3)
3. Explain any one method for blood cell count. (3)
4. What is Spectrophotometer? (3)
5. With necessary illustration, explain the placement of electrodes for recording EEG signal. (5)
6. Explain the following with illustration: i) Flame photometer ii) Spectrophotometer (8)
7. What is plethysmograph? Explain full body plethysmograph with illustration. (7)
8. Explain how nerve conduction velocity is calculated. An EMG signal has the following specifications. Maximum signal amplitude 3mVand bandwidth 20 to 3000 Hz. Draw the block diagram of EMG measurement and explain the need for each block. (8)
9. List any four human respiratory parameters and define in two lines and explain how spirometer can be used for respiratory volume measurement. (8)
10. Explain the structure of a human neuron (5)
11. A person was found to have variation in the oxygen content in his blood. Which method would have helped him determine this? With a neat diagram explain any one type of this method. (8)

MODULE IV

1. What is a pacemaker? What is its significance? Explain the working with illustration of an atrio-synchronous pacemaker. (7)
2. What is diathermy? With a neat block schematic diagram, explain the working and applications of surgical diathermy equipment. (8)
3. What is dialysis? Explain any one type of dialyzer with necessary illustration (7)
4. Explain what cardiac defibrillator is. Describe the different types of cardiac paceakers used in medical field. (7)
5. Explain with a block diagram the working of a hemo dialysis machine. (5)
6. What is a cardiac defibrillator? With a neat diagram explain DC defibrillator. (7)
7. Explain with a neat diagram the respiratory system of a human body. (7)
8. What is surgical diathermy? Explain the various electro surgery techniques available. (8)

MODULE V

1. How X-rays are produced? What are its properties? (5)
2. Mention any three applications of X-rays in medical field. (3)
3. What is the basic principle of Computed Tomography (CT)? (4)
4. How image reconstruction is done in CT? (4)
5. Mention any four applications of CT. (4)
6. What is the principle of Ultrasonic Imaging and describe the imaging modalities of Ultrasonic imaging system? (8)
7. Compare A-mode, B-mode and M-mode displays in Ultrasonic imaging system. (6)
8. Draw the block schematic of CT scan system and explain. (7)
9. Compare CT scan and X-ray imaging technique. (4)
10. List any four properties of X-ray. With a neat block diagram explain the working of a X-ray machine. (10)

MODULE VI

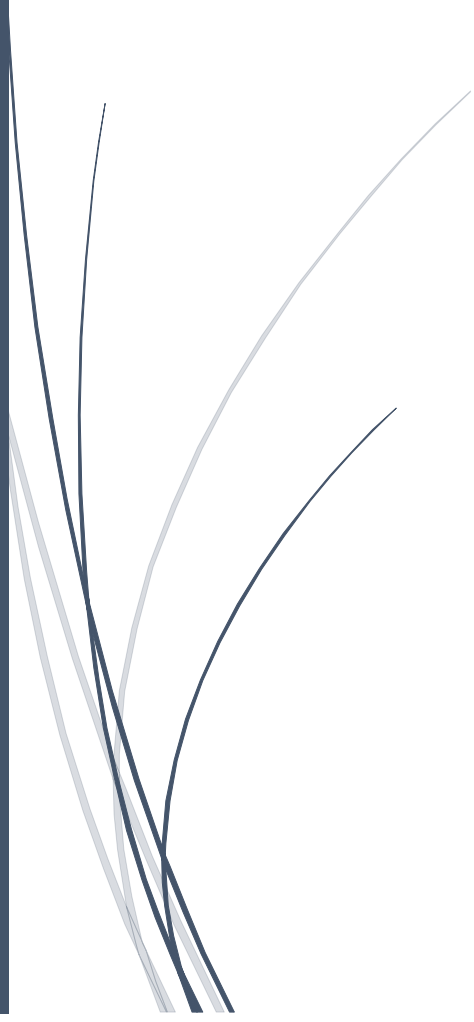
1. Mention any three applications of telemetry in medicine. (3)

2. What are the sources of electrical hazards? Explain about the precautions to be taken to avoid electric shocks, (8)
3. What are the basic components of telemetry system? (4)
4. Describe single channel telemetry system for ECG and temperature. (4)
5. Describe Image acquisition ad reconstruction techniques Magnetic Resonance Imaging (MRI). (7)
6. Explain the sub-systems of NMR imaging system with necessary illustration (5)
7. Explain how electric shock is hazardous to human body. What changes it will bring in the body, when the current increases. (7)
8. Explain NMR with necessary illustration. (5)
9. Illustrate and explain the components of bio telemetry system, also write the application of telemetry in medicine. (8)
10. Explain with illustration the basic pulse echo system. (6)
11. With a neat block diagram explain single channel ECG telemetry transmitter. (9)
12. What is the principle behind NMR imaging? What are the advantages of NMR imaging? (10)

2017 Batch Semester-5
2019-20

EC303 APPLIED ELECTROMAGNETIC THEORY

Faculty- Mr. Dawn Sivan



EC303 Applied Electromagnetic Theory
QUESTION BANK

MODULE 1

1. State and prove Ampere's circuit law **(KTU, May 2019, Apr 2018)** (6)

2. Derive an expression for magnetic energy of a continuous distribution of current in a volume. **(KTU, May 2019)** (7)

3. Find the potential function and electric field intensity for the region between concentric right circular cylinders, where V = 0 at r = 1 mm and V = 100 V at r = 30 mm. **(KTU, May 2019)** (5)

4. A square loop of 4m side is placed in *xy* - plane with its centre at the origin and sides long the coordinates axes. If the magnetic flux density in the region is given by $B = \left(0.28a_x - 0.3a_y + 0.4a_z\right)e^{-0.1t}\ Wb/m^2$, find the induced EMF in the loop at t=10s. **(KTU, May 2019)** (8)

5. An air filled parallel plate capacitor is with following specification, area = 2 m^2 and spacing between the plates = 0.1 m. If a voltage $V = 20cos10^3t$ is applied across the capacitor plates, find the magnetic field between the capacitor plates. **(KTU, May 2019)** (5)

6. Point charges 5 nC and -2 nC are located at (2, 0, 4) and (-3, 0, 5), respectively. (i) Determine the force on a 1nC point charge located at (1, -3, 7). (ii) Find the electric field E at (1, - 3, 7). **(KTU, Dec 2018)** (7)

7. Give Poisson's and Laplace equation in electrostatics. Give application. **(KTU, Dec 2018)** (7)

8. Derive the expression of capacitance and inductance of two wire transmission line. **(KTU, Dec 2018, Dec 2017)** (8)

9. Define electric field intensity. Derive the equation for electric field intensity at a distance '*r*' from a point charge of *Q* coulombs. **(KTU, Apr 2018)** (7)

10. Define curl of a vector field. Derive the equation for curl of a vector field in Cartesian co-ordinate system. **(KTU, Apr 2018)** (10)

11. Derive the expressions for Energy stored in Electric Field. **(KTU, Dec 2017)** (8)

12. Eight identical charges, Q each are placed on the corners of a cube of side 'a'. Find the resultant force on a charge. **(KTU, Dec 2017)** (7)

MODULE 2

1. State and explain Maxwell's equations in the integral and differential forms. **(KTU, May 2019, Dec 2018, Dec 2017)** (8)

2. Derive the solution of uniform plane wave in lossy dielectric medium. **(KTU, May 2019)** (6)

3. State and prove boundary conditions for E and H in accordance with Maxwell's equations. **(KTU, Dec 2018, Dec 2017)** (7)

4. Starting from Maxwell equation, derive the wave equation for a conducting medium. **(KTU, Apr 2018, Dec 2017)** (7)

5. Derive the equation for Electric and Magnetic field intensities for an electromagnetic wave propagating in the z-direction in a dielectric medium. Find the following: i) Attenuation constant; ii) Phase velocity; iii) Phase constant; iv) Intrinsic impedance. **(KTU, Apr 2018)** (9)

6. Define skin depth for a conductive medium? If σ denotes the conductivity, Derive the equation for skin depth for a good conductor. **(KTU, Apr 2018)** (5)

7. Derive the boundary conditions for electric field at the interface of two dielectrics. **(KTU, Dec 2017)** (6)

8. Explain Group velocity and Phase velocity. When a wave of 6 GHz propagates in parallel conducting plates separated by 3 cm, find the V_p and V_g of the wave for dominant wave. **(KTU, Dec 2017)** (8)

MODULE 3

1. Derive an expression for reflection coefficient of a plane wave incidence with parallel polarization at a dielectric interface. **(KTU, May 2019)** (5)

2. Derive an expression for net outward power flow associated with an electromagnetic wave, from a surface. **(KTU, May 2019)** (10)

3. What is Snell's law? **(KTU, May 2019)** (3)

4. What is Polarisation? Explain the different types of Polarisation? **(KTU, Dec 2018, Dec 2017)** (7)

5. Derive the expression for the ratio of reflected to incident electric field strength for an insulator with oblique incidence. **(KTU, Dec 2018)** (7.5)

6. Derive the expression for refraction and reflection coefficient of plane electromagnetic waves that undergoing oblique incidence with vertical polarization (considering boundary separation). **(KTU, Apr 2018)** (7)

7. State Poynting theorem. Derive the equation of complex vector. **(KTU, Dec 2017)** (8)

8. Derive Brewster angle. A parallel-polarized plane wave is incident from air onto a dielectric medium with $\varepsilon_r = 9$ at the Brewster angle. What is the refraction angle? **(KTU, Dec 2017)** (9)

MODULE 4

1. Define reflection coefficient and VSWR of a transmission line and derive the relation between reflection coefficient and VSWR. **(KTU, May 2019, Dec 2018)** (7)

2. Derive the current and voltage equation of a transmission line. **(KTU, May 2019)** (7)

3. Draw the circuit of small section of transmission line of differential length and label the circuit parameters. **(KTU, May 2019)** (3)

4. A lossless transmission line has primary constant L = 0.01 μH/m, C = 100 pF/m. Find the characteristic impedance or the line. **(KTU, May 2019)** (5)

5. Derive an expression for characteristic impedance of a transmission line and show that it is resistive at radio frequencies. **(KTU, Dec 2018)** (7)

6. Derive the ABCD parameters of a transmission line. **(KTU, Dec 2017)** (8)

7. A lossless 50-Ω transmission line is terminated in a load with ZL = (50+ j25) Ω. Calculate (i) The reflection coefficient Γ. (ii) The standing-wave ratio. **(KTU, Dec 2017)** (7)

8. Derive standard Transmission line equations. **(KTU, Dec 2017)** (6)

MODULE 5

1. What are distributed elements? **(KTU, May 2019)** (4)

2. A load impedance 90 - j25 is to be matched to 50 Ω using single stub matching. Find the length and location of stub using smith chart. **(KTU, May 2019)** (10)

3. Derive the expression for r-circles and x-circles in Smith chart. **(KTU, Dec 2018)** (10)

4. Explain single stub matching using analytical method. **(KTU, Dec 2018)** (10)

5. Write short notes on single stub matching and double stub matching. **(KTU, Apr 2018)** (8)

6. How a smith chart is useful in finding the stub length for impedance matching. **(KTU, Apr 2018)** (4)

7. Write note on half wave and quarter wave transmission lines. **(KTU, Dec 2017)** (5)

8. A lossless 60Ω line is terminated by a 60 + j60Ω load. Find Γ and s, if Z_{in} = 120 - j60 Ω. How far is the load from generator (Solve with Smith chart)? **(KTU, Dec 2017)** (6)

9. Design a stub to match 40 + j30 Ω load (antenna) to a lossless line of 100 Ω (use Smith chart). **(KTU, Dec 2017)** (9)

10. By analytical method, get the value of position where stub has to be placed from load and stub length with single stub impedance matching in transmission lines. **(KTU, Dec 2017)** (7)

11. Explain Half Wave and Quarter Wave Transmission lines. Given that Z_L = 30 + j40 Ω, Z0 = 50 Ω. Find the shortest length ('*l*') and point where stub has to be placed for a matching. (Use Smith chart) **(KTU, Dec 2017)** (10)

MODULE 6

1. Derive the expressions for TE mode in a rectangular wave guide. **(KTU, May 2019, Apr 2018)** (10)

2. The longitudinal electric field for TM_{11} mode is given by $E_z = \sin 5x \sin 8y\, e^{-j\beta z}\, V/m$. Find the cut off frequency of the mode. **(KTU, May 2019)** (7)

3 The cross section of a rectangular wave guide is 20 cm x 5 cm. Find 3 lowest order mode frequencies. **(KTU, May 2019)** (3)

4 Determine, assuming TE_{10} mode of propagation ,the cut-off frequency, cut-off wavelength, guide wavelength, phase constant, phase velocity, group velocity and wave impedance in the case of a hollow rectangular metallic waveguide of dimensions 6 cm and 3 cm, respectively, when the applied signal frequency is 5 GHz. **(KTU, Dec 2018)** (10)

5 A hollow rectangular waveguide has dimensions of a= 4 cm and b= 2 cm. Calculate the amount of attenuation if the frequency is 3.5 GHz. Assume dominant mode. **(KTU, Dec 2018)** (10)

6 With a neat diagram explain the propagation of electromagnetic wave in a rectangular wave guide? **(KTU, Apr 2018)** (8)

7 What are called degenerate modes? Explain. **(KTU, Dec 2017)** (5)

8 Draw the field distribution pattern for TE_{20} mode inside a rectangular waveguide. **(KTU, Dec 2017)** (4)

9 List all the modes which are supported in rectangular waveguides and why? **(KTU, Dec 2017)** (8)

10 Derive the relationship between guide wavelength, free space wavelength and cut off wavelength in rectangular waveguide. **(KTU, Dec 2017)** (5)

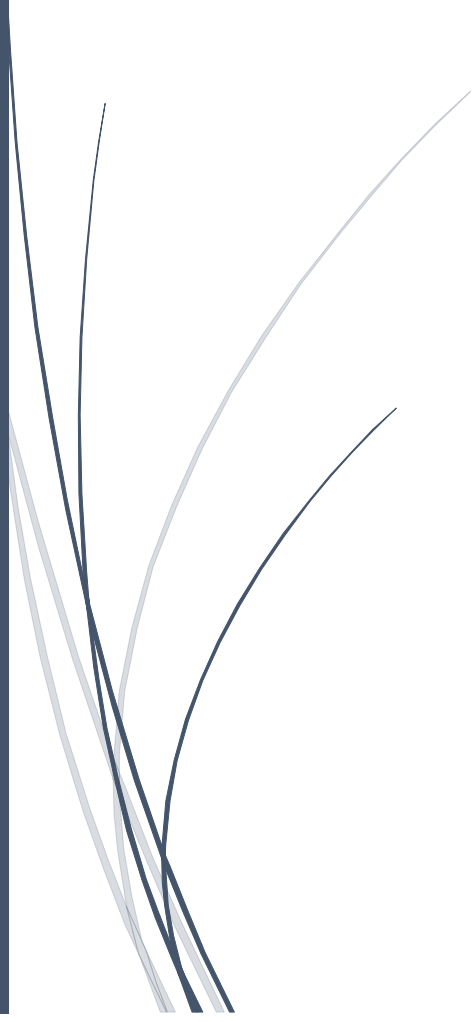
11 Discuss the attenuation of waveguides. **(KTU, Dec 2017)** (5)

12 Explain waveguides and its different modes of wave propagation. **(KTU, Dec 2017)** (10)

2017 Batch Semester-5
2019-20

HS300 PRINCIPLES OF MANAGEMENT

Faculty- Mr. Rajesh G R



HS300 PRINCIPLES OF MANAGEMENT QUESTION BANK

SEMESTER-5

MODULE -1

1.	Define Management	3
2.	Explain the art & science perspectives of Management	3
3.	Describe any four elements of the external environment of a manufacturing Firm with a suitable example	4
4.	Explain challenges faced by new generation firms	4
5.	Explain various features of the organizations of the new era	4
6.	Explain Competitive advantage	2
7.	Explain Current challenges of a Manager. b) How would you tackle it?	10
8.	Explain various roles of a manager	10
9.	Explain External environment of an organization in detail	10
10	In the context of a car manufacturing firm, describe any four elements of the external environment.	4
11	List any four forces of the external environment	4
12	Why the management of the organizations of the new era differ from old ones?	4

MODULE-2

1.	Explain any four contributions of Henry Fayol	4
2.	Explain Mc. Gregor's X and Y Theory	4
3.	Why Elton Mayo's study is called Human relations Management	2
4.	Describe any two examples of CSR	4
5.	Distinguish between systems approach and contingency approach	3
6.	Draw 7S frame work	3
7.	Explain Scientific Management.	10
8.	What are the contributions of FW Taylor?	10

9.	Describe any one instance of application of Corporate social responsibility.	4
10	How Corporate Social Responsibility helps an organization in enhancing its image explain with examples	5
11	List and illustrate the contributions of Gilbreth's	5
12	What is managerial ethics? Illustrate a situation in which whistle blowers perform ethical duty.	10

MODULE-3

1.	List any four objectives of Planning	4
2.	Who does strategic planning and why?	3
3.	Differentiate between goal, plan and procedure	3
4.	Explain the steps in Planning process	7
5.	Who does Operational planning and why it is easier?	5
6.	What are the advantages of MBO	4
7.	How MBO helps an organization to achieve organizational goals?	4
8.	Write short notes on a) Strategic planning, b) Tactical planning c) Operational planning	7
9.	Planning is a bridge between where we are now and where we want to go Explain.	10
10	Explain various levels of planning	10
11	Define the terms: Plan, Objective, Goal, Policy and Rule	5
12	With a block diagram, outline the structure of Management by Objectives MBO	5

MODULE-4

1.	Explain Departmentation	5
2.	Define Span of control	4
3.	Classify the factors effecting span of control	3
4.	What are the merits and demerits of Line organization	5
5.	Decision Making is a difficult task. Why?	4
6.	Distinguish between programmed and non programmed decisions	6
7.	Explain Organizational structure and its various types.	10
8.	Explain Decision Making process and its limitations	5
9.	Explain Creative process and innovation	6
10	Write short note on : Decision Making under certainty, uncertainty and risk	8
11	What is an organization chart? What are its merits and demerits?	4
12	Illustrate the difference between programmed and non-programmed decisions by highlighting suitable examples	5

MODULE-5

1.	Explain Staffing function	4
2.	Describe why delegation of authority is required	4
3.	Explain characteristics of an entrepreneur	5
4.	Explain Organizational Culture	4
5.	How does it affect organizational effectiveness?	5
6.	Explain staffing.	4
7.	How Manager Inventory chart helps in staffing? Explain with a diagram	6
8.	Explain systems approach to selection with a diagram.	7
9.	How Job design is important in an organization? b) How would you design a job?	4
10	What factors would you consider for the best job design?	6
11	Distinguish the following: Recruitment, Selection, Placement and Induction.	4

12	List the advantages and limitations of interview as a selection technique.	4

MODULE-6

1.	Comment and compare Leaders Vs. Managers	5
2.	Explain Transactional & Transformational Leadership	4
3.	Differentiate between feedback and feed forward control.	7
4.	Write a short note on Global controlling	8
5.	Explain the dimensions of leadership with a diagram	5
6.	Control techniques used in an organization depends on various factors. Explain common control techniques used in organizations.	7
7.	How preventive control helps an organization to avoid problems in advance? Explain	6
8.	Explain Overall controls	8
9.	Explain various Leadership styles	8
10.	Explain the process of controlling function with the aid of a sketch.	8
11	List any six qualities of an effective leader	4
12.	With a block diagram and highlighting a situation, explain how a feed forward control mechanism works.	5

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2017 Batch Semester-5
2019-20

EC307 POWER ELECTRONICS & INSTRUMENTATION

Faculty- Ms. Liji Ramesan Santhi

QUESTION BANK

SUBJECT: EC307 POWER ELECTRONICS & INSTRUMENTATION

Module 1				
Sl No.	Questions	Marks	KU/KTU (Month/Year)	Instructional Objectives
1	With neat sketch explain the static and dynamic characteristics of power diodes.	10	KTU December 2018	
2	Explain the constructional details and the working of power MOSFET. Also bring out the difference between low power MOSFET and power MOSFET.	10	KTU April 2018	
3	Describe the structure of Power MOSFET by explaining channel formation. Draw its I-V characteristics labelling different voltages as well as regions of operation. Also draw the switching characteristics.	15	KTU December 2017	
4	Draw the structure of an IGBT and explain its operation.	10	KTU December 2018	
5	Define softness factor of power diodes. MOSFET. Describe the working of IGBT. How does Latch-up occur in IGBT?	7	KTU April 2018	
6	Explain the switching waveform of power transistor. Also describe its input and output characteristics.	8	KTU April 2018	
7	Explain the working principle of GTO	10		
8	Discuss why PMOSFET has no reverse blocking voltage whereas an IGBT has	10		
9	Why are IGBT becoming popular in their application to control convertor? Enumerate some application of IGBT	5		
10	Explain in details the static characteristics of Power BJT. Compare the I-V characteristics of Power BJT with low signal BJT.	8	KTU December 2017	
11	Compare power MOSFETs and power BJTs.	5	KTU December 2018	
12	Describe the structural features of power diode. How it differ from signal diode?	5		

Module 2				
Sl No.	Questions	Marks	KU/KTU (Month/Year)	Instructional Objectives
1	What is meant by boost convertor? Explain using relevant circuit diagram and wave form. Write down the expression for output ripple voltage	7	KTU December 2017	
2	Draw the circuit of a Buck converter and explain its working with relevant waveforms.	6	KTU December 2018	
3	In a step down convertor consider all components to be ideal. Let $v_0=V_0$ be held at 5V By controlling switch duty ratio D. Calculate the minimum inductance L required to keep the convertor operation in a continuous conduction mode if V_d= 10-40 V output power greater than or equal to 5W & frequency is 50 KHz	10		
4	Describe forward converter including its circuit wave form and expressions	5	KTU December 2017	
5	Describe push-pull converter including its circuit wave form and expressions	5	KTU December 2017	
6	Explain full bridge DC DC convertor including its circuit diagram and suitable wave forms	5	KTU December 2017	
7	What is meant by buck-boost converter? Explain using relevant circuit diagram and wave form. Write down the expression for output ripple voltage	10		
8	What are the advantages of isolated converter circuits over the basic converter circuits? Explain the forward converter circuit with relevant waveforms.	9	KTU December 2018	
9	Explain the operation of a Flyback converter.	7	KTU December 2018	
10	Explain the basic concept of switch mode regulator with neat diagrams.	5		
11	Explain the principle of operation of full bridge isolated converter topology.	7	KTU April 2018	

12	Explain the working principle of buck converter and illustrate the operation with the inductor current and the switching waveforms.	8	KTU April 2018	

Module 3				
Sl No.	Questions	Marks	KU/KTU (Month/Year)	Instructional Objectives
1	What is the general arrangement of an online UPS system? Explain with the help of block diagram.	5	KTU December 2017	
2	Describe single phase half bridge inverter explaining the principle of sinusoidal PWM switching scheme.	7	KTU December 2017	
3	Explain the working principle of push pull inverter. Distinguish between choppers and inverters.	7	KTU April 2018	
4	Describe single phase full wave inverter. .Explain the principle of sinusoidal PWM switch scheme	7		
5	Explain the concept of space vector modulation?	8	KTU December 2017	
6	What is the general arrangement of offline UPS system? Explain with the help of block diagram	5		
7	What is pulse-width modulation? List the various modulation technique. How do these differ from each other?	5		
8	A single phase full bridge inverter feeds power at 50 H_z to RLC load with R=5 ohm, L=0.3 H and C = 50 microfarad. The DC input voltage is 220 V dc (a) Find the expression for load current upto fifth harmonic. (b) Power absorbed by the load and also fundamental power. (c) RMS and peak current of each thyristor.	10		
9	Explain Self oscillating type and driven type inverters	5	KTU April 2018	

10	With relevant waveforms explain the circuit of a push pull single phase inverter circuit.	9	KTU December 2018	
11	Explain the principle of space vector modulation in three phase inverter circuits.	10	KTU December 2018, KTU April 2018	
12	Explain the principle of operation of switched mode inverters. Draw the circuit of a full bridge single phase inverter circuit and explain its operation with relevant waveforms for R load.	8	KTU December 2018	

Module 4				
Sl No.	Questions	Marks	KU/KTU (Month/Year)	Instructional Objectives
1	What do you mean by measurement system and also discuss the general principles of measurements	5		
2	Explain the different classification of instruments. What is the criterion for balance of Schering's bridge?	15	KTU April 2018	
3	How to measure resistance by using Wheatstone's bridge?	5	KTU December 2017	
4	Define the following static characteristics (a) Resolution (b) Precision (c) Linearity (d) Sensitivity (e) Repeatability	10	KTU December 2017	
5	How to measure inductance by using Maxwell-Weins bridge	5	KTU December 2017	

6	Draw a Maxwell's bridge circuit and derive the condition for balance of the bridge for finding the unknown inductance value.	7	KTU December 2018	
7	With neat block diagram explain functional element of measuring instrument	5	KTU December 2017	
8	Explain the dynamic characteristics of measuring instrument	5		
9	Describe the principle of operation of Wheatstone bridge and derive the expression for unknown resistance	8	KTU April 2018	
10	Draw the block diagram and explain the functional elements of an instrument? What do you mean by static characteristics of an instrument? Define any six static parameters of an instrument.	15	KTU December 2018	

Module 5				
Sl No.	Questions	Marks	KU/KTU (Month/Year)	Instructional Objectives
1	What is the principle of operation of resistance transducer? Explain the working of strain gauge	8	KTU December 2017	
2	What is a transducer? Explain the classification of transducer	7	KTU December 2017	
3	Describe the construction and working of LVDT with neat schematic	8	KTU December 2017	
4	Explain the principle of operation of resistance transducer. Explain the difference between bonded and unbounded type strain gauges.	10	KTU April 2018	
5	Describe the construction and working of capacitor microphone with schematic	10		
6	Explain the working of hall-effect transducer. Mention any two applications	5	KTU December 2017,2018	

7	Explain the principle of operation of proximity transducers. Give two applications.	10	KTU December 2018	
8	Explain about any two types of capacitive transducers.	8	KTU April 2018	
9	Explain briefly the comparison between inductive and capacitive transducer	5		
10	Explain briefly the comparison between resistive and capacitive transducer	5		
11	What are the major guidelines for the selection of transducers	5	KTU April 2018	

Module 6

Sl No.	Questions	Marks	KU/KTU (Month/Year)	Instructional Objectives
1	What is RF power meter and explain its working?	6	KTU December 2017	
2	Explain the block diagram of frequency synthesizer with waveforms.	6	KTU April 2018	
3	Explain about ramp type digital voltmeter.	4	KTU April 2018,	
4	Explain the range changing circuit of digital voltmeter.	5	KTU April 2018, KTU December 2017	
5	What is electronic multimeter and explain its working	5		
6	What is audio power meter and explain its working	5		
7	Explain the digital measurement of time , phase , frequency	5		
8	With a block diagram describe logic state analyzer	10	KTU December 2018	

9	Draw and explain the basic block diagram of DSO. Sketch the system waveforms and list out its applications	10	KTU April 2018, KTU December 2017	
10	Explain the block diagram of swept super heterodyne spectrum analyzer.	5	KTU April 2018	
11	Write notes on:(i) spectrum analyzer(ii) Electronic multimeter	8	KTU December 2018	
12	Explain the operating principle of time measurement of a signal using digital instruments.	12	KTU December 2018	