AIKTC/KRRC/SoET/ACKN/QUES/2018-19/ **Date:** _____

School: SoET-CBSGS **Branch:** EXTC ENGG. **SEM:** V

To,
Exam Controller,
AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following **Semester/Unit Test-I/Unit Test-II (Reg./ATKT)** question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format		No. of Copies
			SC	HC	
1	Microcontroller & Its Applications	ETC501		✓	02
2	Analog Communication	ETC502		✓	02
3	Random Signal Analysis	ETC503		✓	02
4	RF Modelling & Antennas	ETC504		✓	02
5	Integrated Circuits	ETC505			
6					

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

(1) TE - Sem - V - CBSGS - EXTC 15/5/19

Paper / Subject Code: 30602 / MICROCONTROLLERS AND APPLICATIONS

Q.P. Code :25311

[Time: 3 Hours] [Marks:80]

Please check whether you have got the right question paper.

N.B:
1. Question no. 1 is compulsory
2. Solve any three questions out of remaining questions.
3. Figures to the right indicate full marks.
4. Assume suitable data where necessary.

Q. 1	a)	Explain TMOD register of 8051 microcontroller.	04
	b)	Explain SCON register of 8051 microcontroller	04
	c)	Explain Current Program Status Register of ARM7	03
	d)	Explain PUSH & POP instruction in 8051 microcontroller	03
	e)	Explain Preindexed & Postindexed addressing mode of ARM7	03
	f)	List & Explain design metrics of Embedded Systems	03
Q. 2	a)	Interface ADC 0808 with 8051 microcontroller. Write Assembly language Program to convert analog signal which is available on channel No 6 to digital and store in memory location.	10
	b)	Draw & Explain dataflow model of ARM7.	10
Q. 3	a)	Explain the Memory Interfacing of 8051 with 16K*8 Data RAM & 16K*8 Data ROM	10
	b)	Write a program for 8051 microcontroller to generate square waveform of 1 Hz & 50% duty cycle at pin P1.5. Assume 8051 is operating at frequency 11.059 MHz.	10
Q. 4	a)	Explain Internal RAM Organization of 8051 microcontroller.	10
	b)	Explain following instructions of ARM7 1. RSB r0, r1, r2 2. ORR r0, r1, r2 3. LDR r0, [r1, #2] 4. AND r1, r1,#3 5. CMP r0, r1,LSR #3	10
Q. 5	a)	Explain Operating modes of ARM7 Processor	10
	b)	Discuss Digital camera as an Embedded System	10
Q. 6		Write short notes on **(Any Two)** 1) Interrupt Structure in 8051 2) Serial communication in 8051 3) Addressing modes in 8051	20

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(1) TE-sem-V - CBSGS - EXTC

Paper / Subject Code: 30604 / ANALOG COMMUNNICATIONS

27/5/19

Duration :3hrs Max.Marks:80

N.B. (1) Question No. 1 is compulsory.
(2)Attempt any three questions out of remaining five.
(3)Figures to the right indicate full marks.
(4)Assume suitable data if required and mention the same in answer sheet.

1. Solve **any four** 20
   (a) Justify why FM is more immune to noise.
   (b) Define sensitivity, image frequency rejection and fidelity in radio receiver.
   (c) Explain Noise figure and noise factor.
   (d) Why IF is selected as 455 KHz in AM?
   (e) What is modulation? Explain the need of modulation.

2. (a) Explain concept of AM Wave with related equations and waveforms. 10
   (b) With the help of block diagram explain Phase Shift method of SSB generation. 10

3. (a) Explain the operation of Foster seeley discriminator with the help of circuit diagram and phasor diagram. 10
   (b) What are different methods of FM generation? Sketch the circuit and explain the principle of reactance modulator. 10

4. (a) What are the drawbacks of delta modulation? Explain the method to overcome these drawbacks. 10
   (b) With the help of suitable waveforms explain generation and detection of PWM. 10

5. (a) Explain Super heterodyne radio receiver in detail with block diagram. 10
   (b) Explain VSB Transmission in detail with its application. 10

6. Write short note on **(any four)** 20
   (a) Compare narrow band FM and wideband FM
   (b) FM noise triangle
   (c) Frequency division Multiplexing (FDM)
   (d) Pre emphasis and de-emphasis circuits
   (e) Aliasing error and aperture effect

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(14)

TE - Sem-V - CBSGS - RSA - Extc

9/5/19

Paper / Subject Code: 30601 / RANDOM SIGNAL ANALYSIS

(3 Hours) **Max Marks: 80**

Note:
1. **Question No. 1 is compulsory.**
2. **Out of remaining questions, attempt any three questions.**
3. **Assume suitable additional data if required.**
4. **Figures in brackets on the right hand side indicate full marks.**

Q.1. (A) State Central limit theorem and give its significance. (05)

(B) State the three axioms of probability. (05)

(C) State various properties of autocorrelation function and power spectral density function. (05)

(D) State and explain Bayes Theorem. (05)

Q.2. (A) A random variable has the following exponential probability density function: $f(x) = Ke^{-|x|}$. Determine the value of K and the corresponding distribution function. (10)

(B) A distribution has unknown mean μ and variance 1.5. Using Central Limit Theorem find the size of the sample such that the probability that difference between sample mean and the population mean will be less than 0.5 is 0.95. (10)

Q.3. (A) Explain Ergodicity in Random Process. (10)
A Random process is given by $X(t) = 10cos(50t + Y)$
where ω is constant and Y is a Random variable that is Uniformly distributed in the interval $(0, 2\pi)$. Show that $X(t)$ is a WSS process and it is Correlation ergodic.

(B) If X and Y are independent Random variables and if $Z=X+Y$, then show that the pdf of Z is given by the convolution of the pdf of X and pdf of Y. (10)

Q.4. (A) The transition probability matrix of Markov Chain is given by, (10)

$$P = \begin{array}{c} \\ 1 \\ 2 \\ 3 \end{array} \begin{array}{c} \begin{array}{ccc} 1 & 2 & 3 \end{array} \\ \begin{bmatrix} 0.5 & 0.4 & 0.1 \\ 0.3 & 0.4 & 0.3 \\ 0.2 & 0.3 & 0.5 \end{bmatrix} \end{array}$$

Find the limiting probabilities?

(B) Explain Strong law of large numbers and weak law of large numbers. (05)

(C) If A and B are two independent events then prove that $P(A \cap \overline{B}) = P(A).P(\overline{B})$ (05)

Q.5. (A) State and prove Chapman-Kolmogorov equation. (10)

(B) In a communication system a zero is transmitted with probability 0.4 and a one is transmitted with probability 0.6. Due to noise in the channel a zero can be received as one with probability 0.1 and as a zero with probability 0.9, similarly one can be received as zero with probability 0.1 and as a one with probability 0.9. If one is observed, what is the probability that a zero was transmitted? (10)

Q.6. (A) Explain power spectral density function. State its important properties and prove any two of the property. (10)

(B) Explain (i) M/G/1 Queuing system. (05)
(ii) M/M/1/∞ Queuing system.

(C) Write short notes on Gaussian distribution. (05)

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TE-sem-V – CBSGS – EXTC

21/5/19

(3)

Paper / Subject Code: 30603 / R F MODELING AND ANTENNAS

Q.P.Code: 37721

(3 Hours) [Total Marks 80]

N.B.: (1) Question **No. 1** is **compulsory.**
(2) Solve **any three** questions from the remaining **five**
(3) Figures to the right indicate full marks
(4) Assume suitable data if necessary and mention the same in answer sheet.

Q.1 Attempt **any four** out of the remaining **five** **[20]**
a) Explain Stripline and Microstrip line.
b) Compare Binomial filter with Chebyshev filter
c) Explain near field and far field radiation related to antenna.
d) Explain pattern multiplication for antenna array.
e) What are characteristics of Log periodic antenna ?

Q.2 a) Explain with equivalent circuits the RF behaviour of resistor, capacitor and inductor. **[10]**
b) Design a composite high pass filter by the image parameter method with the following specification. **[10]**
R_0=75 Ω, f_c=50 MHz, f_∞=48MHz

Q.3 a) Design a LPF whose input and output ports are matched to 50 Ω impedance with cutoff frequency of 3 GHz, equi ripple of 0.5 dB and rejection of atleast 40 dB at approx twice the cutoff frequency. **[10]**

b) Explain the following terms related to basic antenna concepts with relevant equations. **[10]**
[i] Gain and Directivity
[ii] Radiation Pattern
[iii] Radiation Resistance
[iv] Antenna Efficiency
[v] Effective aperture

Q.4 a) Derive radiation resistance of infinitesimal dipole. **[10]**

b) What is maximum power received at a distance of 0.75 Km over free space for 1 GHz frequency. The system consists of transmitting antenna with 3 dB gain and receiving antenna with 17dB gain and antenna is fed with 200 W power. **[10]**

Q.5 a) Explain working principle of Yagi-Uda antenna and draw its radiation pattern. Mention its applications. **[10]**
b) Draw the structure of Microstrip antenna. Discuss its characteristics, limitations and applications. **[10]**

Q.6 Write short notes on the following : **[20]**
a) Hazards of electromagnetic radiation
b) Friss transmission formula
c) Helical antenna
d) Principle of Parabolic reflector antenna