EXTC / Sem - V (CBSGS) / Microcontrollers & Applications

QP Code : 5621

(3 Hours) **[Total Marks : 80**

Notes: 1. Q.1 is compulsory.
2. Answer any **three** from Q.2 to Q.6

Q.1 a) List and explain design metrics of an Embedded system. 05
b) Explain pipeline stages used in ARM7 processor. 05
c) Draw format of IE SFR and write purpose of each bit in this SFR. 05
d) Explain Program status register of 8051 microcontroller. 05

Q.2 a) Interface stepper motor with 8051 microcontroller and write assembly language program to rotate it in clockwise direction. 10
b) Which are different core extensions used with ARM processor? Explain. 10

Q.3 a) Explain different addressing modes of ARM7 processor. 10
b) Discuss Digital camera as an embedded system. 10

Q.4 a) Design 8051 based system with following specifications 10
i) 8051 is working at 10 MHz.
ii) 8KB external Program memory using 4 KB chips.
iii) 16 KB external Data memory using 8 KB chips.
b) Write assembly language program to generate square wave with 50% duty cycle on pin P1.0 of 8051. 10

Q.5 a) Explain register organisation of ARM7. 10
b) Interface ADC 0808 with 8051 microcontroller and write assembly language program to convert analog signal which is available on channel no. 3 to digital and store digital value at memory location 30H. 10

Q.6 Write note on 20
a) Internal and external Program memory 8051
b) Current program status register of ARM7
c) Operating modes of ARM7 processor
d) Serial port modes of 8051

B.E. Sem-V-EXTC-CCBSGS) - Analog communicabons - Nov-15

Q.P. Code : 5705

(3 Hours) [Total Marks : 80

N.B. :1) Question No. 1 is **compulsory**.
2) Attempt any **three** questions out of the remaining **five** questions.
3) Assume suitable data is **necessary**.

1 Solve any four :
a) What is modulation ? Explain the need of modulation.
b) Explain Pre - emphasis and De - emphasis in FM. 20
c) Define sensitivity, selectivity,fidelity and image frequency in radio receiver.
d) What are the causes of fold over distortion or aliasing ? How can it be prevented or removed.
e) Explain companding in detail.

2 (a) Derive Friss formula for calculation of total noise figure, if two amplifiers are connected in cascade.
(b) Draw the block diagram of phase cancellation SSB generator and explain how carrier and unwanted sidebands are suppressed ? 10

3 (a) With the help of a neat block diagram explain the principle and generation of indirect method of FM generation. 10
(b) Draw and explain Adaptive delta modulation transmitter and receiver with its advantages. 10

4 (a) An AM transmitter radiates 5 MHZ carrier with 80KW power, carrier is modulated by 600HZ and 2 KHZ signals. 10
1. What will be the total modulation index if each signal modulates at 60 % of modulation ?
2. Determine the transmitted power. 10
3. Draw the frequency spectrum of modulated signal.
4. What is % of power saving if one of the sideband and carrier is suppressed?

(b) What is signal multiplexing ? Explain FDM in detail. 10

5 (a) Explain the operation of Foster Seeley discriminator with the help of circuit diagram and phasor diagram. 10

(b) Explain with block diagram and waveform of AM Super - heterodyne radio receiver. 10

6 Write a short notes on (solve any four) : 20

(a) Aliasing error and aperture effect.

(b) Applications of pulse communication.

(c) Practical diode detector.

(d) ISB receiver.

(e) Wide band FM and Narrow band FM.

BE - Sem - V - (BSAS) - EXTC - Random Signal Analysis - Nov. 15.

QP Code : 5579

Time 03 hours.

Max Marks: 80

Instructions to candidate

1. Q 1 is compulsory
2. Attempt any THREE from remaining
3. Figures to the right indicate full marks
4. Assume suitable data if necessary

1 a] Explain concept of power spectral density 5

b] state and prove Central Limit Theorem 5

c] Explain properties of cross correlation function 5

d]state and prove Bayes' theorem 5

2 a] Box 1 contains 5 white balls and 6 black balls. Box 2 contains 6 white & 4 black balls 10
A box is selected at random and then a ball is chosen at random from the selected Box (i)What is the probability that the ball chosen will be a white ball
(ii)Given that the ball chosen is white what is the probability that came from box1

b] Give the properties of CDF, pdf, and PMF. 10

3 a] Explain concept of conditional probability and properties of conditional probability 10

b] Explain what do you mean by? 03
(i)Deterministic system
(ii) stochastic system
(iii) Memoryless system

c] Prove that if input to memoryless system is strict sense stationary(SSS) process then output is also strict sense stationary 07

4 a] Explain Random process, define ensemble mean, Auto correlation, and Auto covariance of the process in terms of indexed random variables in usual mathematical forms 10

b] Let Z=X+Y Determine pdf of Z $f_Z(Z)$ 10

5a] state and prove Chapman Kolmogorov equation 10

b] Explain Chebyshev's inequality with suitable example. 10

TURN OVER

6] a] The joint probability density function of two random variables is given by

$F_{xy}(x,Y)=15\ e^{-3x-3y}$; $x\geq 0, y\geq 0$

i) Find the probability that $x<2$ and $Y>0.2$
ii) Find the marginal densities of X and Y
iii) Are X and Y Independent?
iv) Find E(x/y) and E(y/x) 10

b] Write short Notes on following special distributions

i)Poisson distributions ii) Rayleigh distributions iii) Gaussian distributions 10

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EXTC/ Sem- V(CBSGS)/ RF Modeling & Antennas

Q.P. Code : 5662

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question No. 1 is compulsory.
(2) Solve any three questions from the remaining.
(3) Assume suitable data wherever necessary and justify the assumption.
(4) Draw suitable diagrams wherever required.

1a. Explain hazards of electromagnetic radiation. 5

b. Find the attenuation of a 4 element 2.5 db ripple low pass Chebyshev filter at $\omega/\omega_c=2.5$ 5

c. What are isotropic pattern and Omnidirectional pattern.Give one example for each. 5

d. Explain near and far field radiation related to antenna

2a. Discuss design procedure for filter using image parameter method. 10

2b. 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

3a. Explain significance of retarded magnetic vector potential and retarded electric scalar potential. 10

3b. Derive radiation resistance of half wave dipole antenna and a monopole antenna 10

4a. Find the radiation pattern for an array of 4 elements fed with same amplitude and same phase.Find its HPBW and BWFN.

4b. State and prove Reciprocity theorem as applicable to antennas.

5a Design Dolph- TChebyshev array of 6 elements with spacing 'd' between elements with a major to minor lobe ratio of 26 dB. Calculate the excitation coefficients. 10

5b. Explain the structure of Microstrip antenna. Discuss its feed mechanisms and applications. 10

6 Write short notes on the following.
a. Log periodic antenna.
b. Schottky diode
c. Broad side and End fire array.
d.Feeding methods of Parabolic antenna.

T.E. / Sem-V / CBSGS / EXTC / Nov. Dec. 2015 / Integrated Circuits

QP Code : 5743

(3 Hours) **[Total Marks : 80**

N.B: (1) Question No. **1** is **compulsory**
(2) Solve any **3** from remaining **5** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Assume suitable **data** if **necessary** and mention the same in the answer sheet.

1. Solve any **five** : **20**
   (i) Differentiate between synchronous counters and ripple counters.
   (ii) Differentiate between inverting and non-inverting amplifier.
   (iii) Design first order non-inverting low pass filter to provide cutoff frequency of 10KHz.
   (iv) Explain 7490 decade counter.
   (v) Design voltage regulator to provide output voltage equal to 5V and load current 1 Amp using IC 7805.
   (vi) With the help of neat circuit diagram explain any one application of PLL565.

2. (a) What is a precision rectifier ? Draw the diagram for a full wave precision rectifier. With the help of waveforms at different points in the circuit explain its working. **10**
   (b) With the help of a neat circuit diagram explain working of RC phase shift Oscillator. **10**

3. (a) Draw functional block diagram of IC723 and explain its working as low voltage regulator and high voltage regulator. **10**
   (b) With the help of neat circuit diagrams explain how analog multiplier AD 534 can be utilised for : **10**
      (i) analog division and
      (ii) Square root extraction.

4. (a) Draw and explain the functional diagram of IC555 and explain its operation in astable mode. **10**
   (b) Explain working of : **10**
      (i) logarithmic amplifier and
      (ii) Anti logarithmic amplifier with the help of circuit diagram.

5. (a) With the help of a neat circuit diagram explain the working of Universal shift register IC74194 as a 4bit, 4-state Ring counter with a single circulating 'I' . 10

(b) With the help of a neat circuit diagram explain the working of 74163 synchronous 4 bit binary coutner. Also illustrate the cascading connections for 74163 based coutners. 10

6. Write short notes on any **four** : 20

(i) 74181 Arithmetic Logic Unit
(ii) Instrumentation Amplifier
(iii) Switching Regulator
(iv) Voltage to frequency converter
(v) Triangular wave generator.
