AKTC KALSEKAR TECHNICAL CAMPUS

INNOVATIVE TEACHING   EXUBERANT LEARNING

Knowledge Resource & Relay Centre (KRRC)

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

School: __SoET-CBCS__   Branch: __EXTC__   SEM: __VI__

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 SC	Format HC	No. of Copies
1	Microcontrollers & Applications	ETC601		✓	02
2	Computer Communication Networks	ETC602		✓	02
3	Antenna & Radio Wave Propagation	ETC603		✓	02
4	Image Processing and Machine Vision	ETC604		✓	02
5	Department Level Optional Course II Digital VLSI design	ETC605		✓	02

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)

Librarian, AIKTC

Time: Hours   **Marks: 80**

- Question no. 1 is compulsory
- Attempt any Three questions in remaining
- Assume suitable data where necessary

Q1 a) Explain Program Status word Register of 8051 Microcontroller   [5]
     b) Explain any five Addressing modes of 8051 with one example in each   [5]
     c) Write short notes on CPSR of ARM7   [5]
     d) Differentiate between ARM and THUMB state.   [5]

Q2 a) Explain Internal RAM Organization of 8051 Microcontroller   [10]

     b) Write a program for 8051 microcontroller to generate square waveform of 2kHz &   [10]
         50% duty cycle at pin P2. Assume 8051 is operating at frequency 11.059MHz.
         Use hardware timer 0 and 1 to generate delay.

Timer1				Timer0			
GATE	C/T̄	M1	M0	GATE	C/T̄	M1	M0
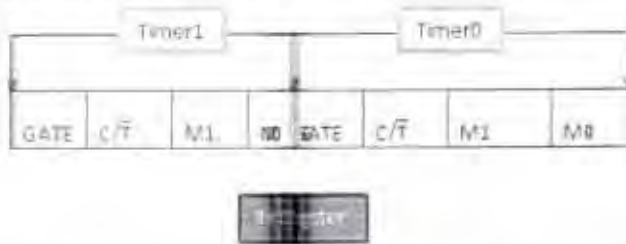
Q3 a) Explain Interrupts in 8051 along with Interrupt vector table.   [10]
     b) Explain LCD interfacing with 8051 and write assembly language program to   [10]
         display message "HI" and draw the connection diagram of 8051 with LCD.

Q4 a) Explain in detail 8051 Timer operating modes   [10]
     b) Draw & Explain dataflow model of ARM7   [10]

Q5 a) Explain Operating modes of ARM7 Processor   [10]
     b) Explain Addressing modes of ARM7 Processor with examples   [10]

Q6 a) Explain following instructions of ARM7 processor with example
         1. ADD r0, r1, r1, LSL   [10]
         2. STR r0, [r1]
         3. LSR r0,#2
         4. LDR r0,[r1,#2]
         5. CMP r0,r1,LSR#

     b) Write embedded C language program to blink LED at P0.16 with certain delay.   [10]
         Use Software approach to generate delay.

(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 4 questions   [20]
     a) Compare circuit switching and packet switching.
     b) Illustrate byte count framing method in Data link Layer.
     c) Explain the tools to achieve Error control in TCP.
     d) How the medium access with Collision avoidance (MACA) protocol works
        in wireless LAN?
     e) Describe Border Gateway protocol (BGP) as a inter-domain Routing
        protocol?

Q.2 a) Explain Link state Routing protocol with the help of building of Link state   [10]
        packets and distribution of link state packets.
     b) Explain HDLC frame format. Describe configuration and response modes   [10]
        supported by HDLC protocol.

Q.3 a) Draw TCP header and explain the meaning of various fields associated with   [10]
        it.
     b) What are the different types of CSMA protocols? Explain 1-persistant   [10]
        CSMA protocol.

Q.4 a) The following is a dump of a UDP header in hexadecimal format.   [10]
                            CB84000D001C001C
        (i)   What is the source port number?
        (ii)   What is the destination port number?
        (iii) What is the total length of the user datagram?
        (iv)   What is the length of the data?
        (v)   Is the packet directed from a client to a server or vice versa?
     b) Explain Go back N protocol with suitable diagram.   [10]

Q.5 a) Explain the function of Repeater, hub, bridge, routers and switches in   [10]
        details and mention in which layer they work.
     b) A company is granted the site address 181.56.0.0 (class B). The company   [05]
        needs 1000 subnets. Design the subnets.
     c) A bit stream **10011001 11100010 00100100 10000100** is transmitted to the
        receiver. Apply checksum error detection scheme and check whether data   [05]
        will be accepted at receiver or not?

Q.6 Short notes on: (Attempt any four)   [20]
        a) IPv4 datagram
        b) Point to Point Protocol (PPP)
        c) Digital Subscriber Line (DSL)
        d) OSI Model
        e) Adaptive tree walk Protocol
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(3 Hours)   (Maximum Marks 80)

NB   1. Question No. 1 is Compulsory.

2. Attempt any 3 questions out of remaining 5.

3. Assume suitable data if necessary.

4. Figures to the right indicate the maximum marks.

Q.1 a) A lossless resonant half-wavelength dipole antenna, with input impedance of 73 ohms, is connected to a transmission line whose characteristic impedance is 50 ohms. Assuming that the pattern of the antenna is given approximately by $U = B_o Sin^3\theta$. find the maximum absolute gain of this antenna.

b) List salient features of Microstrip antenna.

c) Draw current distribution and radiation pattern of $0.1\lambda, 0.5\lambda, \lambda$ and 3λ simple dipole antenna.

d) What is grating lobe in broadside and end-fire array antenna, how it can be minimized in both.

Q2 a). What is the significance of beamwidth of antenna? If HPBW of directional antenna in E-plane and H-plane is 30^0 and 45^0 respectively. calculate directivity and gain of the same antenna. (Assume radiation efficiency =55%)

b) With neat sketch explain parabolic reflector antenna. List feed mechanism used.

Q.3 a) Derive expressions of radiation resistance of half wavelength dipole antenna. Why, actual length of half wavelength dipole antenna is lies between 0.47λ to 0.48λ instead of 0.5λ.

b) With neat diagram derive important parameters of helical antenna in axial mode. What is the effect of change in length and circumference of the same on the radiation pattern?

Q.4 a) What is pattern multiplication of array antenna, if two isotropic point sources of array are $\lambda/4$ distance apart and if they fed with equal amplitude and $\pi/2$ phase, draw radiation pattern of the same.

b) Design 10-element binomial array with a spacing of $\lambda/2$ between the elements. Determine amplitude distribution of all elements; also calculate the half-power beamwidth (in degrees) and the maximum directivity (in dB).

Q.5 a) Design rectangular microstrip antenna for 2.4 GHz frequency application using Rogers RT/Duroid 5880 substrate with thickness of 1.6 mm.

b) Describe formation of ionized layer in the ionosphere and describe their importance in radio communication. Define critical frequency.

Q.6 Write short notes on (any four)

a) Polarization measurements.

b) Ground wave propagation.

c) Phased (Scanning) Array.

d) Log-periodic antenna.

e) Horn antenna.

67906

17E36DB05955128D9E32F0CE5FF60044

Time: 3 Hrs   Total marks: 80

Instructions

1. Q1 is compulsory
2. Solve any 3 from remaining
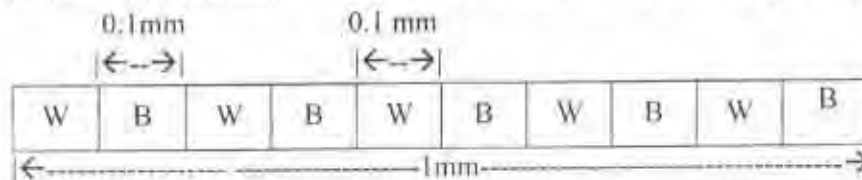3. Assume suitable data if necessary

Q1 Answer the following

1. Identify the noise in following image and remove it by filtering   4M

19	0	20	21
21	150	25	26
22	23	24	27

2. For given figure. Improve and reduce the spatial resolution, consider W= White line, B = Black line. Size of each white and black line is 0.1 mm, total length is 1 mm.   4M

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        0.1mm              0.1 mm
       |←--→|             |←--→|
   ┌─────┬─────┬─────┬─────┬─────┬─────┬─────┬─────┬─────┬─────┐
   │  W  │  B  │  W  │  B  │  W  │  B  │  W  │  B  │  W  │  B  │
   └─────┴─────┴─────┴─────┴─────┴─────┴─────┴─────┴─────┴─────┘
   |←--------------------- 1mm ----------------------→|
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3. Explain the steps in digital image processing   4M
4. Write Hadamard transform matrix for N=4 and its application   4M
5. Explain the effect of illumination in thresholding   4M

Q2

1. Find Haar basis for N=4   10M
2. Explain image enhancement using frequency domain filtering   10M

Q3

1. For given image find and equalize histogram   07M

10	12	8	9
10	12	12	14
12	13	10	9
14	12	10	12

1. Apply Averaging filter on given image Use pixel replication for padding.   05M

4	8	9
12	15	18
30	32	46

2. Explain 1) Sharpening using 2nd order derivative 2) Unsharp masking and high boost filtering   8M

Q4

1. Draw PDF and write equation for following noise models   04M
    a) Gaussian Noise   b) Rayleigh noise
2. Find the chain code, shape number for given image using 8-connectivity. Use anti-clockwise direction. (Arrow shows starting point)   6M

3. Find the border for image F given below using 2 different structural elements A and B respectively   10M

Q5

1. Explain SVM in detail?   10M
2. Explain canny edge detection algorithm with proper steps   10M

Q6   Write Short Notes on any 2 of the following   20M
    1. Geometric border representation
    2. B-spline algorithm
    3. Statistical texture description methods

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TE-Sem-VI - Choice based - EXTC

Paper / Subject Code: 88945 / Elective - II Digital VLSI Design

3/6/19

(3 Hours)   Total Marks: 80

N.B.: (1) Question No. 1 is **compulsory**.
      (2) Solve any **three** from remaining **five** questions.

Q1.	a)	Compare FPGA and CPLD	04
	b)	Draw carry circuit for 3-bit CLA adder using MOS	04
	c)	Draw layout for inverter using lambda rules	04
	d)	Draw D flip flop and write HDL program for it	04
	e)	Explain clock distribution scheme	04

Q2. a) Implement full adder circuit using CMOS   05
    b) Design circuit for 4-bit Carry skip adder   05
    c) Implement $Y = \overline{AB.(C + DE)}$ using following design styles   10
        1) Static CMOS 2) Dynamic CMOS 3) Clocked MOS(C2MOS) 4)Pseudo NMOS

Q3. a) Draw 4-BIT ripple carry adder using Full adder and Write program for it using HDL   10
    b) Design Sum of absolute differences using RTL design technique. Draw HLSM, Datapath , Interface and Controller FSM   10

Q4. a) Explain SRAM and its operation with proper diagram   10
    b) Draw 4x4 bit NOR based ROM array to store the following data in respective memory locations   10

Memory Address	Data
1000	0111
0100	0101
0010	0110
0001	1001

Q5. a) Design RTL for Serial FIR filter. Draw HLSM, Datapath and FSM   10
    b) Implement clocked J-K latch using CMOS and draw layout for it using Lambda design rules   10

Q6. Write short notes
    (a) ESD Protection   05
    (b) Clock Generation   05
    (c) Interconnect delay model   05
    (d) Flash Memory   05

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