Sem III Comp/IT (rev)
(rev)

31/05/14

AM III

QP Code : NP-18619

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

N.B. : (1) Question No.1 is **compulsory.**
(2) Attempt any **three** questions from Question No.2 to Question No.6.
(3) Non-programmable **calculator** is **allowed.**

1. (a) Find $L^{-1}\left[\frac{Se^{-\pi s}}{S^2+2S+2}\right]$ 5

(b) State true or false with proper justification "There does not exist an analytic function whose real part is $x^3 - 3x^2y - y^3$". 5

(c) Prove that $f_1(x) = 1$, $f_2(x) = x$, $f_3(x) = \frac{(3x^2-1)}{2}$ are orthogonal over $(-1, 1)$. 5

(d) Using Green's theorem in the plane, evaluate $\int_c (x^2 - y)dx + (2y^2 + x)dy$ around the boundary of the region defined by $y = x^2$ and $y = 4$. 5

2. (a) Find the fourier cosine integral representation of the function $f(x) = e^{-ax}, x > 0$ and hence show that $\int_0^\infty \frac{\cos ws}{1+w^2}dw = \frac{\pi}{2}e^{-x}, x \geq 0$. 6

(b) Verify laplaces equation for $U = \left(r + \frac{a^2}{r}\right)\cos\theta$ Also find V and f(z). 6

(c) Solve the following eqn. by using laplace transform $\frac{dy}{dt} + 2y + \int_0^t ydt = \sin t$ given that $y(o) = 1$. 8

3. (a) Expland $f(x)=\begin{cases}\pi x, & 0<x<1\\ 0, & 1<x<2\end{cases}$ with period 2 into a fourier series. 6

(b) A vector field is given by $\bar{F}=\left(x^2+xy^2\right)i+\left(y^2+x^2y\right)j$ show that $\bar{F}$ is irrotational and find its scalar potential. 6

(c) Find the inverse z - transform of - 8

$$f(z)=\frac{z+2}{z^2-2z+1},\ |z|>1$$

4. (a) Find the constants 'a' and 'b' so that the surface $ax^2 - byz = (a + 2)x$ will be orthogonal to the surface $4x^2y + z^3 = 4$ at (1, -1, 2) 6

(b) Given $L\left(\text{erf}\sqrt{t}\right)=\frac{1}{S\sqrt{S+1}}$, evaluate $\int_0^\infty t.e^{-t}\text{erf}\left(\sqrt{t}\right)dt$ 6

(c) Obtain the expansion of $f(x) = x(\pi - x)$, $0 < x < \pi$ as a half-range cosine series. 8

Hence show that - (i) $\sum_1^\infty \frac{(-1)^{n+1}}{n^2}=\frac{\pi^2}{12}$

(ii) $\sum_1^\infty \frac{1}{n^4}=\frac{\pi^4}{90}$

5. (a) If the imaginary part of the analytic function W=f(z) is $V=x^2-y^2+\frac{x}{x^2+y^2}$ find the real part U. 6

(b) If $f(k) = 4^k U(K)$ and $g(k) = 5^k U(K)$, then find the z- transform of $f(k)\cdot g(k)$ 6

(c) Use Gauss's Divergence theorem to evaluate $\iint_S \bar{N}\cdot\bar{F}\,ds$ where $\bar{F}=4xi+3yj-2z\hat{k}$ and S is the surface bounded by x = o, y = 0, z = 0 and 2x + 2y + z = 4. 8

6. (a) Obtain complex form of Fourier series for $f(x) = \cosh 3x + \sin h\, 3x$ in $(-3, 3)$. 6

(b) Find the inverse Laplace transform of $\frac{(s-1)^2}{(s^2-2s+5)^2}$ 6

(c) Find the bilinear transformation under which 1, i, -1 from the z-plane are mapped onto 0, 1, ∞ of w-plane. Also show that under this transformation the unit circle in the w-plane is mapped onto a straight line in the z-plane. Write the name of this line. 8

SE (computer) sem III (CBSGS) (51)

ECCF. 22.05.14.

QP Code : **NP-18652**

(3 Hours) [Total Marks : 80

N. B. : (1) Questions No. 1 is compulsory.
(2) Solve **any three** questions out of remaining questions.
(3) Draw neat and clean diagrams.
(4) **Assume** any suitable **data** if required.

1. (a) Explain input offset voltage, CMRR and SVRR for operational amplifier. 5
   (b) Explain Barkhausen's criteria for principle of oscillation. 5
   (c) Explain principle of FDM. 5
   (d) Compare FM and AM. 5

2. (a) Sketch a typical drain characteristics for $V_{GS} = 0$ for an n-channel JEFET. Explain the shape of the characteristics, identify regions and indicate the important current and voltage levels. 10
   (b) Explain class C BJT power amplifier in detail. Compare it with class A BJT power amplifier. 10

3. (a) Explain amplitude modulation for more than one modulating signal in following cases 10
   (i) Mathematical equation
   (ii) AM waveform
   (iii) Am amplitude and power spectrum
   (iv) Modulation coefficient
   (v) Transmission power
   (b) Explain with block diagram AM superheterodyne receiver. 10

4. (a) Explain ideal as well as practical differentiator wing operational amplifier in detail. 10
   (b) The antenna current of an AM broadcast transmitter, modulated to a depth of 40% by an audio sine wave is 11 A. It increases to 12 A as result of simultaneous modulation by another audio sine wave. What is the modulation index due to this second wave? 10

5. (a) State sampling theorem. What happens if the sampling is done at less than $2f_{max}$. 10
   (b) What is multiplexing in communication system? Draw black diagram of TDM-PCM System and explain?. 10

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Con. 11450-14.

6. (a) Explain PLL as a frequency synthesizer. 5
   (b) Explain operating principle of PLL. 5
   (c) List different types of ADC's and explain binary weighted ADC in detail. 10

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S.E. (COMP.), Sem. III (CBSGS) 03/06/2014

DLDA.

QP Code : NP-18720

(3 Hours) [Total Marks : 80

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

1. (a) Perform following without converting into other bases. 5
   (i) $(57)_8 * (24)_8$ (ii) $(312{\cdot}0)_4 + (213{\cdot}2)_4$
   (b) Define following Parameters for CMOS family :— 5
   (i) Fan out (ii) Fan in.
   (c) Design a full adder using half adder and additional gates. 5
   (d) Explain concept of bistable multivibrators. 5

2. (a) Using Quine MC Clusky method determine minimal SOP form for : 10
   $F(A, B, C, D) = \Sigma m\ (1, 2, 3, 6, 7, 10, 12, 14)$
   (b) Obtain even Parity hamming code for 1010. Prove that hamming code is an error detecting and correcting code. 10

3. (a) Explain the operation of 4-bit universal shift register. 10
   (b) Design a 2-bit digital comparator that accepts inputs A and B and gives three outputs G, E and L. 10
   (i) Output G, when A > B
   (ii) Output E, when A = B
   (iii) Output L, when A < B.

4. (a) Implement the following using 8:1 Mux. 10
   $F(A, B, C, D) = \pi M(1, 3, 5, 9, 11, 12, 13)$.
   (b) Simplify following function using k-map. 10
   $F(A, B, C, D) = \Sigma m\ (1, 2, 3, 4, 6, 8, 10, 14, 15)$

5. (a) Design a sequence generator for following sequence. Identify and check for lock out condition 10
   $0 \rightarrow 3 \rightarrow 5 \rightarrow 6 \rightarrow 0$.
   (b) Explain 4-bit Johnson counter. Draw its timing diagram. 10

6. Attempt any **two** :— 20
   (a) Working of Master-Slave J-K flip flop.
   (b) Details and comparison of FPGA and CPLD.
   (c) Convert the following :—
   (i) SR to JK (iii) JK to D
   (ii) SR to D (iv) JK to SR.

SE (comp) sem III 28.5.14

DS

QP Code : NP-18681

(3 Hours) [Total Marks :80

N.B. : (1) Question no. **1** is **compulsory.**
(2) Solve any **3** questions from remaining questions.
(3) Assume suitable data whereever **necessary.**

1. (a) Explain different types of data structures with example. **5**
   (b) Write recursive & non-recursive functions to calculate GCD of 2 numbers. **5**
   (c) Show with example how graphs are represented in computer memory. **5**
   (d) Discuss practical application of trees. **5**

2. (a) What is hashing? What is mean by collision? Using modulo division method & linear probing, store the values given below in array with 10 elements. **10**
   99 33 23 44 56 43 19.
   (b) Write a program in 'C' to convert infix expression to postfix expression using stacks. **10**

3. (a) Write a program in 'C' to perform Quick sort. show steps with example. **10**
   (b) Write a program in 'C' which will read a text and count all occurrences of a particular word. **10**

4. (a) Write a program in 'C' to implement circular queue using Link-list. **10**
   (b) Construct Binary tree for the pre order & Inorder traversal sequences: **10**

Preorder:	A	B	D	G	C	E	H	I	F
Inorder:	D	G	B	A	H	E	I	C	F

5. (a) Write a program in 'C' to implement Doubly Link-list with methods insert, delete and search. **10**
   (b) Write a program in 'C' to implement Binary search on sorted set of integers. **10**

6. Write short note on:—
   (a) Discuss Threaded Binary tree in detail. **10**
   (b) Explain BFS algorithm with example. **10**

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Con. 11971-14.

Sem III Comp (old) 31/05/14

AM III

(OLD COURSE) QP Code : **MV-17871**

(3 Hours) **[Total Marks : 100**

NB 1. Question No.I is compulsory
2. Attempt any four from the remaining six questions
3. Figures to the right indicate full marks

Q1 a Find Fourier Series for $f(x)=x^2$ in $(-\pi,\pi)$ [20]

b Express the given matrix A= $\begin{bmatrix} -1 & 2+i & 5-3i \\ 2-i & 7 & 5i \\ 5+3i & -5i & 2 \end{bmatrix}$ as sum of Hermitian and Skew-Hermitian matrices.

c. Find Laplace Transform of $(e^t.\cos t)^2$

d Find Z transform of the sequence $f(k)=(1/3)^k, k\geq 0$

Q2 a Find Laplace Transform of $f(t)=\begin{cases} a\sin pt\ ; & 0<t<\pi/p \\ 0 & ;\pi/p<t<2\pi/p \end{cases}$, $f(t+2\pi/p)=f(t)$ [6]

b Reduce to normal form and find rank of A= $\begin{bmatrix} 1 & 3 & 5 & 7 \\ 4 & 6 & 8 & 10 \\ 15 & 27 & 39 & 51 \\ 6 & 12 & 18 & 24 \end{bmatrix}$ [6]

c Find Fourier Series of $f(x)=\begin{cases} x & ;\ 0\leq x\leq \pi \\ 2\pi-x & ;\ \pi\leq x\leq 2\pi \end{cases}$. Hence deduce that $\sum_{n=0}^{\infty}\frac{1}{(2n+1)^2}=\frac{\pi^2}{8}$ [8]

Q3 a Find Fourier Sine Integral of $f(x)=\begin{cases} \sin x & 0\leq x\leq \pi \\ 0 & x>\pi \end{cases}$ [6]

b Evaluate the integral $\int_0^{\infty}\frac{\sin^2 t.e^{-t}}{t}dt$ [6]

c For what value of k, the following equations are consistent?

$x-3y+2z=4,\ 2x+y-z=1,\ 3x-2y+z=k$. Solve the system completely [8]

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Q4 a Show that the functions $1, x, \frac{3x^2-1}{2}$ are orthogonal on (-1,1). [6]

b Find Inverse Laplace Transform using Convolution Theorem $\frac{s}{(s^2+a^2)(s^2+b^2)}$ [6]

c Find half range sine series of $f(x)=lx-x^2$ in $(0,l)$ and hence prove that

$$\frac{1}{1^6}+\frac{1}{3^6}+\frac{1}{5^6}+\ldots=\frac{\pi^6}{960}$$ [8]

Q5 a Find Inverse Z transform of $\frac{2z^2-10z+13}{(z-2)(z-3)^2}$, $2<|z|<3$ [6]

b Find non-singular matrices P and Q such that PAQ is in the Normal form of A.

Hence find Rank of $A=\begin{bmatrix}3 & 2 & -1 & 5\\ 5 & 1 & 4 & -2\\ 1 & -4 & 11 & -19\end{bmatrix}$ [6]

c Solve the Differential Equation using Laplace Transform
$y''+4y'+8y=1$ $y(0)=0, y'(0)=1$ [8]

Q6 a Find the Complex form of Fourier series of $\cosh 2x+\sinh 2x$ in [-2,2] [6]

b Show that the given vectors are Linearly Dependent and find the relation connecting them [6]
$X_1=(1\ \ 1\ \ 1\ \ 3), X_2=(1\ \ 2\ \ 3\ \ 4), X_3=(2\ \ 3\ \ 4\ \ 7)$

c Find Inverse Laplace Transform of the following functions

1) $\frac{e^{-2s}}{s^2+8s+25}$ 2) $\frac{s+2}{s^2-4s+13}$ [8]

Q7 a Determine a,b,c when $\frac{1}{3}\begin{bmatrix}a & b & c\\ -2 & 1 & 2\\ 1 & -2 & 2\end{bmatrix}$ is Orthogonal. Hence find Inverse of A. [6]

b Find $Z\{f(k)*g(k)\}$ if $f(k)=\frac{1}{3^k}, g(k)=\frac{1}{5^k}$ [6]

c Find Half Range Cosine Series for $f(x)=\sin x$ in $(0,\pi)$. Hence deduce that

$$\frac{1}{1\cdot 3}-\frac{1}{3\cdot 5}+\frac{1}{5\cdot 7}-\ldots\ldots=\frac{\pi-2}{4}$$ [8]

SE (Comp) Sem III (old)

DSF

QP Code : **MV-17939**

(OLD COURSE)

28/5/14

(3 hours) [Total Marks : 100

N.B.: (1) Question no. **1** is **compulsory**.
(2) Solve any **four** out of remaining **six** questions.
(3) Assume **suitable** data wherever **necessary**.

1. (a) Explain Linear and non-Linear data structure with example. **5**
   (b) Compare iteration and recursion. **5**
   (c) Write a program in java which will read a text and count all occurrence of particular word. **10**

2. (a) Explain different representation of graph with its advantages and disadvantages. **10**
   (b) Write a program in java to sort given n integer number using Quick Sort. Show the steps to sort the following numbers :– **10**
   [44, 33, 11, 55, 77, 90, 40, 60, 99, 22, 88, 66]

3. (a) What is hashing. Show the hash table (size = 11) entries for the given dataset using linear Probing, quadratic probing and double hasting. **10**
   7, 10, 0, 3, 28, 48, 5, 99, 23, 33.
   (b) Write a program in java to implement conversion of given number to its equivalent binary form using stack. **10**

4. (a) Explain priority queue with example. Give applications of priority queue. **10**
   (b) Write a program in java to delete a node from a binary tree. Show all possible cases. **10**

5. (a) A binary tree has 7 nodes. The pre-order and post-order traversal of the tree are given below. Draw the tree :– **10**
   Pre-order : GFEDABEC
   Post-order : ABDCEFG
   (b) Write a program in java to create single linked list ADT. ADT should support the following functions :– **10**
   (i) Create linked list
   (ii) Insert node at first
   (iii) Display linked list.

6. (a) Discuss Threaded binary tree in detail. **10**
   (b) Explain the method of Huffman encoding. Apply Huffman encoding method for the word. "MALAYALAM." **10**

7. Write short notes on (any **two**) :– **20**
   (a) Circular Queue
   (b) Infix, prefix and postfix expression
   (c) Array implementation using linked list
   (d) B+ tress and B– trees.

Con. 11983-14.

S.E. (COMP), Sem. III – (OLD) 03/06/2014

DLDA.

(OLD COURSE) **QP Code : MV-17972**

(3 Hours) **[Total Marks : 100**

N. B. : (1) Questions **no. 1** is **compulsory.**
(2) Solve **any four** questions out of the remaining.
(3) Figures to the right indicate **full marks.**
(4) Assume **suitable** data is **required.**

1. (a) Find binary, octal and hexadecimal equivalent for the following numbers 4
   (i) $(32)_{10}$ (ii) $(51)_{10}$
   (b) Perform the following subtraction using TWO's complement method 4
   (i) $(11011)_2 - (1111)_2$ (ii) $(15)_{10} - (12)_{10}$
   (c) Perform the following operation 4
   (i) $(53.23)_8 + (24.56)_8$ (ii) $(FFAB)_{16} + (9A57)_{16}$
   (d) Express the following numbers in Gray code 4
   (i) $(25)_{10}$ (ii) $(11010111)_2$
   (e) Universal Properties of NAND gates. 4

2. (a) Explain the following characteristics with respect to logic families — Propagation Delay, Noise margin, Current parameters, Fan in and Fan out. 10
   (b) Draw a Two input TTL NAND gate circuit. Discuss the operation and draw its transfer characteristics. 10

3. (a) Convert JK Flip Flop to T and SR Flip Flop to D. 10
   (b) Find the reduced logical expression using Quine McClusky method 10
   $F(A, B, C, D) = \Sigma m(0, 2, 4, 6, 7, 8, 10, 12, 14, 15)$

4. (a) For the following function find the reduced expression in SOP form and implement using NAND gates only 10
   $F(A, B, C, D) = \Sigma m(0, 1, 2, 3, 8, 9, 10, 11, 13, 15)$
   (b) Design ful ladder using decoders. 10

5. (a) Design a lockout free Mod 8 Synchronous Up counter using MS-JK Flip Flops 10
   (b) Implement 10
   $F(A, B, C, D) = \Sigma m(0, 1, 2, 3, 4, 6, 7, 9, 10, 11, 12, 13, 15)$ using
   (i) one 8 : 1 multiplexer
   (ii) 4 : 1 multiplexers tree

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Con. 12808-14.

QP Code : MV-17972

6. (a) Design a Binary to Gray code converter **10**
   (b) Design a two bit digital comparator and implement using minimum number of Gates. **10**

7. Write short notes on: (any **four**) **20**
   (i) Weighted and unweighted codes
   (ii) BCD adder
   (iii) Boolean Algebra
   (iv) Universal Shift Register
   (v) Asynchronous and Synchronous Sequential Circuits
   (vi) Race around condition in JK Flip Flop

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Con. 12808-14.