Sem. III (CBSGS) IT (CBSGS) 12/05/17

App. Maths - III

Q.P. Code : 540702

Total Marks:80
Duration: 3Hrs

NB 1. Question No.1 is compulsory

2. Attempt any three from the remaining six questions

3. Figures to the right indicate full marks

Q1a If the Laplace Transform of $e^{-t}\int_0^t u\cos 2u\,du$ [20]

b Prove that $f(z)=\sinh z$ is analytic and find its derivative

c Obtain Half range Sine Series for $f(x)=x+1$ in $(0,\pi)$

d Find a unit vector normal to the surface $x^2y+2xz=4$ at $(2,-2,3)$

Q2 a Prove that $\overline{F}=(2xy^2+yz)i+(2x^2y+xz+2yz^2)j-(2y^2z+xy)k$ is Irrotational.

Find Scalar Potential for $\overline{F}$ [6]

b Find the inverse Laplace Transform using Convolution theorem

$$\frac{(s-1)^2}{(s^2-2s+5)^2}$$ [6]

c. Find Fourier Series of $f(x)=\begin{cases}\pi x; 0\le x\le 1\\ \pi(2-x); 1\le x\le 2\end{cases}$ [8]

Q3 a Find the Analytic function $f(z)=u+iv$ if $v=\frac{x}{x^2+y^2}+\cosh x\cos y$ [6]

b Find Inverse Z transform of $\frac{(3z^2-18z+26)}{(z-2)(z-3)(z-4)}$, $3<|z|<4$ [6]

c Solve the Differential Equation $\frac{d^2y}{dt^2}+2\frac{dy}{dx}+2y=5\sin t$, $y(0)=0$, $y'(0)=0$ using Laplace Transform [8]

Q4 a Find the Orthogonal Trajectory of $3x^2y-y^3=k$ [6]

b Find the Z-transform of $2^K\sinh 3K$, $K\ge 0$ [6]

c Express the function $f(x)=\begin{cases}1 & ;|x|<1\\ 0 & ;|x|>1\end{cases}$ as Fourier Integral. Hence evaluate $\int_0^\infty \frac{\sin\lambda}{\lambda}\cos(\lambda x)\,d\lambda$ [8]

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Q5 a Evaluate using Stoke 's theorem $\int_c (2x - y)dx - yz^2 dy - y^2 z dz$ where C is the circle $x^2 + y^2 = 1$ corresponding to the sphere $x^2 + y^2 + z^2 = 1$ above the XY plane [6]

b Show that $w = \frac{2z+3}{z-4}$ maps the circle $x^2 + y^2 - 4x = 0$ into straight line $4u + 3 = 0$ [6]

c Find Inverse Laplace Transform *i)* $e^{-s} \tanh^{-1} s$ ii) $\frac{6}{(2s+1)^3}$ [8]

Q6 a Find the Laplace transform of $f(t) = \frac{2t}{3}, 0 \le t \le 3, f(t+3) = f(t)$ [6]

b Find Complex Form of Fourier Series for $\sin(\alpha x)$; $(-\pi, \pi)$, α is not an integer [6]

c Verify Green's theorm for $\int_c (2x^2 - y^2)dx + (x^2 + y^2)dy$ where C is the boundary of the surface enclosed by lines x=0,y=0,x=2,y=2 [8]

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Sem-III I.T(CBSGS) 18/05/2017

PADC

Q.P. Code : 552202

(3 Hours) [Total Marks : 80]

Note: 1) Question **No.1** is **compulsory.**
2) Out of remaining attempt **any three**.
3) Assume & mention suitable data wherever required.
4) **Figures** to **right** indicates **full marks**.

1. Solve **any four** **20**
   a) Compare analog and digital communication system.
   b) Define modulation. Explain and justify any two need of modulation.
   c) Explain in brief Pre-emphasis and De-emphasis in FM.
   d) Explain in brief the process of quantization.
   e) What is line coding. Draw the NRZ and Manchester signal for the following binary signal 10111010.

2 a) Explain the term thermal noise. Prove that the noise voltage $V_n = \sqrt{4kTBR}$ For electronic device operating at a temperature of 17°C with a bandwidth of 10 KHz, determine **10**
1. Thermal noise power in dBm. 2. RMS noise voltage for a 100 Ω internal resistance and a 100 Ω load resistance.

   b) State and prove time scaling property of Fourier transf01m. Determine the Fourier transform for a rectangular pulse of amplitude 'A' and time period 'T' is from-T/2 to+ T/2 **10**

3. a) An AM signal appears across a 50 Ω load and has the following equation $v(t)= 12(1+ \sin 12.566 \times 10^3 t) \sin 18.85 \times 10^6 t$ volts **10**

   i) Sketch the envelope of this signal in time domain.
   ii) Calculate modulation index, sideband frequencies, total power and bandwidth.

   b) What are the limitations of TRF' receiver. Explain how these limitations are avoided using super heterodyne receiver. **10**

4. a) With the help of neat circuit diagram explain the working of Ratio detector. **10**
   b) What is multiplexing in communication system. Draw and explain in briefthe transmitter and receiver of FDM. **10**

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5. a) State and prove sampling theorem for low pass band limited signal .Explain aliasing error. **10**

   b) What are the various pulse modulation techniques? Explain how PPM is obtained from PWM. **10**

6. a) Explain in brief the generation and detection of Delta modulation. **10**

   b) Explain the generation and detection of ASK signal with block diagram and waveforms. **10**

Sem III I.T (CBGS)

Q. P. Code : 552501

06/06/17

(Time: 3 Hrs) **Marks: 80**

N.B. : 1. Question no. 1 is **compulsory**.
2. Solve any **Three** questions out of remaining **Five** questions.

Qu-1 a) Explain Transaction state diagram. **5**

b) Describe View and Trigger. **5**

c) Discuss different Users of Database system. **5**

d) Explain different types of attributes in ER Model. **5**

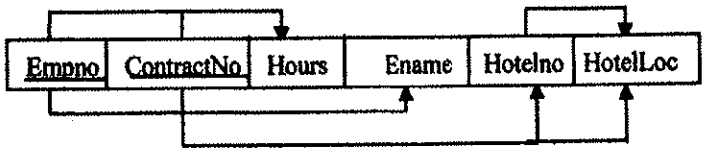
Qu-2 a) Explain the algorithm to map ER and EER model to relational model in detail **10**

b) Explain steps in Query Processing. **10**

Qu-3 a) What is Conflict Serializability? How precedence graph is used to check whether the schedule is conflict serializable or not? **10**

b) Explain DML and DDL commands with syntax. **10**

Qu-4 a) Consider the following dependency diagram of relation R and Normalize till 3NF **10**



b) Discuss fundamental operations in relational algebra. **10**

Qu-5 a) **10**
Employees(Empid, Fname, Lname, Email, Phoneno, Hiredate, Jobid, Salary, Mid, Did)
Departments(Did , Dname, Managerid , Locationid)
Locations(Locationid , Streetadd, Postalcode, City)
Write the SQL queries for the following.
1. List the employees have a manager who works for a department based in the US.
2. Write a query to display the details of all employees in the Finance department.
3. Give 10% hike to all the Employees working in Did 20.
4. Write a query to display all the information of the employees whose salary is within the range 1000 & 3000.
5. Display the information of all the employees whose first name starts with 'R' in descending order of their salary.

b) Draw and explain Database System Structure. **10**

Qu-6 Write Note on any **TWO**. **20**

a) Shadow Paging.

b) ACID Properties of Transaction.

c) Deadlock Detection and Recovery.

24/05/17

Sem III I.T (CBGS)

Q.P. Code: 552300

(3 Hours) [Total Marks : 80

N.B. : (1) Question No.1 is Compulsory.
(2) Answer any three out of remaining questions.
(3) Assume suitable data if necessary.
(4) Figures to the right indicate full marks.

1. (a) Explain asymptotic notations. 3

(b) What are linear and non-linear data structures. 3

(c) What is recursion ? State its advantages and disadvantages. 3

(d) What is expression tree ? Give examples. 3

(e) What is depth, height and degree of Binary tree. 3

(f) Define graph. List its types with examples. 3

(g) Define minimum spanning tree. 2

2. (a) Write a program for implementing QUICK SORT and comment on its complexity. 10

(b) Write a program for implementing STACKS using arrays. 10

3. (a) Construct the binary tree for the in order and pre-order traversal sequence given below :- 10

IN ORDER:- ENGINEERING
PRE ORDER :- E G N EN I I R E N G

(b) Write functions to implement insert ( ) and traverse ( ) of singly linked-list. 10

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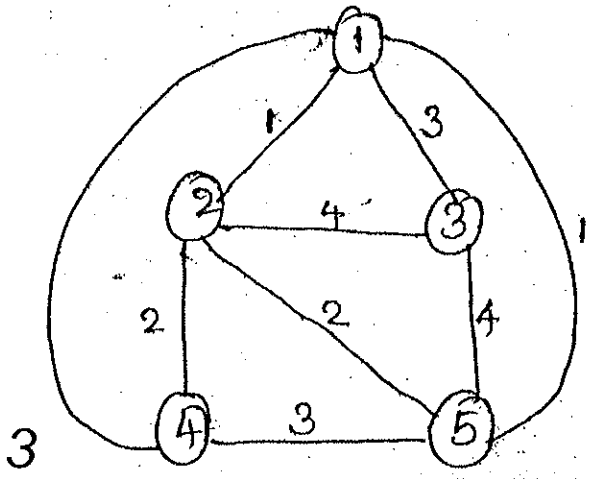
Q.P. Code: 552300

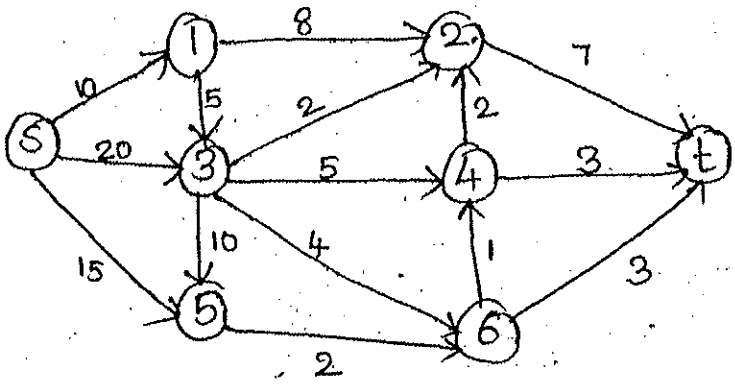
4. (a) What is Minimum Spanning Tree? Draw the MST using kruskal and prim's Algorithm and find out the cost with all intermediate steps. **10**



(b) Write the algorithm for deletion of a node in Binary Search Tree. Explain all the three cases of traversals. **10**

5. (a) Write an algorithm for the following operations on doubly linked list. **10**
   (1) Insertion
   (2) Forward Traversal
   (3) Reverse Traversal

(b) Find the shortest path using Dijkstra's Algorithm. **10**



Q.P. Code: 552300

6. Solve (**Any Four**) 20
   (1) Priority Queue
   (2) AVL Tree
   (3) BFS -Breadth First Search
   (4) Circular linked list
   (5) Insertion Sort
   (6) Red Black Trees.

Co I.T Sem - III

12/06/17

QP CODE : 541202

Time: 3 Hours **Max Marks: 80**

N.B.: (1) Question No. 1 is compulsory.
(2) Attempt any three questions out of remaining five.

1	(a)	Explain JVM in detail.	5
	(b)	Compare Interface and abstract class.	5
	(c)	Write a Java program to calculate maximum & minimum of three numbers using conditional operator, accept input from command line.	5
	(d)	Explain super & final keywords with suitable example.	5
2	(a)	Identify classes, their attributes, relationships and multiplicity for the Hotel Management System and draw class diagram based on it. Main functions of the system are as follows, Customer registration, Room Booking, Payment, Cancellations, feedback, food items, other facilities etc.	8
	(b)	Write a Java program to perform functions listed in Q2(a) using various types of constructors and methods. Display output data for all the listed functions in Q2(a).	6
	(c)	WAP that accepts a shopping list of items and performs the following operations: Add an item at a specified location, delete an item in the list, and print the contents of the vector.	6
3.	(a)	Write an applet program to draw a smiley face. (It should cover various shapes like line, circle, rectangle, arc etc).	8
	(b)	Draw a sequence diagram for user registration and login authentication of a website.	6
	(c)	Write a Java program to print following output using multidimensional array. 0 1 2 3 4 5 6 7 8 9	6
4.	(a)	Write a Java program to find number of uppercase and lowercase characters, blank spaces, digits and special characters from input string.	8
	(b)	Write a Java program to check if the given number is Armstrong number or not. Take input from command line. (e.g. Armstrong no. : $153=1^3+5^3+3^3$)	6
	(c)	How will you add an interface to a package? Explain with example.	6

{TURNOVER

5.	(a)	Write a java program to calculate gross salary of an employee. Read employee's details as Name, Birth date, Designation, Basic salary, No. of leaves etc. Make use of try, catch, throws, throw and finally keywords.	8
	(b)	Explain various methods of thread class (at least 5) with suitable example.	6
	(c)	Write a Java program to calculate area of circle and triangle using multilevel inheritance.	6
6.		Write short note on **(any four)**	20
	(a)	Wrapper classes	
	(b)	Type casting in Java	
	(c)	Features of OOPM	
	(d)	Lifecycle of a thread	
	(e)	Coupling and Cohesion	

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QP Code :552402

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

N.B
1. Question No.1 is compulsory
2. Attempt any three question from remaining five questions
3. Assume suitable data wherever required but justify them
4. Draw appropriate waveforms wherever required

1. **Solve any four** **[20]**

   (a) Explain Zener breakdown mechanism in Zener diode with VI characteristics.
   (b) Calculate the stability factor S for the fixed bias circuit with R_B=100KΩ, R c = 1 KΩ, V_{BE}=0.7 V and V_{CE}=6 V.
   (c) What are the important features of a differential amplifier?
   (d) State De Morgan's Theorem and implement EX-OR gate using NAND gates only.
   (e) Convert T FF to D FF.

2. (a) Explain the working of Astable multivibtrator using IC 555 with suitable waveforms. **[10]**
   (b) Design and implement one digit BCD adder using IC 7483. **[10]**

3. (a) Design a MOD-12 Asynchronous down counter. **[10]**
   (b)Define r_d, g_m and μ for JFET and explain h_{oe} to obtain them from characteristics. **[10]**

4. (a) Make subtraction using two's complement method $(52)_{10}$-$(65)_{10}$ **[5]**

   (b) Simplify Y=ABC +BC'D + A'BC and realize using basic gates. **[5]**

   (c)Explain how OPAMP can be used as summing, scaling and averaging amplifier in inverting configuration with derivation of output voltage equation. **[10]**

5. (a) Explain the working of LCD. **[5]**

   (b) Define load regulation and Line regulation of power Supply. **[5]**

   (c)Write in short about ENTITY declarations in VHDL. Write VHDL program for full adder. **[10]**

6. (a) Compare schottky barrier diode and PN junction diode. **[5]**

   (b) Draw circuit diagram of voltage divider bias using CE configuration and explain how it stabilizes Operating point. **[5]**

   (c) Implement the following Boolean function using only one 8:1 Mux and few gates
   $F=\sum m(0,1,3,4,5,7,9,10,12,13,15)$ **[5]**
   (d) Convert $(101101.1101)_2$ to decimal, hexadecimal and octal form. **[5]**