S.E. IT. Sem III CBGS May-2014

Sub:- DBMS.

QP Code :**NP-18770**

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

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

1. (a) Define the following terms :– **10**
(i) Transaction
(ii) Primary key
(iii) Deadlock
(iv) Strong entity set
(v) Lock point.

1. (b) Consider the following relation :– **10**

A	B	C	Tuple #
10	b_1	c_1	#1
10	b_2	c_2	#2
11	b_4	c_1	#3
12	b_3	c_4	#4
13	b_1	c_1	#5
14	b_3	c_4	#6

Given the previous state which of the following dependencies may hold in the above relation ? If the dependency cannot hold explain why by specifying the tuples that cause the violation :–
(i) $A \rightarrow B$
(ii) $B \rightarrow C$
(iii) $C \rightarrow B$
(iv) $B \rightarrow A$
(v) $C \rightarrow A$

2. (a) Explain different data models with its advantages and disadvantages. **10**

(b) Explain Generalization, Specialization and Aggregation with the help of an example. **10**

3. (a) Construct on E-R diagram for a car-insurance company that has a set of customers each of whom owns one or more cars. Each car has associated with it zero to any number of recorded accidents. **10**

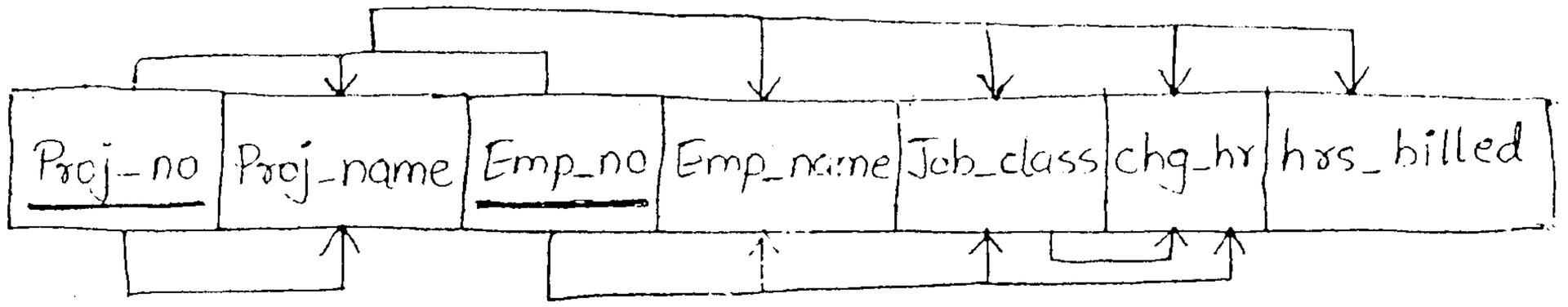
[TURN OVER

(b) Define Deadlock Detection and Recovery. **10**

4. (a) Consider the following relations for a book club :– **10**
Members (Member-Id, Name, Designation, Age)
Books (Book-Id, Booktitle, BookAuthor, Bookpublisher, Bookprice)
Reserves (Member-Id, Book-Id, Date)
Write SQL queries for following statements :–
(i) Find the names of members who are professor older than 50 years.
(ii) List the titles of books reserved by professors.
(iii) Find Ids of members who have reserved books that cost more than ₹ 500.
(iv) Find the authors and titles of books reserved on 20-09-2012.

(b) What do you mean by serializability schedule ? How would you test whether given schedule S is conflict serializable. **10**

5. (a) Consider a dependency diagram of relation R and normalize it up to third normal form. **10**



(b) Explain shadow paging method. **10**

6. (a) Draw the Query tree for the following relational algebra expression :– **10**

$$\pi \text{ Customer - name } (\sigma \text{ branch - city} = \text{"Brooklyn"} \wedge \text{balance} > 1000 \\ ((\text{branch} \bowtie (\text{account} \bowtie \text{depositor})))$$

(b) Explain the following relational algebra operations with proper examples :– **10**
(i) Natural join
(ii) Assignment
(iii) Rename
(iv) Set-Intersection operation
(v) Union.

S.E. IT. Sem III CBGS M-14

Sub - PADC. 22/5/14

QP Code : NP-18658

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

N.B. : (1) Question **one** is compulsory.
(2) Attempts any **three** question from remaining question.
(3) Assume suitable data if necessary.

1. (a) Explain friiss transmission formula. **20**
   (b) What are the energy signal and power signals
   (c) Explain Ask system.
   (d) Compare pcm and Delta modulation.

2. (a) Explain the operating principle, working of transmitter and receiver of BPSK system. **10**
   (b) An amplitude modulated ware form has a form **10**
   $Xc(t) = 10\ (1 + 0.6\ Cos2000\pi t + 0.4\ Cos400\pi t)Cos2000\pi t)$
   (i) Sketch the amplitude spectrum of Xc(t)
   (ii) Find the power content of each spectral component including currier.
   (iii) Find total power and sideband power.
   (iv) What is modulation index.

3. (a) What is meant by sensitivity of a radio receiver and How it is improved. **10**
   (b) Find the mathematical expression of FM signal. **10**

4. (a) State and prove the sampling theorem for low pass and limited signal. Explain aliasing error. **10**
   (b) Explain the working of foster seeley discriminator with neat ckt diagram and phcasor diagram. **10**

5. (a) What is meant by sensitivity of a radio receiver and How it is improved. **10**
   (b) What are the advantages of QPSK system. **5**
   (c) Compare analog and digital communication system. **5**

6. (a) What are advantages and dis-advantages of digital comm^n also draw block diagram of pcm and explain it. **10**
   10
   (b) Explain the following in relation of radio receiver
   (i) Selectivity
   (ii) Sengitivity
   (iii) Double spotting.

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DSAA.

QP Code : **NP-18696**

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

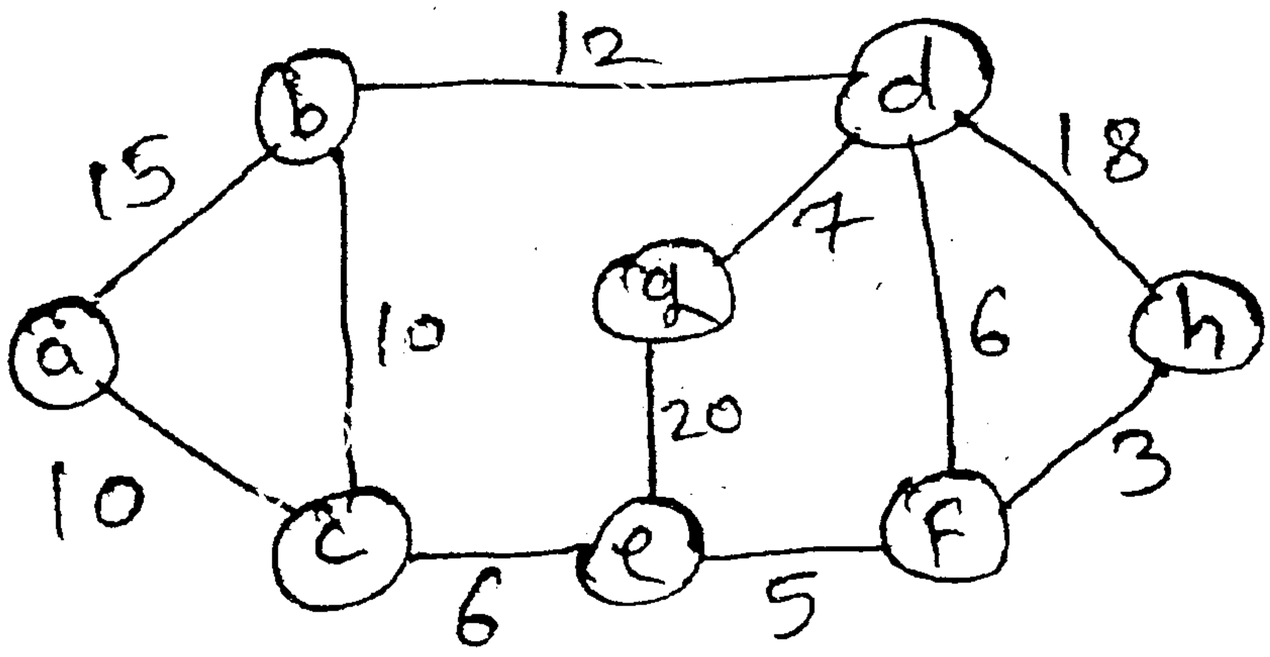
N. B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **three** from **remaining** questions.
(3) **Assume** suitable **data** if **necessary**.

1. (a) What is stack ? Give applications of it. **2**
(b) What is time complexity ? Determine time complexity of following code :- **3**

```
for (i=1; i<=n; i++)
for (j=1; j <=n; j++)
  x=x+1;
```

(c) Explain with e.g. :- **3**
(i) Complete binary tree
(ii) Degree of tree
(iii) Height of tree
(d) Explain linked list with its various types. **3**
(e) Define double ended queue and give its applications. **3**
(f) Define asymptotic notation along with example. **3**
(g) Define Graph. List its types with example. **3**

2. (a) Find the shortest path using Dijkstra's algorithm :- **10**



(b) Implement quick sort with example and find its complexity. **10**

3. (a) Explain BFS and DFS with algorithm and proper example. **10**
(b) What is linked list ? Write 'C' function for insertion of 'n' elements. **10**

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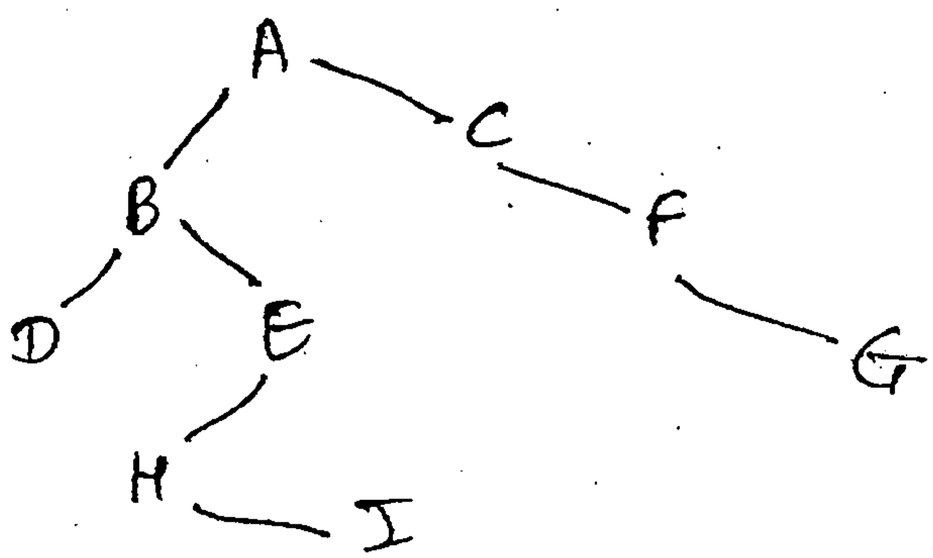
4. (a) Traverse the following binary tree into preorder, inorder, postorder by giving its algorithm. **10**



(b) Using Prim's algorithm find minimum spanning tree of a graph with example. Write algorithm of it. **10**

5. (a) What is priority queue ? Give implementation of it. **10**

(b) What is graph ? Give representation of graph with example. State applications of it. **10**

6. Solve any **four** :- **20**

(a) AUL Tree

(b) Euclids algorithm

(c) Sparse matrix

(d) B-Tree

(e) Circular linked list

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ADC 3|6|2014

QP Code : NP-18735

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

N.B. (1) Q.No.1 .is compulsory
(2) Attempt any three out of remaining five questions
(3) Assume suitable data wherever required but justify them.
(4)Draw appropriate waveforms wherever required.

Q.1.a) Explain the working of Zener diode as Voltage regulator. (04)

(b) Give the comparison between LED and LCD. (04)

(c) Why Transistor biasing is required? And state the factors to be considered in designing a biasing circuit (04)

(d) Convert the following decimal numbers to Binary, octal and Hexadecimal number.
(i) $(555)_{10}$ (ii) $(7905)_{10}$ (04)

(e) Compare Combinational Logic with Sequential Logic. (04)

Q.2. (a) Design and Implement one digit BCD adder using IC- 7843 (10)

(b)Explain the working of Monostable Multivibrator using IC- 555 (10)

Q.3. (a) Explain any four Linear applications of operational Amplifier (12)

(b) Design a Modulo-9 up counter using 4-bit ripple counter. (8)

Q.4. (a) Implement the following expression using only one 4:1 MUX and few Logic gates

$F(A,B,C,D) = \sum M(0, 1, 2, 3, 6, 8, 11, 13, 15)$ (10)

(b) Explain Differential Amplifier and explain any one method to improve CMRR. (10)

Q.5. (a) Design a synchronous counter which goes through following states using J-K Flip-Flop.

1-3-5-7-1---- (10)

(b)With a neat logic diagram explain the operation of 5-bit shift Register. (10)

Q.6. Write short notes on the following. (20)
(a) 3-bit Binary to gray code conversion
(b)VHDL Program Format
(c) S-R and J-K Flip-Flop

Con. 13862-14.

SE comp (CBGS)
SE IT Applied Mathematics - III 31 May 2014
(CBGS)

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 $f(x) = \cosh 3x + \sinh 3x$ in $(-3, 3)$. **6**

(b) Find the inverse Laplace transform of $\dfrac{(S-1)^2}{(S^2-2S+5)^2}$ **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**

S.E. Sem III CBGS Comp / IT. M-2014

Sub:- OOPM

QP Code : **NP-18782**

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

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

1. (a) Write a reurssive method to calculate factorial of a integer number. 5
(b) Explain Bit-wise operators available in JAVA with example. 5
(c) Explain how JAVA is platform - independent. 5
(d) Write a program to find the largest of the three integers accepted from command line. 5

2. (a) Write a detailed note on System.arraycopy(). 5
(b) Write a program to display following pattern :- 5

```
1
0 1
1 0 1
0 1 0 1
```

(c) Explain different types of inheritance with example. 10

3. (a) With proper example explain the steps to create a package and add a class or interface. 5
(b) Explain Thread life cycle. 5
(c) Write a program in JAVA to accept the values of a, b, c and d. 10
Calculate and display ((a*d) + (b*c)) / (b*d).
Create user defined exception to display proper message when value of (b*d) is ZERO.

4. (a) What is Vector ? Explain any five methods of Vector. 5
(b) Explain what are abstract class and abstract methods. 5
(c) Write a program to find largest and second largest element of an array. 10

5. (a) Explain method overloading and method overriding with suitable example. 10
(b) Write a program to accept a number from command line and to check whether it is Armstrong Number or Not. 10

6. Write short notes on (any **four**) :- 20
(a) Wrapper classes.
(b) Life cycle of Applet
(c) Static members
(d) Thread synchronization
(e) Exception handling mechanism.
