Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : MCA THIRD SEMESTER

COURSE CODE : MCA204 **COURSE TITLE : JAVA PROGRAMMING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What if I write static public void instead of public static void?
b. What is the default value of the local variables?
c. Why Java does not supports pointers?
d. What is final class?
e. Can we declare the main method as final?
f. What is an exception?
g. Why java is called platform independent?
h. What is Data Hiding and how to achieve in Java?
i. What is the purpose of constructor?
j. Do I need to import java.lang package any time? Why?

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. What is jagged array, write a code to implement it
b. Explain Constructor in details with example.
c. What is abstraction, how do we implement it in java?
d. Why we need to synchronized the thread, also differentiate between thread and process?
e. Write a program to overload the sum method.
f. Define final and static with example?
g. Write a program to connect Java program with MYSQL.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** What do you mean by wrapper classes, why we need it, write a code to implement it? 06
b. Discuss object oriented concepts in JAVA. 09

Q. 4. **a.** What do you mean by AWT, discuss it with example? 07
b. Explain exception handling. 08

Q. 5. **a.** What is JSP, define its all implicit objects. 08
b. Write a program to read a file and display it on monitor. 07

Q. 6. **a.** What is servlet, explain the life cycle of the servlet. 08
b. Write a program to sum all elements in a 5 integer array through either command line arguments or keyboard. 07

Q. 7. **a.** What is Multithreading and how do we implement it in JAVA. 08
b. What is JDBC and its driver, also write the steps for the database connectivity 07

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : MCA THIRD SEMESTER

COURSE CODE : MCA206 **COURSE TITLE : THEORY OF AUTOMATA**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is Kleen Closure?

b. What is Chomsky Normal form?

c. Define Chomsky Hierarchy.

d. Find L(G),where P consists of S→aSb , S→ab .

e. Remove unit production from the following grammar

S->Aa|B, B->A|bb, A->a|bc|B

f. Define transition function for a NFA.

g. Give a regular expression for the set of all strings having odd number of 1's

h. How a Non deterministic finite state automaton (NFA) differs from a Deterministic finite state automaton (DFA)?

i. Define pushdown Automaton.

j. Construct a TM as transducer of 1's Compliment.

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Given a grammar G with production rules

S →0B|1A, A →0S|AA|0, B →1S|0BB|1

Obtain the (i) leftmost derivation, and (ii) rightmost derivation for the string "00110101".

b. Design a PDA that accepts L={ na(w)=nb(w)} .Show acceptability of a string by the PDA by taking suitable example.

c. What is the application of pumping lemma? Also prove that L={anb2n|n>=1} is not Regular Language.

d. Define Turing Machine and also construct TM for L={anbncm|n,m>=1}.

e. Define and Construct a mealy machine that print 'b' whenever the sequence '1001' is encountered in any input binary string.

f. Discuss types of Languages and their rule with example.

g. Convert NFA to DFA for Language which should contain a substring '101'.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. Define PDA and also convert the following into CFG.

δ (A,0,z_0)	⟶	(A,xz_0)
δ (A,0,x)	⟶	(A,xx)
δ (A,1,x)	⟶	(B,ε)
δ (B,ε,x)	⟶	(B,ε)
δ (B,,z_0)	⟶	(B,ε)
δ (B,ε,z_0)	⟶	(B,ε)

Q. 4. **a.** When we say a problem is decidable? Give an example of Undecidable Problem? **(5)**

b. Discuss Church`s Thesis. **(5)**

c. Write down the properties of recursive and recursively enumerable language. **(5)**

Q. 5. **a.** Explain Myhill-Narode Theorem. Give an example to support it. **(7)**

b. What is Moore machine? Also construct a moore machine that counts the occurrence of the sequence 'aabb' in any input strings over $\sum$={a,b}. **(8)**

Q. 6. **a.** Construct a PDA for the language L = $\{a^n b^{2n}, n \geq 1\}$ using acceptance by final state. **(5)**

b. Design FA which accepts even number of 0's and even no of 1's. **(5)**

c. Write the Regular Expression for the following: **(5)**

- **i.** L={w||w| ≡ 0 mod 2}
- **ii.** L={w||w| mod 3≡ 0 mod 3}
- **iii.** Set of all strings over {0,1} end with '0' and has no substring '11'
- **iv.** All Strings over {0,1} with the substring'0111'
- **v.** Start and end with same symbol over {a,b}

Q. 7. **a.** Construct a grammar in GNF which is equivalent to the grammar **(7)**

S→AA|a|ε

A→SS|b

b. What do you mean by ambiguous grammar? Give example and also show that the below grammar is ambiguous or not. **(8)**

S →aB| ab, A→aAB| a, B→ABb|b

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JANUARY-2018

PROGRAM : MCA THIRD SEMESTER

COURSE CODE : MCA201 **COURSE TITLE : ADVANCED COMPUTER NETWORKS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections &Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Define message switching.
b. Explain mesh topology.
c. Define WAN.
d. Write two applications of RARP.
e. What are the function of router?
f. Write all fields of UDP header.
g. What is POP.?
h. What is purpose of DHCP?
i. What are the advantages of using sensor networks?
j. What is a subnet?

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain the Integrated quality of service in detail.
b. How router decide routes. Elaborate one routing protocol each in detail.
c. Define switch fabrics. How concept of switch fabric evolves.
d. How congestion can be controlled. Explain Leaky Bucket algorithm.
e. Explain about IPv6.How it is different from IPv4.
f. Explain the working of RMON. Write 2 short coming of it
g. Explain about wireless transmission media?

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** An organization is granted the block 200.14.10.40. The administrator wants to create 50 subnets. Find-

i. The subnet and default mask in dotted decimal notation and slash notation.
ii. Total number of hosts
iii. The second and last address of subnet 20. (8)

b. What is CRC? Calculate the CRC if frame is 1010101001 & divisor is 10011. (7)

Q.4. **a.** Write in detail about class full addressing .What is HDLC? (8)
b. What are Hamming code? Calculate the hamming code if the frame is 10011001010. (7)

Q.5. **a.** Define Crossbar Switch. Why it is important. (8)
b. What is purpose of WWW? How FTP is different from Telnet? (7)

Q.6. **a.** Why we need **an** Ad hoc network? Explain any of two protocols of Ad hoc network. (8)
b. What are the function of DNS? How an email is processed from sender to receiver? (7)

Q.7. **a.** Reactive routing protocol is different from proactive routing protocol. Explain how. Give example of each type of protocol. (8)
b. Why a sensor network may be required? Explain the requirement of Routing Protocols for sensor network. (7)

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Enrol. No. | S | R | H | U | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JANUARY-2018

PROGRAM : MCA THIRD SEMESTER

COURSE CODE : MCA203 **COURSE TITLE : GRAPH THEORY & COMBINATORICS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. A row with all 0's in the A(G) represents an.....vertex.

b. Define coefficient of internal stability.

c. The rank of the circuit matrix of K_9 is.....

d. Every.....of a tree is a cut-set.

e. A covering exists for a graph iff the graph has no.....vertex.

f. The maximum vertex connectivity one can achieve with a graph G of n vertices and e edges is.....

g. The number of fundamental cut sets is equal to the number of .....in the graph.

h. Define conditional probability with suitable example.

i. Thickness of $K_{3,5}$ is.....

j. How many ways a tree on 6 vertices can be properly colored with at most 4 colors?

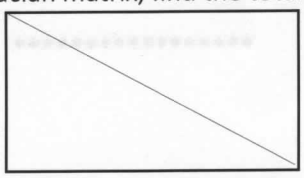
Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Let G be a graph with k components, where each component is a tree. If n is the number of vertices and m is the number of edges in G, prove that n = m+k.

b. Find all the fundamental circuits and cut sets of 3-regular graph with 6 vertices.

c. Define spanning tree. Using Laplacian matrix, find the total number of spanning trees for the given graph.



d. Define Path matrix and incidence matrix for undirected graph. Give example of each along with their properties.

e. Find 'x' if **[8 x 7 6 6 5 4 3 3 1 1 1]** is a graphical vector.

f. Define complement of a graph. Find an example of a self-complementary graph on four vertices and one on five vertices.

g. Discuss the method of elementary reduction for checking the planarity of a graph with suitable example.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Find the minimum spanning tree using Kruskal's algorithm for the following graph: **(7.5)**

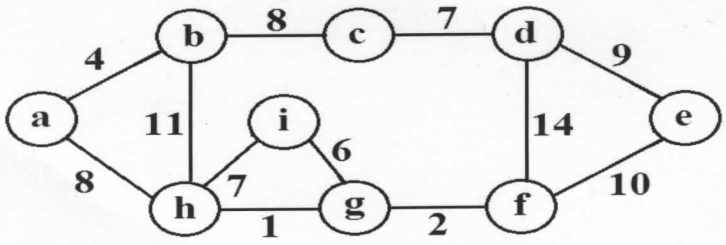


Fig. 1

b. Explain the various types of digraph with suitable example. **(7.5)**

Q. 4. Define the following operations on the graph with suitable examples: **(3*5)**
(i) Ring Sum (ii) Complement (iii) Sum (iv) Deletion (v) Intersection

Q. 5. Find A(G), B(G), C(G), B_f, C_f and chromatic number for the graph in Fig. 1. **(2.5*6)**

Q. 6. **a.** Find the chromatic polynomial of the following graph: **(7.5)**

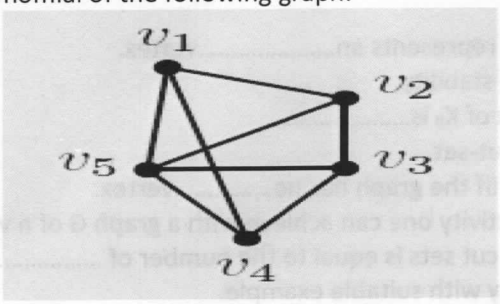


Fig. 2

b. Suppose that the reliability of a HIV test is specified as follows:
Of people having HIV, 90% of the test detect the disease but 10% go undetected. Of people free of HIV, 99% of the test are judged HIV negative but 1% are diagnosed as showing HIV positive. From a large population of which only 0.1% have HIV, one person is selected at random, given the HIV test, and the pathologist reports him/her as HIV positive. What is the probability that the person actually has HIV? **(7.5)**

Q. 7. For the graph given in **Fig. 2**, find vector space, cut-set vectors, circuit vectors, W_τ and W_s. Also find the basis of W_τ and W_s. **(3+2*6)**

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END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : MCA THIRD SEMESTER

COURSE CODE : MCA205 **COURSE TITLE : SOFTWARE ENGINEERING AND PROJECT MANAGEMENT**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What are the characteristics of the software?
b. What are the various categories of software?
c. Explain software crisis.
d. What are the fundamental activities of a software process?
e. Write down the quality parameter used in software engineering.
f. What are the merits of incremental model?
g. What are the drawbacks of spiral model?
h. Explain bath tab curve for hardware and software life time.
i. Short note on black box testing.
j. What are the functional and non-functional requirements?

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. List the process maturity levels in SEI CMM.
b. What are the different problems which are resolved by SRS?
c. Differentiate alpha, beta and acceptance testing.
d. What do you understand by software project management plan (IEEE 1058.1)?
e. What are the project team organization techniques? Give a brief of any one technique.
f. What do you understand by software reverse engineering and software reengineering?
g. Explain the economics of maintenance. Justify that maintenance cost is more than other phases of SDLC.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Define the term project management. Discuss in detail the various project scheduling techniques.
b. Explain in detail the various software complexity measures and their need?

Q. 4. **a.** What do you mean by estimation? Explain in detail the various cost estimation model used in software engineering.
b. Explain the need of maintenance in software engineering. Differentiate various types of maintenance and their need?

Q. 5. **a.** Explain prototyping model and RAD model for software life cycle and various activities in each phase.
b. Differentiate Data flow Diagram and E-R diagram. Assume an appropriate system and design DFD and E-R diagram. Justify you answer.

Q. 6. **a.** Define the meaning of software quality and detail the factors which affect the quality not productivity of a software product.
b. Give the benefits of verification and validation in software development and tell about the techniques of verification and validation in the process of software development.

Q. 7. **a.** Discuss the general IEEE format of a SRS document and discuss its main components in detail.
b. Assume that the size of an organization type an organic type software product has been estimated to be 32000 lines of source code. Assume that the average salary of software engineer be Rs. 15000/month. Determine the effort required to develop the software product and the nominal development time.

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : MCA THIRD SEMESTER

COURSE CODE : MCA203 **COURSE TITLE : GRAPH THEORY & COMBINATORICS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Explain Euler Digraph.

b. Suppose X is the adjacency matrix of a graph. What does X^K denote?

c. Define a complete graph.

d. Draw a graph with a Hamiltonian path.

e. Discuss Induced sub-graph with an example.

f. Describe separable and non-separable graph?

g. Suppose G is a graph with 1000 vertices and 3000 edges. Is G planar?

h. How many ways a tree on 5 vertices can be properly colored with at most 4 colors.

i. The number of fundamental cycles is equal to the number of .....in the graph.

j. Give an example of an Euler graph which is arbitrarily traceable.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Show that the complete graph of 4 vertices is self-dual.

b. Find all the spanning trees of the graph given below in Fig.1 using Laplacian Matrix.

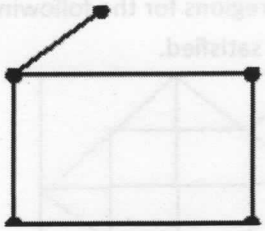


Fig. 1

c. Find all the fundamental circuits and cut sets of 3-regular graph with 6 vertices.

d. Prove that the sum of the degrees of the vertices of a graph is equal to twice the number of edges. Does the theorem hold for a multigraph? Justify your answer with example.

e. Give an example of a tree in which diameter ≠ 2 * radius. Find its eccentricity, diameter and radius.

f. Define complement of a simple graph. Let G be a simple graph of order n. If size of G is 56 & size of complement of G is 80, what is n?

g. Find the chromatic polynomial of W_6.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Which trees are complete bipartite graphs? **(5)**

b. Define a cut-set vector and circuit vector of a graph. For the graph given below in Fig. 2, find all the cut-set vectors and circuit vectors, circuit subspace (W_τ) and cut-set subspace(W_s) and also find the basis of the two subspaces. **(10)**

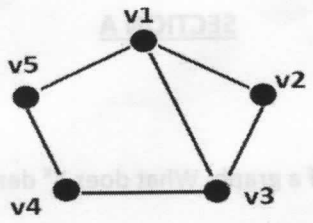


Fig. 2

Q. 4. **a.** Suppose that a tree T has two vertices of degree 2, four vertices of degree 3 and three vertices of degree 4. Find the number of pendant vertices in T. **(7)**

b. Define Walk, Path and Cycle with the help of suitable example. **(8)**

Q. 5. Define the following terms with suitable example. **(6*2.5)**

i. Strongly connected digraph
ii. Component of a graph
iii. Euler path
iv. Induced subgraph
v. Separable graph
vi. Covering

Q. 6. **a.** Find any three spanning trees of the graph in Fig. 3. Also calculate the distance among them. **(6)**

b. Find the number of vertices, edges and regions for the following planar graph in Fig. 3 and verify that Euler's Theorem for connected planar graphs is satisfied. **(9)**

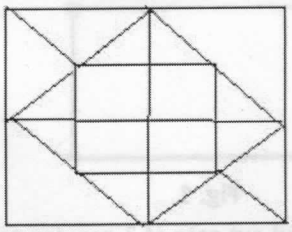
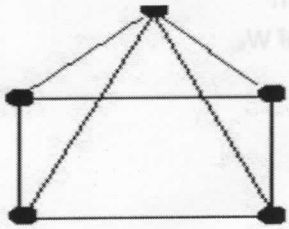


Fig. 3

Q. 7. **a.** Prove that the ring sum of two cut sets is either a third cut set or an edge disjoint union of two cut sets. **(7)**

b. Find the chromatic polynomial for the given graph and use that to find information on chromatic number of the graph. **(8)**



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END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : MCA THIRD SEMESTER

COURSE CODE : MCA205 COURSE TITLE : SOFTWARE ENGINEERING & PROJECT MANAGEMENT

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What are the major areas of the applications of the software?

b. What is Build and Fix Model in SDLC Models?

c. What is the role of "Problem Statement" in Requirement Engineering?

d. What is Context Diagram?

e. What is COCOMO Model?

f. Define CMM.

g. What is a Project? How is Software project different from other type of Project?

h. Calculate the ROI for Project, the net profit is $50,000 for 5 Years and the total investment is $1,00,000.

i. What is PERT?

j. What is Software Quality?

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. What do you understand by the term Software Development Life Cycle (SDLC)? Why is it important to adhere to a life cycle model

b. Describe the various steps of requirement engineering. Is it essential to follow these steps?

c. Draw the use case & ER diagram of the railway reservation system

d. What is Software Requirement specification (SRS)? List out the advantages of SRS standards. Why is SRS known as the black box specification of a system?

e. Annual change traffic for a software system is 15% per year. The development effort is 600PMs. Compute an estimate for Annual Maintenance Effort. If life Time of the Project is 10Years, what is the total effort of the project?

f. Draw the step wise Project Planning diagram and describe each activity.

g. What is Gantt chart? What are the advantages and disadvantages of Gantt chart?

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** What is software testing? Discuss the role of software testing during software life cycle and why is it so difficult?

b. What is software maintenance? Describe various categories of maintenance. Which category consumes maximum effort and why?

Q. 4. **a.** Explain : Creating the framework of monitoring and control the progress of projects.

b. What are the places of software quality in project planning?

Q. 5. **a.** Compare the waterfall model and the spiral model of software development. Sketch a neat diagram of spiral model of software development.

b. Why do you feel that characteristic of requirement play a very significant role in the selection of a life cycle model?

Q. 6. **a.** SRHU wishes to develop a software system for the Library Management System. A problem statement is to be prepared for the software development company. The problem statement may give an overview of the existing system and broad expectation from the new software system.

b. Suppose that a project was estimated to be 400 KLOC. Calculate the effort and development time for each of the three mode i.e., organic , semidetached and embedded

Project	a_b	b_b	c_b	d_b
Organic	2.4	1.05	2.5	0.38
Semidetached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

Table 1

Q. 7. **a.** What is the importance of software quality?

b. What is PERT? Calculate the expected time and sketch graph for the following table:

Activity	Immediate Predecessor	Optimistic	Most Probable	Pessimistic
A	---------	4	5	12
B	A	3	4.5	15
C	A	2	3	4
D	C	6	8	22
E	B	4	6	8
F	C	3	4	5
G	D,E	1.5	3	4.5
H	B	5	7	15
I	H	3	4	5
J	G,I	2	4	6

Table 2

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : MCA THIRD SEMESTER

COURSE CODE : MCA201 **COURSE TITLE : ADVANCED COMPUTER NETWORKS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Define message switching.

b. Explain mesh topology.

c. Define WAN.

d. Write two applications of RARP.

e. What are the function of router?

f. Write all fields of UDP header.

g. What is POP.?

h. What is purpose of DHCP?

i. What are the advantages of using sensor networks?

j. What is a subnet?

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain the Integrated quality of service in detail.

b. How router decide routes. Elaborate one routing protocol each in detail.

c. Define switch fabrics. How concept of switch fabric evolves.

d. How congestion can be controlled. Explain Leaky Bucket algorithm.

e. Explain about IPv6.How it is different from IPv4.

f. Explain the working of RMON. Write 2 short coming of it

g. Explain about wireless transmission media?

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** An organization is granted the block 200.14.10.40. The administrator wants to create 50 subnets. Find :

i. The subnet and default mask in dotted decimal notation and slash notation. **(8)**

ii. Total number of hosts

iii. The second and last address of subnet 20.

b. What is CRC? Calculate the CRC if frame is 1010101001 & divisor is 10011. **(7)**

Q. 4. **a.** Write in detail about class full addressing .What is HDLC? **(8)**

b. What are Hamming code? Calculate the hamming code if the frame is 10011001010. **(7)**

Q. 5. **a.** Define Crossbar Switch. Why is it important? **(8)**

b. What is purpose of WWW? How is FTP different from Telnet? **(7)**

Q. 6. **a.** Why do we need an Ad hoc network? Explain any of two protocols of Ad hoc network. **(8)**

b. What are the function of DNS? How an email is processed from sender to receiver? **(7)**

Q. 7. **a.** Reactive routing protocol is different from proactive routing protocol. Explain how. Give example of each type of protocol. **(8)**

b. Why a sensor network may be required? Explain the requirement of Routing Protocols for sensor network. **(7)**

Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : MCA THIRD SEMESTER

COURSE CODE : MCA202 **COURSE TITLE : DATA BASE MANAGEMENT SYSTEMS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What are the disadvantages of file system?

b. Why do we need normalization?

c. Define TCL, DCL commands in sql.

d. List aggregate functions supported by SQL.

e. Why do we need integrity constraints?

f. Define requirement analysis using appropriate example.

g. Write ACID properties of transaction.

h. What is BCNF?

i. What is deadlock? Write its conditions.

j. What is mobile database? List down various issues while implementing it.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain two Phase- Locking protocol. What benefit does strict two-phase locking protocol provide?

b. Explain the advantages of decomposition? Discuss the problems faced in decomposition.

c. Why foreign key constraints are important? Explain with employee & Dependent table.

d. What is time stamp ordering? Explain how it is used for concurrency control?

e. Explain view serializability with an example. How it is different from conflict serializability?

f. Explain about domain constraints and key constraints.

g. Discuss about various emerging database technologies.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Explain various types of attributes in E-R model with example. **(7.5)**

b. What are extended E-R features. **(7.5)**

Q. 4. **a.** What is the purpose of Database Management System? Who all are the actors on the scene? What are their roles? **(7.5)**

b. Explain 3 level architecture of database. **(7.5)**

Q. 5. **a.** Explain all six elementary operators of relational algebra. **(7.5)**

b. Discuss in detail the operators SELECT, PROJECT and UNION with suitable examples. **(7.5)**

Q. 6. **a.** What is lossless decomposition? Explain how it is achieved by taking a suitable example. **(7.5)**

b. Check whether given relations F:{A B,B C,C D} & G:{A BC,C D} are functionally equivalent or not. **(7.5)**

Q. 7. **a.** What is lock compatibility matrix? What is its purpose and how is it used? **(7.5)**

b. What is a schedule? Classify it and explain all the classes. **(7.5)**

Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : MCA THIRD SEMESTER

COURSE CODE : MCA206 **COURSE TITLE : THEORY OF AUTOMATA**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt all questions. **(2 x 10 = 20)**

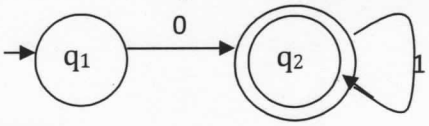
a. What is regular grammar?

b. Construct regular expression for the language L which accepting all combinations of a's except the null string.

c. Construct regular expression for the language L which accepts all the strings with at least two b's over Σ = {a, b}.

d. Differentiate between Mealy machine and Moore machine.

e. Construct regular expression for the given FA.



f. What is ambiguity in CFG?

g. Explain pumping lemma for CFL.

h. What is transition graph?

i. Differentiate between left-most derivation (LMD) and right-most derivation (RMD).

j. Show that (r*)* = r* for a regular expression.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Compare finite-state machine (FSM), PDA and Turing machine(TM).

b. Construct regular expression for the language L over Σ = {a, b} in which the total number of a's are divisible by 3.

c. Convert the following regular expression:

(a+b)*ab, into DFA

d. Define Chomsky-Normal Form (CNF). Reduce the following grammar to CNF.

S → abSb | aAb | a

A → bS | aAAb.

e. Design PDA for the language L = {ww^T | w∈ (0+1)*, where w^T is reverse of w} accepted by final state.

f. Design Turing machine for the function f(x) = x+2.

g. Given the following productions:

S →aAS | a

A → SbA | SS | ba

Find out LMD, RMD, and parse tree for the string aabbaa.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. Prove the following:

a. Union of two recursively languages is recursive. **(7)**

b. Union of two recursively enumerable languages is recursively enumerable. **(8)**

Q. 4. **a.** Eliminate ϵ- productions from CFG: **(7)**

$A \rightarrow ABCD \mid CDa$

$B \rightarrow Cb$

$C \rightarrow a \mid \epsilon$

$D \rightarrow bD \mid \epsilon.$

b. Convert CFG into GNF: **(8)**

$A \rightarrow BC$

$B \rightarrow CA \mid b$

$C \rightarrow AB \mid a.$

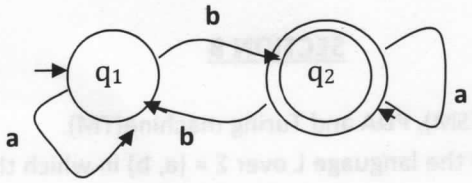
Q. 5. Design Turing machines to recognize the following language:

a. $\{0^n1^n \mid n \geq 1\}$ **(7)**

b. $\{ww^R \mid w \text{ is in } (0+1)^*\}$, where w^R is the reverse of w. **(8)**

Q. 6. **a.** Give Chomsky's hierarchy classification of languages. Explain in brief. **(7)**

b. Convert the following automata into regular expression. **(8)**



Q. 7. **a.** Prove that vertex cover is NP-complete problem. **(8)**

b. Explain NP-class problems with suitable examples. **(7)**

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : MCA THIRD SEMESTER

COURSE CODE : MCA204 **COURSE TITLE : PROGRAMMING IN JAVA**

[Time allotted: Two hours] **[Max. Marks: 50]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is a stream? How is the concept of streams used in Java?

b. How do we start a thread?

c. Is an **empty.java** file name a valid source file name?

d. How do we design a package?

e. What is exception?

f. Why do we need the import statement?

g. Why can't we use a keyword as a variable name?

h. What is the task of the **main** method in a Java program?

i. Can we compile and execute a class without **main** method?

j. Can **try** statements be nested?

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. What are command-line arguments? How are they useful?

b. Why is Java known as platform-neutral language?

c. What is multithreading? Develop a real-life application program to illustrate the used of multithreads.

d. Distinguish between GenericServlet and HttpServlet?

e. What are the main steps in java to make JDBC connectivity?

f. What is JSP? Explain lifecycle of a JSP.

g. How does String class differ from the StringBuffer class?

SECTI ON C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** What is a token? List the various types of tokens supported by Java. **(7)**

b. Write a program to calculate sum of the following series: **(8)**

1 1 2 3 5 8 .....

Q. 4. **a.** What are Servlets? Explain servlet life cycle. **(8)**

b. What is difference between Get and Post method? **(7)**

Q. 5. **a.** What is an applet? Differentiate between local applets vs. remote applets. **(8)**

b. Discuss the steps involved in developing and running a local applet. **(7)**

Q. 6. **a.** Describe the various forms of implementing interfaces. Give examples of Java code for each case. **(7)**

b. Give an example where interface can be used to support multiple inheritance. **(8)**

Q. 7. **a.** What is difference between JDK, JRE and JVM? **(7)**

b. What are the advantages of servlets over CGI? **(8)**

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM : MCA FOURTH SEMESTER

COURSE CODE : MCA209 **COURSE TITLE : DESIGN AND ANALYSIS OF ALGORITHMS**

[Time allotted: Three hours] **[Max. Marks : 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Define Complexity. Differentiate between time complexity and space complexity.

b. What is algorithm? How is it different from a program?

c. How many different trees are possible with 10 nodes?

d. What is spanning tree?

e. Differentiate between depth-first traversal and breadth-first traversal of a graph.

f. Are B-trees of order 2 full binary trees? If so, how?

g. Explain asymptotic notations.

h. Define principle of optimality.

i. What is purging rule?

j. What is complexity of quick sort in all cases?

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Construct a B-tree of order 5 by inserting the following keys in the order shown into an empty B-tree: 92, 24, 6, 7, 11, 8, 22, 4, 5, 16, 19, 20, 78.

b. Explain and solve 4-queens problem using backtracking.

c. Show how QuickSort sorts the following sequences of keys: 5, 5, 8, 3, 4, 3, 2.

d. Find an optimal solution to the knapsack instance n=7, m = 15, $(p_1, p_2, ..., p_7) = (10, 5, 15, 7, 6, 18, 3)$ and $(w_1, w_2, ..., w_7) = (2, 3, 5, 7, 1, 4, 1)$.

e. What is parallel algorithm? Draw the expression: 7 * (4 + 64 / 10 - (3 * (13 - (6 + 5)))) as an expression tree with leaves numbered from left to right and apply parallel evaluation algorithm on this tree.

f. Explain graph coloring problem with example.

g. What is backtracking? Solve Hamiltonian circuit problem using backtracking.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q.3. Consider the following undirected graph-

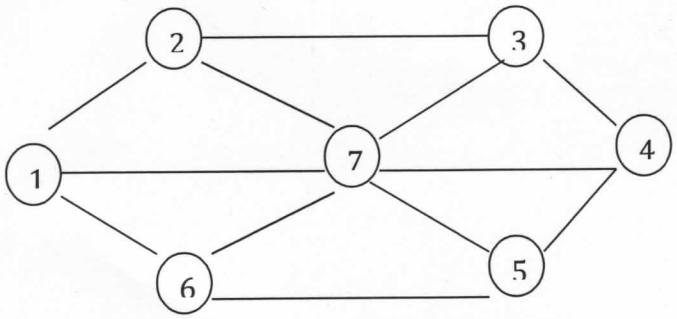

Figure 1: undirected graph

a. Find the adjacency list representation of the graph. **5**

b. Find a depth-first spanning tree starting at node 1. **5**

c. Find a breadth-first spanning tree starting at node 1. **5**

Q. 4. **a.** Differentiate between decision problems and optimization problems. **7**

b. Define the following classes of problems: P, NP, NP-complete and NP-hard. **8**

Q. 5. **a.** What is optimal merge patterns? Explain with example. **7**

b. What is the optimal Huffman code for the following set of frequencies based on first 8 Fibonacci number?

a:1 b:1 c:2 d:3 e:5 f:8 g:13 f:21. **8**

Q. 6. **a.** What is binary search tree? Explain with suitable example. **7**

b. Suppose the following sequence list the nodes of a binary tree T in preorder and inorder, respectively:

Preorder: G, B, Q, A, C, K, F, P, D, E, R, H

Inorder : Q, B, K, C, F, A, G, P, E, D, H, R

Draw the diagram of the tree and also calculate postorder traversal of a tree. **8**

Q. 7. **a.** What is Stassen's matrix multiplication? **8**

b. If $A = \begin{bmatrix} 5 & 3 & 0 & 2 \\ 4 & 3 & 2 & 6 \\ 7 & 8 & 1 & 4 \\ 9 & 4 & 6 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 2 & 4 & 7 \\ 2 & 5 & 2 & 9 \\ 3 & 9 & 0 & 3 \\ 7 & 6 & 2 & 1 \end{bmatrix}$ **10**

Implement Stassen's matrix multiplication on A and B.

b. What is greedy technique? Write any two characteristics of Greedy Algorithm? **7**

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, JUNE-2018

PROGRAM : MCA FOURTH SEMESTER

COURSE CODE: MCE222 **COURSE TITLE : CYBER LAW & SECURITY**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What do you mean by Authentication Service Security?
b. Write is TCP SYN attack?
c. What is tunneling?
d. What is ISO 27001?
e. What are environmental threats to server?
f. Define asymmetric cryptosystem.
g. What do you understand by E-cash?
h. What is ARP poisoning?
i. Define data theft and Identity theft with example.
j. What is copy right?

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Write in detail about Indian Cyber Law.
b. What are security challenges in wireless communication? Discuss issues in data & software privacy?
c. What are biometric systems? What are the benefits of using biometric systems?
d. Write in detail about firewalls. How we can set new rules in a Window OS firewall.
e. Explain the model of Cryptographic Systems?
f. What is Virtual Organizations? Discuss its need.
g. Define IDS and why it is needed for organization.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Give the classification of Threats? Briefly explain the history of Information Systems.
b. What are the disasters & controls for an Information System? Discuss digital locker.

Q. 4. **a.** What are Fingerprints? Also discuss the economic & social aspects of biometric systems?
b. What is E-governance? Define it under IT ACT 2000, and discuss the threats over e-governance.

Q. 5. **a.** Define networking devices with their functions.
b. What do you understand by Digital Signatures? Explain the use of digital signatures in the security purposes?

Q. 6. **a.** Explain VPN and its need and types.
b. Differentiate between http and https. Discuss the threats over social sites and how we can save ourselves from these threats.

Q. 7. **a.** What is E-Commerce? Explain different types of E-Commerce?
b. What is the importance of E-Commerce in the development of business? Discuss business transaction over web.

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE-2018

PROGRAM : MCA FOURTH SEMESTER

COURSE CODE : MCA212 **COURSE TITLE : ENTERPRISE RESOURCE PLANNING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections and Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Define data warehousing.
b. Define SCM.
c. Write two benefits of ERP.
d. Describe ERP adoption decision phase.
e. Write two application of AHP.
f. Write users role in ERP implementation.
g. Define ROI.
h. What is strategic grid.
i. Write difference between ERP and extended ERP.
j. Define E-commerce.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. What is BPR? How is it different from ERP?
b. Write in detail about ERP life cycle.
c. Define AHP and write the detailed process of AHP taking an example.
d. Write about different approaches for the implementation of ERP. Which one you consider best and why?
e. What are the ERP success inhibitors and accelerators?
f. Explain the direct and indirect benefits of ERP system.
g. Define ERP. Discuss the reason for the growth of ERP Market. Define CRM.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** What are the system and business benefits of ERP. (7.5)
b. Write short note on data mining and OLAP. (7.5)

Q. 4. **a.** Explain in details about evolution of an ERP system. (7.5)
b. List the limitations of ERP systems. Write down three technologies that can help to overcome these limitations. (7.5)

Q. 5. **a.** Write in detail about ERP modules. (7.5)
b. Write down the critical success and failure factors for ERP implementation. (7.5)

Q. 6. **a.** Write in detail about extended ERP . Why it is required. How it is different from ERP. (7.5)
b. List and explain the ERP Implementation challenges. (7.5)

Q. 7. How are ERP and E-Commerce connected? What is the impact of internet in ERP market? Why is Integration of data required for taking right decision. (15)

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END SEMESTER EXAMINATIONS, JUNE-2018

PROGRAM : MCA FOURTH SEMESTER

COURSE CODE : MCE211 **COURSE TITLE : ARTIFICIAL INTELLIGENCE**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections and Questions.

SECTION A

Q.1. Attempt **all** questions. Answers should be precise and to the point. **(2 x 10 = 20)**

a. What is a machine? Can a machine think? How?
b. What is heuristic?
c. How can we implement common sense in artificial Intelligence?
d. What is the truth table for p=>q?
e. What is tautology in knowledge representation?
f. What do you mean by a fuzzy set? Also give the expression.
g. What is CNF?
h. What is local minima/maxima problem?
i. Write a note on intelligent agent.
j. Name the components of pattern recognition system.

SECTION B

Q.2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Write all the different architecture of intelligent agent.
b. What is game theory? Explain alpha beta pruning in game theory.
c. Write a short note on object Identification.
d. Explain Best First Search with algorithm and its advantages.
e. What are different quantifiers used in knowledge representation and what are their uses.
f. What are the different sub fields of Artificial Intelligence?
g. Consider two fuzzy subsets of the set *X*,

X = {a, b, c, d, e, f, g, h}
A = {0.5/a, 0.3/b, 1/c, 0.4/d, 0/e, 0.6/f, 0.2/g, 0.3/h} and
B = {0.8/a, 0.7/b, 0.9/c, 0.6/d, 0.1/e, 1/f, 0.3/g, 0.7/h}

Find A union B, A intersection B, Complement of A, Cardinality of A, Cardinality of B and A Cartesian product B.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q.3. **a.** What is fuzzy relation? Explain with example.
b. Explain FOL (First order predicate logic). Give a suitable example of semantic net implementation.

Q.4. **a.** Explain case grammar and how the following sentences would be represented in case structure:
i. the plane flew above the clouds **ii.** the co-pilot flew the plane
b. Explain ambiguity and resolving methods in NLP. Draw architecture of NLP.

Q.5. **a.** Design any fuzzy logic controller indicating all the four steps included in the process for decision making.
b. What are the properties of a good knowledge representation system should have and explain approaches used for knowledge representation.

Q.6. **a.** Explain cryptarithmatics puzzles in constraint satisfaction problem. Give examples.
b. Construct a first order Predicate logic representation of the following:
i. Mary owns all the cats in universe. **ii.** All Romans were either loyal to king or hated him.

Q.7. **a.** What is an Interface system? Explain forward and backward deduction with example.
b. Define A* and greedy BFS algorithm with example.

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : MCA FIFTH SEMESTER

COURSE CODE : MCA301 **COURSE TITLE : COMPUTER GRAPHICS**

[Time allotted: Two hours] **[Max. Marks: 50]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is vector graphics?

b. What is the smallest unit of graphics on the screen?

c. What is OpenGL?

d. What is segment table?

e. Explain control points.

f. Name any two algorithms for polygon filling.

g. How many minimum points are required to draw a plane?

h. Write the function for drawing a red color circle using graphics.h in C?

i. What is gm and gd in C while using graphics.h?

j. What is the use of dos.h?

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Write a complete program in C for drawing a circle with its size increasing.

b. Explain 2D scaling and its matrix.

c. Explain 3D rotation and its matrix.

d. What is Z buffer method? Why is it used?

e. What is morphing in graphics animation?

f. Explain DDA algorithm for line generation.

g. Explain the working of CRT.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Explain Cohen-Sutherland algorithm and its need. **(7.5)**

b. Explain 3D modeling and its steps. **(7.5)**

Q. 4. **a.** Explain back face removal algorithm. **(7.5)**

b. What is Sierpinski triangle? Explain. **(7.5)**

Q. 5. **a.** Explain polygon table with the help of an example. **(7.5)**

b. What is multiple windowing and its need. **(7.5)**

Q. 6. **a.** How client server model works for computer graphics? **(7.5)**

b. Explain Phong equation and its parameters. **(7.5)**

Q. 7. **a.** What is illumination model? Explain in detail. **(7.5)**

b. Explain RGB and HSV color space for image. **(7.5)**

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : MCA FIFTH SEMESTER

COURSE CODE : MCA302 **COURSE TITLE : NETWORK SECURITY & CRYPTOGRAPHY**

[Time allotted: Two hours] **[Max. Marks: 50]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Define S/MIME.

b. Describe in general terms an efficient procedure for checking a prime number with example?

c. Define diffusion & confusion.

d. Using the Vigenère cipher, encrypt the word "explanation" using the key leg.

e. Differentiate symmetric and asymmetric encryption with example?

f. List the design goals of firewalls?

g. Define virus. Specify the types of viruses?

h. Define key Identifier?

i. What you meant by MAC?

j. Perform encryption and decryption using RSA algorithm for the following. P=7; q=11; e=17; M=8.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Write and explain the Elgamal Digital Signature Scheme.

b. Discuss Web Security Issues?

c. Define CIA with examples?

d. Define HMAC and CMAC function.

e. Define Record protocol and handshake protocol.

f. What type of security mechanisms are provided when a person signs a form he has filled out to apply for a credit card, also discuss any two security mechanism.

g. What do you mean by Fermat`s theorem? Find the following based on the Fermat`s theorem-

5^{-1} mod 23

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** What do you mean by Substitution Cipher? Explain any two with example.

b. Explain differential cryptanalysis and linear cryptanalysis.

Q. 4. **a.** Briefly describe about the overall processing of Message Digest Generation using MD5 with necessary block diagram.

b. Explain the services of PGP and function provided by S/MIME.

Q. 5. **a.** Briefly explain the idea behind Elliptic Curve Cryptosystem.

b. Discuss Euclid's algorithm? Find gcd (1970, 1066) using Euclid's algorithm.

Q. 6. **a.** Discuss active and passive attacks with example.

b. Explain DES in detail.

Q. 7. **a.** Compare the features of MD5 and SHA-1 algorithms.

b. Briefly explain the idea behind SSL/TLS.

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Enrol. No. | S | R | H | U | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : MCA FIFTH SEMESTER

COURSE CODE : MCE331 **COURSE TITLE : WEB 2.0 AND RICH INTERNET APPLICATIONS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is Folksonomies?

b. Write syntax of GET method in AJAX.

c. Write syntax of XML Http Request Object.

d. What is CSS?

e. Define role of XML in web2.0.

f. Define PHP.

g. What is data binding?

h. Write structure of XML.

i. What is inheritance?

j. Define DOM.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Define inner functions.

b. What is web 2.0? Explain the concepts involved in web 2.0.

c. Write any four XHR object properties and their meaning.

d. Explain flex application life cycle.

e. Explain the concept of arrays in action script with examples.

f. Write short notes on (i) validity of integer (ii) handling timeouts.

g. What are the advantages of CSS in web designing?

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Discuss the example of error handling in action script. **(7.5)**

b. Explain handle multiple XMLHTTP request objects in the same page with an example. **(7.5)**

Q. 4. **a.** Briefly explain MXML syntax and structure? **(7.5)**

b. How to create objects in action script? Explain the inheritance features in action script. **(7.5)**

Q. 5. **a.** How to define and add a state using ActionScript. **(7.5)**

b. With a neat diagram, explain how flex application works. **(7.5)**

Q. 6. **a.** Explain XHR object with both GET and POST method. List the advantages and disadvantages of the same. **(7.5)**

b. What is flex framework? Explain the contents of flex class library. **(7.5)**

Q. 7. **a.** Differentiate between AJAX application model and traditional web application model. **(7.5)**

b. What is Ajax? Write the key principles of AJAX. **(7.5)**

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : MCA FIFTH SEMESTER

COURSE CODE : MCE345 **COURSE TITLE : CLOUD COMPUTING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Define broad network access a characteristic of cloud computing.

b. What is open stack?

c. Define full virtualization

d. Write two differences between SAAS and PAAS.

e. What is web 3.0?

f. Define use of NAS.

g. Who developed Eucalyptus? What can be done with it?

h. Difference between simulation and emulation.

i. Name hypervisor developed by Linux and write one use of it.

j. Write role of DMTF.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. What do understand by Cloud Interoperability & Standards? Name any two organizations active in this field.

b. How is cloud computing influenced by VMM? Define VMM and its types.

c. Write in detail about community cloud.

d. Write NIST definition of cloud and explain each term in it.

e. Write in detail about Language level Virtualization.

f. Define cloud ecosystem's components. What are their roles?

g. What do you think about future of cloud computing future in India? Which service is most popular?

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Define different types of virtualization. How is simulation different from emulation? **(8)**

b. How can we secure Hypervisor from security threats? Name few open source hypervisors. **(7)**

Q. 4. **a.** A cloud environment can be set in four ways. What are they? Which one is best suited for SRHU? **(8)**

b. Write in detail about SAAS, PAAS & IAAS. **(7)**

Q. 5. **a.** What are VLAN and SAN? What are their roles to provide better services to user? **(8)**

b. How advances in hardware and software paved the way for cloud computing. Discuss these advances. **(7)**

Q. 6. **a.** Write in detail about AWS. What are the services offered by it? What kind of services are provided by Google App Engine and Azure. **(8)**

b. Facebook, Twitter and many other big companies are using cloud computing for the expansion of their services. Elaborate this with an example. **(7)**

Q. 7. **a.** Write about top security issues in cloud. Explain three surfaces of attacks. Define OS security. **(8)**

b. What are web services? Explain its standards. **(7)**

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Enrol. No. | S | R | H | U | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : MCA FIFTH SEMESTER

COURSE CODE : MCA303 **COURSE TITLE : DATA WAREHOUSE & DATA MINING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q.1. Attempt **all** questions. **(2 x 10 = 20)**

a. What are the different sources of information?
b. Define data mart.
c. Explain DBMS schema?
d. Write short note on data replication.
e. Write short note on distributed memory architecture.
f. What do you mean by data preprocessing?
g. Explain chi-square test.
h. Differentiate between database & data warehouse.
i. Write short note on histogram.
j. Write short notes on: a) Data b) Information c) Knowledge

SECTION B

Q.2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Differentiate between data warehouse and data mining.
b. Discuss the need of human intervention in data mining process.
c. Write short note on: a) Generalization b) Regression c) aggregation
d. Differentiate between feed forward and feedback system.
e. What do you mean by client-server model?
f. Compare SMP with SPP.
g. Explain the conceptual view of a data warehouse.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q.3. **a.** Is it possible to build an SPP system using cluster of PCs? How? What would you propose to make synergy a true SPP system? Justify. **(7.5)**
b. What about redundant data? Write how to handle data redundancy discuss in details. **(7.5)**

Q.4. **a.** Draw KDD process diagram. Discuss the five major elements of data mining in details. **(7.5)**
b. What about missing data? Discuss how to fill missing data in details. **(7.5)**

Q.5. **a.** What are the different vendors available which support database parallelism? Compare any two. **(7.5)**
b. Given a set of data : **(7.5)**

{12,8,45,23,6,7,8,25,34,22,19,22,34,45,41}

Can you employ the binning method to allocate the data on the set into **3** bins by equal-frequency, smoothing by bin means and smoothing by bin boundaries respectively?

Q.6. **a.** Define Client/Server Model. Explain third generation client/server model with suitable diagram. **(7.5)**
b. Write short notes on: **(7.5)**

i. Star Schema
ii. Snow Flake Schema
iii. Fact Constellations

Q.7. **a.** What do you mean by subject-oriented, integrated, time-variant and non-volatile collection of data in data warehousing? **(7.5)**
b. What is genetic algorithm? Compare genetic algorithm with other on techniques and explain its use in other methods. **(7.5)**

Enrol. No. | S | R | H | U | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JANUARY-2018

PROGRAM : MCA FIFTH SEMESTER

COURSE CODE : MCA301 **COURSE TITLE : COMPUTER GRAPHICS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Explain display file structure.

b. What is a Polygon in 3D?

c. Explain visibility of Polygon in computer graphics.

d. What is the advantage of vector graphics?

e. What is jpeg file format?

f. Explain components of multimedia.

g. Explain GIF file format and its need.

h. What is interactive computer graphics?

i. What do you understand by graphics mode?

j. Name any five input devices.

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain 2D scaling matrix.

b. Explain 3D translation matrix.

c. What is the need of Open GL API?

d. What is Direct X? Explain in detail.

e. Write a complete C program to draw ellipses.

f. What is flood fill algorithm? Explain.

g. Explain Hidden line method and its need.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** What is a polygon table? Explain with help of an example. (7.5)

b. Explain and provide an example of multiple windowing with the help of a diagram. (7.5)

Q. 4. **a.** Explain HSV color space in detail. (7.5)

b. What is YUV color space? Explain in detail. (7.5)

Q. 5. **a.** Why fractals are important? Explain in detail. (7.5)

b. Explain illumination model in detail with the help of an example. (7.5)

Q. 6. **a.** What is event driven input in computer graphics? (7.5)

b. Explain what MAYA and UNITY and its use. (7.5)

Q. 7. **a.** Explain Scan Line method and why we use it? (7.5)

b. Explain Digital Image in RGB and Gray color space. (7.5)

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END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : MCA FIFTH SEMESTER

COURSE CODE : MCA303 **COURSE TITLE : DATA WAREHOUSE & DATA MINING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q.1. Attempt all questions. **(2 x 10 = 20)**

a. What do you mean by data mining?
b. Why we need a separate data warehouse?
c. What do you mean by data preprocessing?
d. Explain correlation analysis.
e. Explain chi-square test.
f. What is shared-memory architecture?
g. Write down characteristics of data warehouse.
h. Which function may be required of servers by user?
i. What are the components of data warehouse?
j. Write short notes on: **i)** Data **ii)** Information **iii)** Knowledge

Section (B)

Q.2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Differentiate between data warehouse and data mining.
b. What are different application areas of data mining?
c. Discuss different type of data sources in details.
d. Differentiate between OLAP & OLTP.
e. What is data warehouse? Give its architecture?
f. Write short note on: **i)** Binning **ii)** regression **iii)** smoothing
g. Explain the difference between classification and clustering and give an informal example of an application that would benefit from each technique.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q.3. **a.** Is it possible to build an SPP system using cluster of PCs? How? What would you propose to make synergy a true SPP system? Justify.
b. What about genetic algorithm? Compare genetic algorithm with other on techniques and explain its use in other methods.

Q.4. **a.** What is shared-memory multiprocessor? Explain with diagram.
b. What is data cleaning? What are the different data cleaning approaches? Explain one approach in detail.

Q.5. **a.** What about redundant data? How to handle data redundancy discuss in details?
b. Write short note on:
i. Bayesian classifiers
ii. Bayesian net
iii. Naïve Bayesian classifiers

Q.6. **a.** Draw KDD process diagram. Discuss the five major elements of data mining in details.
b. Given a set of data
{12,8,45,23,6,7,8,25,34,22,19,22,34,45,41}
Can you employ the binning method to allocate the data on the set into **3** bins by equal-frequency, Smoothing by bin means and smoothing by bin boundaries respectively?

Q.7. **a.** Define Client/Server Model. Explain first generation client/server model with suitable diagram.
b. What do you mean by decision tree? What are advantages and disadvantages of decision tree approaches over other approaches of data mining?

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : MCA FIFTH SEMESTER

COURSE CODE : MCE331 **COURSE TITLE : WEB 2.0 AND RICH INTERNET APPLICATIONS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Write structure of action script.
b. Compare POST method and GET method with syntax.
c. Define CSS.
d. What is Folksonomies?
e. What is data binding?
f. Define role of AJAX in web 2.0.
g. Write syntax of XML Http Request Object.
h. What is interface?
i. Write syntax of XML.
j. Write structure of HTML and XML.

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Differentiate between HTML and flex application?
b. What is web 2.0? Explain the concepts involved in web 2.0.
c. Explain the following terms related to action script (i) Methods ;(ii) Interfaces.
d. Write a note on Images & cookies.
e. Compare and contrast traditional & flex web applications?
f. Write short note on i) validity of integer ii) handling timeouts.
g. Explain the two methods that are used to modify the HTML pages.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Write the syntax of XMLHttp Request object open method. What is the purpose of it? (7.5)
b. List the JavaScript properties that can be used with nodes? (7.5)

Q. 4. **a.** Briefly explain MXML syntax and structure? (7.5)
b. How to create objects in action script? Explain the inheritance features in action script. (7.5)

Q. 5. **a.** Explain XHR object with both GET and POST method. Also list the advantages and disadvantages. (7.5)
b. With a neat diagram, explain how flex application work. (7.5)

Q. 6. **a.** Write an AJAX application to dynamically create & validate an image. (7.5)
b. What is the UI component? What are the common properties implemented with UI component. (7.5)

Q. 7. **a.** Draw the diagram for AJAX application model and traditional web application model and compare them. (7.5)
b. What is XMLHTTP request? With suitable example bring out the different browser implementations of XMLHTTP. (7.5)

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END SEMESTER EXAMINATION. JANUARY-2018

PROGRAM : MCA FIFTH SEMESTER/

COURSE CODE : MCA304/ CCS305 **COURSE TITLE : WEB TECHNOLOGY**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. AJAX stands for?
b. ASP stands for?
c. What is Ruby on Rails?
d. MVC stands for?
e. node.js is a?
f. JSON stands for?
g. DOM stands for?
h. is used for?
i. <a href="url"> is used for?
j. <th> is used for?

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain information passing using GET method.
b. What is Document Object Model?
c. What is Bootstrap? Explain in detail.
d. What is jQuery? Explain why it is important?
e. Explain all ways to insert CSS.
f. Explain 5xx series of server errors.
g. Explain 3xx series of redirection.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** What is GeoIp locator? Explain its working. (7.5)

b. What is a plug-in and widget in CMS? (7.5)

Q. 4. **a.** What is Angular JS? Explain why it is used? (7.5)

b. What is SEO? Explain On-page and Off-page SEO. (7.5)

Q. 5. **a.** Explain SEM in detail. (7.5)

b. Explain the use and importance of CGI.pm. (7.5)

Q. 6. **a.** Explain MVC model for Ruby on Rails (7.5)

b. What is Active record in Ruby on Rails? (7.5)

Q. 7. **a.** What is a controller in MVC model? (7.5)

b. What is a URL and domain of any web site? Why it is important? Explain in detail. (7.5)

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : MCA FIFTH SEMESTER

COURSE CODE : MCE345 **COURSE TITLE : CLOUD COMPUTING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Define Scalability.
b. What is EC2?
c. Define Para virtualization.
d. Write two differences between IAAS and PAAS.
e. What is web 2.0?
f. Define use of SAN.
g. Who developed Aneka? What can be done with it?
h. Difference between simulation and emulation.
i. Name hypervisor developed by Microsoft and write one use of it.
j. Write the role of CSI.

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Define Machine Reference model. Write the role of each entity involved in it.
b. Explain in detail about Hypervisors and their role in cloud computing.
c. Why community clouds are being used? Write in detail about public cloud.
d. What are the main Cloud Information security fundamentals?
e. Write in detail about OS level Virtualization.
f. Who are the players of cloud ecosystem? What are their role?
g. Why cloud is becoming a popular key word in developing countries like India. Where do you see it after 5 years?

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Define different types of virtualization. Which type of virtualization is hardest to achieve. Why? **8**
b. How virtualization can itself become a Vitim of a cyber-attack. How it can be defended. **7**

Q. 4. **a.** Explain in detail about the ways in which we can deploy a cloud. Give example of each type. **8**
b. How many types of services are provided by cloud? Define Network-as-a-service. **7**

Q. 5. **a.** Define Grid, Cluster and Peer-to-peer computing. **8**
b. What is software oriented architecture. Explain it with the help of suitable example. **7**

Q. 6. **a.** What are the functions of VLAN and VPN? How it provide security to a cloud service user. **8**
b. Name some of the application of cloud computing. How it play important role in developing tools used in social media. **7**

Q. 7. **a.** What is Virtual Desktop Infrastructure? Explain about thin client and golden image. **8**
b. Do you think cloud computing technology will survive after 10-15 years? What kind of human resources are required to handle this technology? What are the services which will be using it in near future? **7**

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SEMESTER EXAMINATION. JANUARY-2018

PROGRAM : MCA FIFTH SEMESTER

COURSE CODE : MCA302 / CCS402 **COURSE TITLE : NETWORK SECURITY & CRYPTOGRAPHY**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Distinguish active and passive attack with example.
b. What is confusion?
c. Define Euler's theorem and its application.
d. What is an Elliptic Curve?
e. Mention the scenario where Kerberos scheme is preferred.
f. Suppose that two parties A and B wish to setup a common secret key (D-H key) between themselves using the Diffie-Hellman key exchange technique. They agree on 7 as the modulus and 3 as the primitive root. Party A chooses 2 and party B chooses 5 as their respective secrets. Find out their D-H key?
g. What is X.509 Standard?
h. Consider the following two statements:
i. A hash function (these are often used for computing digital signatures) is an injective function.
ii. A encryption technique such as DES performs a permutation on the elements of its input alphabet.
Which one statement(s) of the above is valid and why?
i. Suppose that everyone in a group on N people wants to communicate secretly with the N - 1 others using symmetric Key cryptographic system. The communication between any two person should not be decodable by the others in the group. The numbers of keys required in the system as a whole to satisfy the confidentiality requirement is
j. What are honey pots?

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Encrypt the plain text , "pay more money", using Hill Cipher, where the key is

$$\begin{Bmatrix} 17 & 17 & 5 \\ 21 & 18 & 21 \\ 2 & 2 & 19 \end{Bmatrix}$$

b. What is Kerberos? Explain how it provides authenticated service
c. What is Euclid's algorithm? Also find gcd (24140, 16762) using Euclid's algorithm.
d. Explain Miller Rabins Primality Testing. Use the same to test the primality of 271, 341. Use base 2.
e. Compare the Features of SHA-1 and MD5 algorithm.
f. Discuss about the objectives of HMAC and it security features.
g. Define S/MIME.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. Write short notes on the following:
a. ElGamal Public key cryptosystem
b. Perform decryption and encryption using RSA algorithm with p=7, q=11, e=17 and M=8.

Q. 4. **a.** Give the structure of AES. Explain how Encryption/Decryption is done in AES.
b. Find the value of $\varphi(100)$ and $\varphi(80)$

Q. 5. Describe the digital signature schemes DSS and ElGamal. What is message authentication? How is it different from message integrity?

Q.6. **a.** What is the need for security services at transport layer of Internet Protocol?
b. Explain the four protocols defined by Secure Socket Layer.

Q.7. **a.** Explain the compression of Secure Hash Algorithm.
b. What are the requirements of hash functions?

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END SEMESTER EXAMINATIONS, JUNE - 2018
MCA SEMESTER IV/ B.TECH.(CSE) SEMESTER VI

COURSE CODE: MCA207/CCS308 **COURSE TITLE: .Net Frame Work and C#**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is local variable?
b. Why do we require type conversion operation?
c. What is initialization? Why is it necessary?
d. What do you mean by boxing and unboxing?
e. Define mutable and immutable string and which classes are used to create them.
f. Why do we use constructor? Write types of constructor (only names).
g. Distinguish between ref and out parameter.
h. Write briefly about polymorphism and name its types.
i. Write syntax of for each loop with example.
j. Write any 2 differences between class and structure.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Suppose we have to develop a login form. Write the login button functionality which takes userid and password as input and if user is authenticated takes user to another page otherwise print message "User is Unauthenticated". (No need to use database)
b. Explain the architecture of web services.
c. Write a program in C# to find the second largest element in an array.
d. What is Microsoft Message Queuing System?
e. Write a program in C# to print all unique elements in an array.
f. What are 2-D vector graphics? Write about any 4 shapes and how they can be created.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Design a class to represent a bank account. Include the following member. (8)

Data Members are:
Name of depositor
Account Number
Type of account
Balance amount in the account
Methods :
1) To assign initial values
2) To deposit an amount
3) To display name and balance

Write a program in C# to demonstrate working.

b. What is operator overloading? Write a program in C# to overload unary '-' operator. (7)

Q. 4. **a.** Write a program in C# to insert value (12, "Hello") into row of SQL database. (12)
Write about types of SQL commands.

b. Write a program to get hostname of local system. (3)

Q. 5. **a.** Write about COM callable wrapper and runtime callable wrapper. What is the advantage of using COM? (7.5)

b. What Graphics Device Interface does in C#? Also, explain brush class. (7.5)

Q. 6. **a.** Write a program in C# to determine if 2 strings are anagrams of each other. (7.5)
(Anagrams are strings having same characters)

b. Write a program in C# to split string in words. (7.5)

Q. 7. **a.** What is the difference between radio button and checklist box? Write a function for button which adds the items in listbox based on items checked in checklistbox (7.5)

b. Write a program in C# to enter a string and count the number of capital letters, small letters, digits, spaces and special characters. (7.5)

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Enrol. No. | S | R | H | U | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM: MCA FOURTH SEMESTER / B.TECH.(CSE) SIXTH SEMESTER

COURSE CODE : MCA208 / CCS310 **COURSE TITLE : COMPILER DESIGN**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is reduce-reduce (R-R) conflict in LR parser?

b. Eliminate Left recursion from the following grammar:

E→aa/abba/Eb/EE

c. Define operator precedence grammar.

d. Construct DAG for the following sequence of 3AC statements

X=Y/Z

W=P*Y

Y=Y*Z

P=W-X

e. Discuss the importance of symbol table in compiler design.

f. Differentiate between syntax directed definition and syntax directed translation scheme?

g. Define kernel and non-kernel items with suitable example.

h. What is loop Jamming? Give suitable example to explain it.

i. Define point and path with reference to global data flow analysis.

j. Consider the following grammar:

0: **S → X** , 1: **X → aXc** , 2: **X → XX** , 3: **X → b**

What is Closure ({**X → X.X**})?

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Write the quadruples, triples and indirect triples for the following expression:

X[i]:= Y

X := Y[i]

b. Consider the following Sequence of 3AC statements in which ** denotes exponentiation.

```
a := b + c
z := a ** 2
x := 0 * b
y := b + c
w := y * y
u := x + 3
v := u + w
```

Assume that the only variables that are live at the exit are v and z, apply code optimization techniques.

c. Discuss the working of Lex compiler. Also, explain the format of its input specification file.

d. Consider the following grammar and compute the FIRST and FOLLOW sets.

S→ABa / bCA , A→CBCD / Ɛ , B→CdA / ad , C→eC / Ɛ , D→bSf / a

e. Use Thompson's construction to construct a NFA for the following regular expression

(aa+b)*(a+cc)*

f. Define dominator. Write down the algorithm for global data flow analysis.

g. Write down the operator precedence parsing algorithm for the given input string and precedence table.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

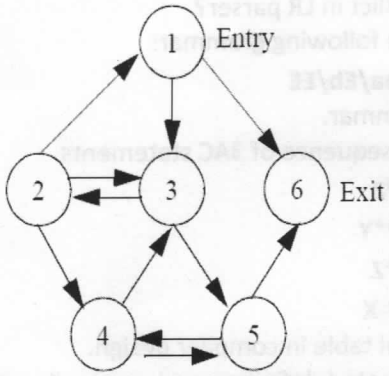
Q. 3. **a.** Define tokens, patterns and lexemes with suitable example. **(7.5)**

b. Describe the various data structures used to create a symbol table? **(7.5)**

Q. 4. **a.** Generate the 3AC for the following program: **(7.5)**

```
int a[20], b[20], dp, i;
int *a1, *b1;
dp=0, a1=a, b1=b;
for(i=0;i<20;i++)
dp+=*a1++ * *b1++;
```

b. What are the natural loop(s) in the following flow graph? **(7.5)**



Is the above flow graph reducible? Explain your answer.

Q. 5. Consider the following grammar for variable and class declarations in Java:

<Decl> → <VarDecl> | <ClassDecl>
<VarDecl> → <Modifiers> <Type> <VarDec> SEM
<ClassDecl> → <Modifiers> CLASS ID LBRACE <DeclList> RBRACE
<DeclList> → <Decl> | <DeclList> <Decl>
<VarDec> → ID | ID ASSIGN <Exp> | <VarDec> COMMA ID | <VarDec> COMMA ID ASSIGN <Exp>

For this grammar answer the following questions:

a. Indicate any problems in this grammar that prevent it from being parsed by a recursive-descent parser with one token look-ahead. You can simply indicate the offending parts of the grammar above. **(7.5)**

b. Transform the rules for <VarDec> and <DeclList> so they can be parsed by a recursive-descent parser with one token look-ahead i.e., remove any left-recursion and left-factor the grammar. Make as few changes to the grammar as possible. The non-terminals <VarDec> and <DeclList> of the modified grammar should describe the same language as the original non-terminals. **(7.5)**

Q. 6. Discuss the implementation of CLR parser with suitable example. **(15)**

Q. 7. Apply gencode() function to design the machine code for the following program fragment, where a and b are array of size 20 x 20 having low1=low2=1, and there are four bytes per word. **(15)**

```
begin
        prod = 0;
        x=1;
        y=1;
do
    begin
      prod= prod + a[x,y] * b[x,y]
        x= x+1;
        y= y+1;
    end
  while x<= 20 and y<= 20;
end
```