Total No. of Questions : **08** Roll No. : 0701.....................................

B.Tech SIXTH SEMESTER EXAMINATION JUNE-2025

(Branch : Computer Science & Engineering)

CS-6311 (EL-I) DATA MINING

Time : Three Hours	***Maximum Marks : 70*** ***Min. Pass Marks : 22***

Note : Attempt any five questions. Each question carries equal marks.

1(a) Define term Data Warehouse. Describe the multi-tiered data warehouse architecture. ***07***

(b) Define data marts and also discuss the types of data marts. ***07***

2(a) Explain OLAP operations with examples. ***07***

(b) Differentiate between : ***07***

(i) OLAP and OLTP
(ii) ROLAP and MOLAP

3(a) Explain KDD process in brief with suitable example. ***07***

(b) What is the need of Data Preprocessing? Discuss various forms of preprocessing. ***07***

4(a) What are association rules? Define frequent Sets, Support and Confidence. Discuss importance of discovering association rules. ***07***

(b) Explain term Frequent Patterns. Write FP-Growth algorithm with example. ***07***

5(a) What are the advantages of decision tree induction? ***07***

(b) Explain terms Over fitting and Pruning in case of Decision tree. Write their disadvantages during classification process. ***07***

6(a) List out the differences between classification and clustering methods with example. ***07***

(b) Discuss any two conceptual model of Data Warehouse schema with examples ***07***

7(a) Explain term DATA CUBE. Discuss various operations associated with Data Cube. ***07***

(b) What is the concept of Partitional Methods for Cluster analysis? Explain K-means method. ***07***

8 Short note on **any two** : ***14***

(i) Data cleaning
(ii) DBSCAN
(iii) Quality and Validity of Cluster Analysis Methods

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Total No. of Questions : **08** Roll No. : 0701....................................

B.Tech SIXTH SEMESTER EXAMINATION JUNE-2025

(Branch : Computer Science & Engineering)

CS-6301 COMPILER DESIGN

Time : Three Hours ***Maximum Marks : 70***
Min. Pass Marks : 22

Note : Attempt any five questions. Each question carries equal marks.

1(a) Explain LEX and YACC. Also describe various allocation data structures that are useful in Compiler Design. ***07***

(b) Language Processing = Analysis of Source Program + Synthesis of Target Program. What does this statement mean? ***07***

2(a) Explain the need of lexical analysis. Also explain what difficulties would arise if lexical analysis is not performed before syntax analysis. ***07***

(b) Draw a transition diagram that recognizes the lexemes matching the token relop. Where relop represents relational operators? ***07***

3(a) In Bottom-up parsing "The leftmost substring that matches the body of some production need not to be a handle". What does this statement mean show by an example? ***07***

(b) Consider the following grammar G with productions : ***07***

$S \rightarrow L = R \mid R$
$L \rightarrow * R \mid id$
$R \rightarrow L$

Prove that the above grammar G is *unambiguous* but not *SLR(1).*

4(a) Show the three-address code and its quadruple representation for the given assignment : ***07***

a = b*-c + b*-c

(b) Explain various rules for Type Checking in intermediate code generation. ***07***

5(a) Consider the program to calculate primes given below: ***07***

```
begin
    read n;
    for i:=2 to n do
        a[i]:=true;   /*initialize*/
    count:=0;
    for i:=2 to n/2 do
        if a[i] then   /*i is a prime */
            begin
                count:=count+1;
                for j:=2*i to n by i do
                    a[j]:=false   /* j is divisible by i */
            end;
    print count
end
```

Construct a flow graph from the equivalent three-address-statements of the given program.

P.T.O.

5(b) Consider the program of Q.5(a) and eliminate induction variable wherever possible. ***07***

6(a) Classify grammars on the basis of the nature of productions they use. ***07***

(b) Draw a NFA N for (a|b)*abbusing Thompson's construction method. ***07***

7(a) There are context-free grammars for which shift-reduce parsing cannot be used, Why? ***07***

(b) What is Garbage Collection in compiler? Also give difference between Static and Dynamic Storage Allocation in context of compiler. ***07***

8(a) Write short note on : ***07***

(i) HiPE Compiler
(ii) The LLVM Modular and Reusable Compiler Technologies.
(iii) The Sun Compilers for SPARC.

(b) What do you mean by code optimization? How it improves the efficiency of execution? Explain why it is an option in the pass structure of the compiler. ***07***

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Total No. of Questions : **08** Roll No. : 0701....................................

B.Tech SIXTH SEMESTER EXAMINATION JUNE-2025

(Branch : Computer Science & Engineering)

CS-6302 NETWORK & WEB SECURITY

Time : Three Hours

Maximum Marks : 70
Min. Pass Marks : 22

Note : Attempt any five questions. Each question carries equal marks.

1(a)	Discuss the various types of attacks (passive and active) on network security. Provide examples for each type.	*07*
(b)	What are security services and mechanisms? Illustrate how these components work together within the OSI model to achieve secure communication.	*07*
2(a)	Describe the design principles and internal structure of the Data Encryption Standard (DES). What are its main components and how do they contribute to security?	*07*
(b)	RC4 is a widely known stream cipher. Explain its key scheduling algorithm (KSA) and pseudorandom generation algorithm (PRGA). What are the known vulnerabilities of RC4?	*07*
3(a)	Explain the Diffie-Hellman key exchange protocol. How does it allow two parties to establish a shared secret over an insecure channel?	*07*
(b)	Elliptic Curve Cryptography (ECC) is considered more efficient than RSA. Analyze the mathematical principles of ECC and explain why smaller key sizes provide comparable security.	*07*
4(a)	Define Public Key Infrastructure (PKI). Discuss its components and how PKI enables secure communication over an open network.	*07*
(b)	Compare and contrast PGP and S/MIME in terms of their architecture, key management, and functionality for secure e-mail communication.	*07*
5(a)	Describe the IP Security Architecture. What are the main protocols involved, and how do they interact to secure IP packets?	*07*
(b)	Compare and contrast intrusion detection systems (IDS) and intrusion prevention systems (IPS). How can IDS be used to detect and mitigate threats such as DDoS attacks or malware infiltration?	*07*
6(a)	Given two large integers, explain a method for testing their primality. Why is prime testing critical in cryptographic systems like RSA?	*07*
(b)	How do differential and linear cryptanalysis techniques work against symmetric ciphers? Explain their significance in the evaluation and design of secure block ciphers.	*07*
7(a)	Consider two users employing the Diffie-Hellman key exchange with public parameters $p = 23$ and $g = 5$. If Alice's private key is 6 and Bob's is 15, compute the shared secret.	*07*
(b)	Illustrate the step-by-step process of authentication using Kerberos. What are the potential vulnerabilities if timestamps are not synchronized properly between users and servers?	*07*
8	Write short note on **any two** : (i) Algebraic Structures (ii) Steganography (iii) Digital signature using RSA (iv) Secure Electronic Transaction (SET)	***14***

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B.Tech SIXTH SEMESTER EXAMINATION JUNE-2025

(Branch : Computer Science & Engineering)

CS-6303 COMPUTER GRAPHIC & MULTIMEDIA

Time : Three Hours *Maximum Marks : 70*
Min. Pass Marks : 22

Note : Attempt any five questions. Each question carries equal marks.

1(a)	Explain the function of display processor in Raster Scan Display. Compare the merit and demerit of raster and vector devices.	*07*
(b)	Develop Bresenham's algorithm to generate a line segment with positive slope greater than one and use it to find the points need to be rasterized along the path of the line segment from (1,2) to (3,10).	*07*
2(a)	Explain the following terms in 2D - translation, scaling &rotation about origin & reflection about x-axis with the help of example.	*07*
(b)	What is line clipping and polygon clipping? Suppose that a window has its lower left corner at (-2,-1) and upper right corner at (3,2). Using Cohen-Sutherland line clipping algorithm, find the visible portion if any, on the line segment joining the points (-3,1) and (1,-2).	*07*
3(a)	Differentiate between parallel and perspective projections.	*07*
(b)	Describe the application of computer graphics in removal of hidden surfaces. Explain depth buffer algorithm for displaying the visible surface of a number of objects.	*07*
4(a)	What are the components of multimedia system? In what format are these data stored in a computer? Discuss how they are linked with each other.	*07*
(b)	Explain RTF, TIFF, MIDI, and JPEG file formats.	*07*
5(a)	Describe the MPEG video encoding technique.	*07*
(b)	What are the different methods of data compression? Explain the steps involved in image compression.	*07*
6(a)	During area filling one start with a point inside the polygon region and point it outward towards boundary. Which fill algorithm is this? Explain it showing how 8-connected approach fills complex figures.	*07*
(b)	Explain Bezier curve with its properties and compare this curve with B-spline curve.	*07*
7(a)	The reflection along the line y = x is equivalent to the reflection along the x-axis followed by counter clockwise rotation by θ degrees. Find the value of θ.	*07*
(b)	What is Animation? What are the challenges faced in its implementation? Write the steps in generation of animation.	*07*
8	Write short notes on **any two**: (i) Color models (ii) Authoring tools (iii) Gouraudshading (iv) Aliasing and Antialiasing	*14*

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Total No. of Questions : **08** Roll No. : 0701......................................

B.Tech SIXTH SEMESTER EXAMINATION JUNE-2025

(Branch : Computer Science & Engineering)

EC-6351 (OEL-II) INTERNET OF THINGS

Time : Three Hours *Maximum Marks : 70*
Min. Pass Marks : 22

Note : Attempt any five questions. Each question carries equal marks. All parts of a question must be attempted at the same place.

1(a) Discuss the characteristics and conceptual framework of IOT giving suitable diagram.

(b) Discuss architectural view and physical design of IOT giving suitable diagram.

2(a) Discuss software defined networking and networking function virtualization for IOT.

(b) Discuss IOT cloud-based services and data storage in IOT.

3(a) Discuss web communication protocol and message communication protocols for connected devices.

(b) Discuss simple object access protocol and Representational state transfer in IOT and compare them also.

4(a) Discuss participatory sensing and wireless sensor network technology.

(b) Discuss industrial IOT and automotive IOT giving suitable diagram.

5(a) Discuss the specification, requirement and process of design methodology of IOT.

(b) Discuss privacy and security solutions of IOT in detail.

6(a) Discuss HTTP Restful and web sockets in detail.

(b) Write a detailed note on Internet based communication and internet connectivity.

7(a) Discuss Logical design and application of IOT.

(b) Discuss IOT based Smart city street lights control and monitoring a case study.

8 Write short notes on **any two** :

(i) Raspberry Pi & Arduino devices
(ii) Media Access Control
(iii) Radio Frequency Identification Technology
(iv) Machine-to-Machine (M2M)
(v) Functional & operational view of IOT design methodology

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