

F-3045

Sub. Code

7MCE1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science

APPLIED MATHEMATICS FOR COMPUTER SCIENCE

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define tautology. Give example.
2. What is the condition for a statement A to tautologically imply a statement B?
3. What is existential Quantifier? Give example.
4. Define disjunctive normal form.
5. Define Rooted tree. Give example.
6. Define level and height of a rooted tree. Give example.
7. Define the canonical form of linear programming problem.
8. What is meant by optimum solution of an LPP?
9. State the mathematical formulation of an assignment problem.
10. What is meant by prohibited assignments?

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Prove that following implications

(i) $(P \wedge Q) \Rightarrow (P \rightarrow Q)$

(ii) $P \Rightarrow (Q \rightarrow P)$.

Or

- (b) Show the following equivalence

$$\neg(P \supset Q) \Leftrightarrow (P \vee Q) \wedge \neg(P \wedge Q)$$
.

12. (a) Obtain the disjunctive normal form of
- $P \vee (Q \wedge R)$
- .

Or

- (b) Obtain the disjunctive normal form of

$$\neg(P \vee Q) \supset (P \wedge Q)$$
.

13. (a) Explain spanning tree with example.

Or

- (b) Explain binary tree with example.

14. (a) Use graphical method to solve the following problem

Maximize $z = 2x + 3y$

Subject to $x + y \leq 30$

$x - y \geq 0$

$y \geq 3, 0 \leq x \leq 20, 0 \leq y \leq 12$

Or

(b) An animal feed company must produce 200lbs of a mixture containing the ingredients X_1 and X_2 . X_1 costs Rs. 3 per lb and X_2 cost Rs. 8 per lb. Note that more than 80 lbs of X_1 can be used and minimum quantity to be used for X_2 is 60 lbs. Find how much of each ingredient should be used if the company wants to minimize the cost. Formulate the above problem.

15. (a) Obtain an initial basic feasible solution to the following transportain problem using Vogel's approximation method.

		To		Available	
		7	3	4	2
From	2	1	3	3	
		3	4	6	5
Demand	4	1	5		

Or

(b) The Head of the department has five jobs A, B, C, D, E and five sub-ordinates V, W, X, Y, Z . The number of hours each man would take to perform each job is as follows.

	V	W	X	Y	Z
A	3	5	10	15	8
B	4	7	15	18	8
C	8	12	20	20	12
D	5	5	8	10	6
E	10	10	15	25	10

How should the jobs be allocated to minimize the total time?

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Obtain an equivalent formula for the following which contains neither the biconditional or conditional

(a) $P \wedge (Q \supset R) \vee (R \supset P)$

(b) $((P \vee Q) \wedge R) \rightarrow (P \vee R).$

17. Obtain the principal disjunctive normal forms of the following and also identify whether they are tautologies or not

(a) $Q \wedge (P \vee \neg Q)$

(b) $(Q \rightarrow P) \wedge (\neg P \wedge Q).$

18. Discuss in detail about matrix representation of Graphs.

19. Use two-phase simplex method to solve the following LPP.

Maximize $Z = 5x_1 + 8x_2$

Subject to $3x_1 + 2x_2 \geq 3$

$$x_1 + 4x_2 \geq 4$$

$$x_1 + x_2 \leq 5, x_1, x_2 \geq 0.$$

20. Find the optimum solution to the following transportation problem using MODI method.

	T ₁	T ₂	T ₃	T ₄	Availability
B ₁	5	3	6	2	19
B ₂	4	7	9	1	37
B ₃	3	4	7	5	34
Requirement	16	18	31	25	

F-3046

Sub. Code

7MCE1C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science

DESIGN AND ANALYSIS OF ALGORITHMS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define space and time complexity.
2. Differentiate stack and queue.
3. Write the recurrence relation of divide and conquer algorithm.
4. Write the recurrence relation for computing time of quick sort.
5. What is feasible solution?
6. Write the purpose of Huffman codes.
7. Define multistage graph.
8. Give example for biconnected graph.
9. What is backtracking?
10. Give example for hamiltonian cycles.

Part B**(5 × 5 = 25)**Answer **all** questions, choosing either (a) or (b).

11. (a) Give a brief note on recursive function with example.

Or

- (b) Write an algorithm for stack operations.

12. (a) Explain how to use recursion for finding maximum and minimum of set of elements.

Or

- (b) Prove that the average computing time $T_A(n)$ of selection sort is $O(n)$.

13. (a) Find the feasible solution to the job sequencing instance $n = 4$, $\{p_1, p_2, p_3, p_4\} = \{100, 10, 15, 27\}$ and $\{d_1, d_2, d_3, d_4\} = \{2, 1, 2, 1\}$.

Or

- (b) Write greedy algorithm to generate shortest path.

14. (a) Explain Bellman Ford algorithm to compute shortest path.

Or

- (b) Write an algorithm for tree traversals.

15. (a) Explain how to estimate the efficiency of backtracking.

Or

- (b) Describe the function for Knapsack problem.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain different representation of Graph.
 17. Discuss about binary search with example.
 18. Describe the stages of Kruskal's algorithm.
 19. Explain breadth first search tree.
 20. Give a brief note on Graph Coloring.
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F-3047

Sub. Code

7MCE1C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science

ADVANCED JAVA PROGRAMMING

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Section A

(10 × 2 = 20)

Answer **all** questions.

1. What is JDBC – ODBC Bridge?
2. What is the purpose of SQL Exception class?
3. What are the two kinds of TCP sockets in Java?
4. How is datagram implemented in Java?
5. What is the purpose of Bound property?
6. What is meant by persistence? How is it achieved in Java Bean?
7. What is servlet? What are the advantages of servlets over CGI?
8. What is a cookie?

9. Tabbed panes are encapsulated by _____ class, which extends _____.
10. What methods are used for drawing Ellipses and circles?

Section B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) What is JDBC? How does it work?
- Or
- (b) Explain JDBC metadata classes.
12. (a) Explain URL and URL connection classes with example code.
- Or
- (b) With a sample code, explain how the contents of a document is cached on a server.
13. (a) Explain JAR files.
- Or
- (b) What is Java Bean? Explain its advantages and disadvantages?
14. (a) What is meant by session Tracking? How is it achieved in HTTP servlet.
- Or
- (b) Draw a state diagram and explain the life cycle of servlet.
15. (a) Discuss the constructors and methods of color class.
- Or
- (b) How is a table created using swing class?

Section C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the Anatomy of a JDBC application and the classes and statements involved.
 17. Write a simple client/server application using RMI and explain the concepts.
 18. Discuss the Design patterns for properties and Events.
 19. Discuss any four important classes and interfaces in Javax.servlet package.
 20. How is a Tree created in an Applet? Explain the various classes and methods used?
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Sub. Code

7MCE1C4

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science

PRINCIPLES OF COMPILER DESIGN

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. Define a compiler.
2. Define a string with an example.
3. Construct a parse tree for $id + id * id$.
4. List down the four actions performed by a shift-reduce parser.
5. Draw the syntax tree for $a * (b + c) / d$.
6. Write about unconditional jumps.
7. Write down the format of symbol table.
8. Specify any two block structured languages.
9. Define a basic block.
10. What do you mean by an optimal ordering?

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Why do we need translators? Explain.

Or

- (b) Explain the method of constructing a deterministic finite automation from a non-deterministic one.

12. (a) Write about ambiguous grammar with an example.

Or

- (b) Write an algorithm for the construction of an SLR parsing table.

13. (a) Explain the method of evaluating the postfix expressions by an example.

Or

- (b) Discuss about the statements that alter the flow of control.

14. (a) Discuss about Hash tables.

Or

- (b) Explain about the storage allocation in Block-structured languages.

15. (a) How can you construct a DAG? Explain.

Or

- (b) Discuss in brief the problems in code generation.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe the structure of a compiler with a neat diagram.
 17. Explain the stack implementation of Shift-Reduce Parsing with an example.
 18. Discuss about any two kinds of intermediate codes used in compilers with examples.
 19. Discuss the storage allocation in brief.
 20. Explain a simple code generator in detail.
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F-3049

Sub. Code

7MCE1E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science

**Elective — OBJECT ORIENTED ANALYSIS AND
DESIGN**

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are the characteristics of an object oriented systems?
2. What is meant by overriding?
3. Define scenarios and event trace.
4. What is a constraint? What are the different types of constraints?
5. What are the steps required in constructing an object model?
6. What is an operation in OOAD parlance? What are the different sources of operations?
7. What are the two forms of layered architecture? When is one preferred over the other?
8. Write down any four kinds of a system.

9. Draw the implementations of stack using Inheritance and delegation? Which one is better than the other?
10. What are the trade-offs between information hiding and optimization?

Part B**(5 × 5 = 25)**Answer **all** questions, choosing either (a) or (b).

11. (a) How do you establish relationships among objects and classes?

Or

- (b) Draw an object model of windowing system discuss the underlying O.O. concepts.

12. (a) Discuss state Generalization with example.

Or

- (b) Explain the relation of object and dynamic models.

13. (a) Discuss scenario, event and event trace with an example.

Or

- (b) How are object attributes identified and right attributes selected?

14. (a) How are sub systems allocated to processors and tasks?

Or

- (b) Discuss the two kinds of control flows in a software system.

15. (a) Discuss any three issues in designing algorithms.

Or

(b) What are the three different models in O.O. Design?
How are they combined?

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Discuss aggregation and multiple inheritance.
 17. Discuss the components of DFD and explain how a functional model is designed using DFD.
 18. Discuss the steps performed in constructing a dynamic model.
 19. Discuss any four common architectural frameworks.
 20. Explain design optimization. Why is it required?
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F-3050

Sub. Code

7MCE1E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science

Elective : SYSTEM SOFTWARE

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. List down the language processing activities.
2. Define a production with its format.
3. Give an example for a DFA.
4. Write down the format of an assembly language statement.
5. Write any two expansion time statements with their syntax.
6. Write the post fix form of $a + b * c + d * e \uparrow f$.
7. What are the components of a interpreter?
8. Define linking.
9. Specify the two object program forms supported by MSDOS.
10. What is a programming environment?

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Write briefly about intermediate representation with its properties.

Or

- (b) Write short notes on Entry formats.

12. (a) How DFA's can be built? Explain with an example.

Or

- (b) Discuss about any two advanced assembler directives.

13. (a) Write about positional and keyword parameters with examples.

Or

- (b) Discuss about the various parameter passing mechanisms.

14. (a) Describe pure and impure interpreters.

Or

- (b) Write down the format of an object module.

15. (a) Discuss about program testing and debugging.

Or

- (b) Write about program environment with its components.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe any two types of table organization in brief.
 17. Describe top down parsing with its implementation with an example.
 18. Explain the design of a macro preprocessor.
 19. Discuss about some of the optimizing transformations used in compilers.
 20. Describe the structure of user Interface and UIMS.
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F-3051

Sub. Code

7MCE1E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer science

Elective – SOFTWARE ENGINEERING

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. What is meant by system software and application software?
2. State the distinguishing feature of the spiral model.
3. What is QFD?
4. Define use-case and actor.
5. State the software equation for the cost estimation model.
6. Mention the ways in which LOC and FP are used during software project estimation.
7. What is the purpose of black– box and while–box testing?
8. State the benefit of smoke testing.
9. What are the three factors that have profound influence on software quality and organizational performance?
10. Define CBSE.

Part B**(5 × 5 = 25)**

Answer **all** the questions, choosing either (a) or (b).

11. (a) State the characteristics of software? Discuss.

Or

- (b) Write short notes on Legacy software.

12. (a) Describe the steps required to initiate requirements engineering.

Or

- (b) Explain how to write effective use-cases in detail.

13. (a) Explain process-based estimation with examples.

Or

- (b) Enlighten about empirical estimation models.

14. (a) Explain basis path testing in detail.

Or

- (b) Describe validation testing in detail.

15. (a) Write short notes on economics of CBSE.

Or

- (b) Describe in detail about Reusable components and Reuse environment.

Part C**(3 × 10 = 30)**Answer any **THREE** questions.

16. Elaborate on prescriptive models and incremental models in detail.
 17. Describe in detail about the function accomplished during the requirement engineering tasks.
 18. Discuss briefly about problem- based estimation and Use-Case based estimation with examples.
 19. Explain various black-box testing methods.
 20. Describe in detail about software measurement and also the metrics used for software quality.
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F-3052

Sub. Code

7MCE2C1

M.Sc DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science

COMPUTER SYSTEM ARCHITECTURE

(CBCS – 2017 onwards)

Time :3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is CPU? What are its major components?
2. Define Stack.
3. How do you define the internal hardware organization of a digital computer?
4. Define Selective complement operation.
5. What is the advantage of Microprogrammed Control unit?
6. What is the purpose of Control Address Register?
7. What is meant by Asynchronous data transfer?
8. Define Hit ratio.
9. What is meant by delayed branch?
10. Write any two characteristics of RISC architecture.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain Instruction formats.

Or

- (b) Discuss the purpose of Status Register in Program Control.

12. (a) A digital computer has a common bus system for 16 registers of 32 bits each. The bus is constructed with multiplexers.

- (i) How many selection input are there in each multiplexer?
(ii) What size of multiplexers are needed?
(iii) How many multiplexers are there in the bus?

Or

- (b) Discuss Input-Output configuration.

13. (a) Define the following

- (i) Micro operation
(ii) Microinstruction
(iii) Micro program
(iv) Microcode

Or

- (b) Explain Address Sequencing in Microprogram control unit.

14. (a) Explain Associative memory.

Or

(b) Explain I/O Interface and connection of I/O bus to Input and Output devices.

15. (a) Discuss the characteristics of Multiprocessors.

Or

(b) Explain Array Processing.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain any six Addressing modes with examples.

17. Explain Instruction Cycle with necessary flowchart.

18. Explain Microprogram sequencer.

19. Explain Parallel Priority interrupt hardware.

20. Explain Instruction Pipeline and the difficulties associated with it.

F-3053

Sub. Code

7MCE2C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science

.NET TECHNOLOGY

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is .NET Framework?
2. What is object oriented programming?
3. Define scope.
4. What is mean by docking a control?
5. What is the difference between Tree and list views?
6. What is Typography?
7. Define name space.
8. Why do we need validator control?
9. What is the difference between ADO and ADO .Net?
10. What is a Repeater?

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write a short note on .Net Assemblies.

Or

- (b) How will you create a structure? Explain with an example.

12. (a) Describe the facilities for handling sub procedures in VB Net.

Or

- (b) How will you create dialog boxes? Explain with an example?

13. (a) Describe the functionality of splitters and notify Icons

Or

- (b) Briefly describe file handling in VB .Net.

14. (a) Explain the usage of Global. asax file.

Or

- (b) Discuss on the creation of user custom controls.

15. (a) Explain the characteristics of ADO.Net

Or

- (b) How data binding is used in ASP.Net Applications? Explain with example.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. How is method overloading different from method overriding? Explain with example.
 17. Elaborate on conditional statement in VB.Net with an Example.
 18. Discuss about the significance of built in Dialog boxes.
 19. Give a detailed note on Http Request and Http response.
 20. Explain the step to implement forms- based security with Diagram.
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F-3054

Sub. Code

7MCE2C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer science

DISTRIBUTED OPERATING SYSTEM

(CBCS – 2017 onwards)

Time : 3 hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are the two primary tasks of operating system?
2. What are PSEs?
3. What are the two basic methods for information sharing?
4. Define buffering.
5. Mention the four factors that are influencing the block size selection?
6. Why does a computer need timer mechanism?
7. Define: File system
8. What do you mean by mutable file model?
9. What do you mean by external security?
10. What are the main types of authentication in distributed system?

Part B

(5× 5= 25)

Answer **ALL** questions, choosing either (a) or (b).

11. (a) What is DCE? Explain its components in detail.

Or

- (b) Differentiate LAN and WAN using their key characteristics.

12. (a) Explain the role of synchronization in distributed system message passing.

Or

- (b) Explain the many-to many communication scheme in group communication of message passing.

13. (a) Write down the advantages of DSM.

Or

- (b) Explain the WFG- based distributed algorithm for deadlock detection.

14. (a) Write the difference between replication and caching.

Or

- (b) State the general principles for designing distributed file system.

15. (a) Explain about key distribution in asymmetric cryptosystems.

Or

- (b) Explain the mechanism of password based authentication system.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss about the issues in designing distributed system.
 17. What are the desirable features of a good message-passing system? Explain.
 18. Explain the different approaches used to implement mutual exclusion.
 19. What are the desirable features of good distributed file system? Explain.
 20. Explain the concept of digital signature for distributed system security in detail.
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F-3055

Sub. Code

7MCE2E1

M.SC DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer science

Elective – MOBILE COMPUTING

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is meant by laptop computing?
2. Distinguish between mobility and portability.
3. Define Multiplexing.
4. What is mobility management?
5. What is agent discovery?
6. What do you mean by registration reply?
7. What is a Datagram?
8. What is foreign agent key?
9. What is smooth handoff?
10. Define Ingress filtering.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) What is mobile networking? Explain.

Or

- (b) Describe the architectural model of IETF Mobile IP protocol.

12. (a) Write a note on signal propagation.

Or

- (b) Briefly explain about handover in cellular systems.

13. (a) Explain the operation of mobile agent.

Or

- (b) Explain the procedure to register mobile node.

14. (a) Write a note on generic routing encapsulation.

Or

- (b) How do you bind caches? Explain.

15. (a) Write about DHCP protocol and its functions.

Or

- (b) What is reverse tunneling? Explain.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Explain the overview of IP and routing with neat diagram.
 17. Describe the GSM system architecture with appropriate diagram.
 18. Explain in detail about agent advertisement.
 19. Explain the different route optimization message formats.
 20. Explain in detail about Wireless Telephony Application.
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F-3057

Sub. Code

7MCE2E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science

Elective — COMPUTER GRAPHICS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. Define Morphing.
2. Distinguish between image processing and computer graphics.
3. State the attributes of character.
4. Define Shear.
5. What is the purpose of input modes of input functions?
6. Define point clipping.
7. State any two applications of depth cueing.
8. What is meant by parallel and perspective projections?
9. Define cabinet projection.
10. What is vanishing point?

Part B**(5 × 5 = 25)**

Answer **all** the questions, choosing either (a) or (b).

11. (a) Describe midpoint circle algorithm in detail.

Or

- (b) Explain the techniques used for color displays.

12. (a) Write short notes on character attributes.

Or

- (b) Explain composite transformations with proper illustration.

13. (a) Describe in detail about text clipping.

Or

- (b) Write briefly about segment attributes.

14. (a) Explain the three dimensional graphics packages in detail.

Or

- (b) Discuss briefly about the three-dimensional display techniques.

15. (a) Explain general parallel-projection transformations in detail.

Or

- (b) Explain back-face detection method in detail.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Discuss briefly about interactive input devices.
 17. Explain in detail about the following transformations in detail.
 - (a) Reflection
 - (b) Shear
 - (c) Translation, Scaling and Rotation
 18. Enlighten about the interactive-picture construction methods.
 19. Explain the three dimensional transformations in detail.
 20. Explain depth buffer method in detail.
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F3058**Sub. Code****7MCE2E4****M.Sc. DEGREE EXAMINATION, NOVEMBER 2019****Second Semester****Computer Science****Elective — PARALLEL PROCESSING****(CBCS – 2017 onwards)**

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **All** Questions.

1. Define parallelism.
2. What is hypercubes?
3. What is ring network?
4. What is control parallelism?
5. Write the types of mapping?
6. Define message passing.
7. Write any two performance laws.
8. Write any two parallel search algorithms.
9. What is multiport memory?
10. Expand NUMA.

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) How to implement parallel processing.
- Or
- (b) Describe the computational demands of parallel processing.
12. (a) Give a brief note on loosely coupled systems.
- Or
- (b) Describe mesh & hypercube architecture.
13. (a) Differentiate message passing & shared address space.
- Or
- (b) Discuss three types of Granularity.
14. (a) Explain Amdahl's & Gustafson's laws.
- Or
- (b) Write a note on types of complexities.
15. (a) Explain cross bar & multiport memory.
- Or
- (b) Discuss about cache coherence.

Part C $(3 \times 10 = 30)$

Answer any **Three** questions.

16. Describe the major issues in parallel processing.
17. Explain tightly coupled systems.

18. Discusses the types of mapping.
 19. Explain depth first & breadth first search algorithms.
 20. Describe memory Contention techniques.
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F-3059

Sub. Code

7MCE2E5

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science

Elective : ADVANCED DATABASE SYSTEMS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. What is data dictionary?
2. Differentiate between schema and instances.
3. What are the main reasons for the delay in development and implementation of relational model.
4. Compare the derived attribute and stored attribute.
5. Describe the concept of full functional dependency.
6. Write the purpose of normalising data.
7. What is client/server computing? What are its main components?
8. What is semi-JOIN?
9. What are multimedia databases?
10. What are the newer modules available for MySQL stability.

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write short notion the functions and responsibilities of DBAs.

Or

- (b) Write a note on data model.
12. (a) Describe with example the different types of keys used in relational model.

Or

- (b) An enterprise database needs to store information as follows :

EMPLOYEE(EMP-ID, SALARY, PHONE)

DEPARTMENTS(DEPT-ID, DEPT-NAME, BUDGET)

EMPLOYEE-CHILDREN(NAME, AGE)

Employees 'work' in departments. Each department is 'managed by' an employee. A child must be identified uniquely by 'name' when the parent (who is an employee) is known. Once the parent leaves the enterprise, the information about the child is not required. Draw an E-R diagram that captures the above information.

13. (a) Illustrate the three Armstrong's axioms using diagrammatical representation.

Or

- (b) Consider the universal relation R (A, B, C, D, E, F, G, H, I, J) and the set of FDs are given as

$$F = (\{A, B\} \rightarrow \{A\} \rightarrow \{D, E\}, \{B\} \rightarrow \{F\}, \{F\} \rightarrow \{G, H\},$$

$$\{D\} \rightarrow \{I, J\}.$$

- (i) What is the key of R?
- (ii) Decompose R into 2NF, then 3NF relations.

14. (a) What is middleware system architecture? Explain with a neat sketch and an example.

Or

- (b) What is distributed locking? What are its advantages and disadvantages?
15. (a) What is a mobile database? Explain the architecture of mobile database with neat sketch.

Or

- (b) Write the features of MySQL 4.1.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the important operations performed on the data file with example.
17. What are the problems that arise when constructing an E-R model? How will you resolve them? Illustrate with examples.
18. Define the concept of multi valued dependency and describe how this concept relates to 4NF. Provide an example to illustrate your answer.
19. Explain the functioning of two-phase and three-phase commit protocols used in recovery control of distributed database system.
20. Define MySQL database. How will you create the MySQL tables? Explain with examples the insertion of data into and retrieval of information from the MySQL table.

F-3060

Sub. Code

7MCE2E6

**M.Sc. DEGREE EXAMINATION,
NOVEMBER 2019**

Second Semester

Computer Science

***Elective* — DIGITAL IMAGE PROCESSING**

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are the modalities of imaging based on CAT principle?
2. Define sampling and quantization.
3. What is meant by Bit-plane slicing?
4. Define histogram of a digital image.
5. What is spatial and temporal aliasing? Give examples.
6. Define 2-D ideal highpass filter.
7. List out order-statistic filters.
8. State Fourier-slice theorem.
9. What is meant by intensity slicing?
10. What is meant by Radiance and Luminance?

Part B**(5 × 5 = 25)**Answer **all** questions, choosing either (a) or (b).

11. (a) Explain image representation, sampling and quantization in detail.

Or

- (b) Explain the role of image transforms and probabilistic methods in image processing.

12. (a) Explain intensity-level slicing and bit-plane slicing in detail.

Or

- (b) Write short notes histogram matching.

13. (a) Explain the following properties of 2-D Discrete Fourier Transform:

- (i) Symmetry
- (ii) Fourier Spectrum and Phase angle.

Or

- (b) Describe Image Smoothing using frequency domain filters in detail.

14. (a) Describe Constrained Least Squares filtering.

Or

- (b) Explain the model of the image Degradation/Restoration Process in detail.

15. (a) Enlighten about color models.

Or

- (b) Discuss in brief about the image compression fundamentals.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Discuss in detail about the relationships between pixels in a digital image.
17. How fuzzy sets used in intensity transformations? Explain.
18. Describe image sharpening using frequency domain filters in detail.
19. Explain the three principal ways to estimate the degradation function for use in image restoration.
20. Discuss in detail about the following image compression methods.
 - (a) Huffman coding
 - (b) LZW coding
 - (c) Run-Length coding
 - (d) Wavelet coding.

F-3061

Sub. Code

7MCE3C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Computer science

CRYPTOGRAPHY AND NETWORK SECURITY

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are the services of security?
2. What is one-time pad?
3. What is block cipher?
4. State the difference between Rijndael and AES.
5. What are the keys used for asymmetric encryption?
6. Write the purpose of Diffie-hellman key exchange.
7. What is hash function?
8. What are the properties of digital signature?
9. What is S/MIME?
10. Write the use of Handshake protocol.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Briefly describe categories of passive and active security attacks.

Or

- (b) Explain Caesar cipher and play fair cipher with example

12. (a) Summarize the strength of DES.

Or

- (b) Briefly describe the key expansion algorithm.

13. (a) Explain the applications and requirements of public key cryptography.

Or

- (b) Discuss about Elliptic curve cryptography.

14. (a) Write a note on cryptanalysis.

Or

- (b) Explain public key encryption approach to deal with replay attacks.

15. (a) Explain different types of keys exchange methods.

Or

- (b) Discuss the principle services provided by PGP.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Briefly define categories of security services.
 17. Explain in detail about AES structure.
 18. Describe RSA algorithm with example.
 19. Discuss about Digital signature algorithm.
 20. Explain in detail about secure socket layer architecture.
-

F-3062

Sub. Code

7MCE3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Computer Science

PROGRAMMING IN PHP

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. State the added features of PHP 4 when compared to PHP 3.
2. Distinguish between Value assignment and Reference assignment.
3. What is the purpose of break and continue statement.
4. List out any four inbuilt string functions.
5. Write a code for checking existence of a file?
6. What is the use of forms?
7. Define a class.
8. Write a code to find the number of rows in a table?
9. What is session?
10. Expand AJAX and DOM.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain how PHP scripts work.

Or

- (b) What are Type-related functions and type identifier functions? Explain.

12. (a) Elucidate the For and For each looping statements with suitable example.

Or

- (b) Define function. Explain the concept of passing arguments to a function by reference.

13. (a) Write a short notes on file creation and deletion.

Or

- (b) How do you get input from user in PHP?

14. (a) Discuss about the base exception class and its methods.

Or

- (b) Write notes on creating session cookie?

15. (a) Explain in detail about Email creation in PHP?

Or

- (b) Write about methods and properties of Http Request?

Part C**(3 × 10 = 30)**Answer any **three** questions.

16. Discuss in detail about the PHP's supported Data types.
 17. How do you sort the arrays in PHP? Explain with example.
 18. How do you read the characters from a file? Explain it.
 19. Discuss in detail about table creation and update the table structure.
 20. Describe the concepts of starting a session and working with session variables.
-

F-3063

Sub. Code

7MCE3C3

M.Sc DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Computer Science

DATA MINING AND DATA WAREHOUSING

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. How is a data warehouse different from a database?
2. List out the strategies for data reduction.
3. What is a data cube?
4. Give the contents of metadata repository.
5. Define the accuracy of a classifier.
6. What is back propagation?
7. List out the categories of clustering methods.
8. What are the two types of hierarchical clustering methods?
9. Name the three types of dimensions in spatial data cube.
10. What is a signature file?

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain about classification and prediction with suitable example.

Or

- (b) Discuss about Principal Component Analysis.

12. (a) Write notes on snowflake schema for multidimensional databases.

Or

- (b) Discuss about the OLAP operations in the multidimensional data model.

13. (a) Describe the issues regarding classification and prediction.

Or

- (b) Write notes on Bayes' theorem.

14. (a) Write notes on binary variables.

Or

- (b) Discuss about grid based methods.

15. (a) Give explanation for text retrieval methods.

Or

- (b) How data mining can be applied for financial data analysis?

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Give detailed explanation for data cleaning process.
 17. Give the architecture for On-Line Analytical Mining and explain.
 18. Discuss in detail about classification by back propagation.
 19. Explain the k-means and k-medoid methods for partitioning.
 20. Explain the various dimensionality reduction techniques for text.
-

F-3064

Sub. Code

7MCE3E3

M.Sc DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Computer Science

Elective- MULTIMEDIA SYSTEM

(CBCS – 2017onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **All** questions.

1. What are the hardware/software components needed for a multimedia development system?
2. Mention some of the image formats used in multimedia.
3. What is the use of graphics in multimedia?
4. Mention the various CD formats.
5. What is meant by adaptive data pulse code modulation?
6. What are the key parameters need to be considered to evaluate compression performance?
7. What is voice mail?
8. Define HTML.
9. What is meant by Hoptic signals?
10. Define scientific visualization.

Part B**(5 × 5 = 25)**

Answer **All** questions, choosing either (a) or (b).

11. (a) Write briefly about Multimedia hardware.

Or

- (b) Discuss about Multimedia standards.

12. (a) Write short notes on Text.

Or

- (b) Discuss about Digital Audio.

13. (a) Write short notes on Transform representation of sounds.

Or

- (b) Describe the various file storage in video.

14. (a) Write short notes on MIME.

Or

- (b) Discuss briefly about the features of Authoring tools in multimedia.

15. (a) Discuss about the mode of interaction.

Or

- (b) Describe about the modelling virtual world.

Part C**(3 × 10 = 30)**

Answer any **Three** questions.

16. Explain in detail about the Multimedia Applications.
17. Write briefly about the video.

18. Discuss in brief about the digital representation of sound.
 19. Explain about the Internet content in Multimedia.
 20. Explain in detail about the sensor Hardware.
-

F-3065

Sub. Code

7MCE3E6

M.Sc DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Computer science

Elective-WAP AND XML

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. List the components of WAP.
2. Write the features of WAP.
3. Expand UML.
4. Define WAP gateway.
5. What is Event?
6. Write any 4 standard Libraries in WML.
7. What is the purpose of XML?
8. Write the use of CSS.
9. Write the difference between attribute & elements.
10. What is Unicode character set?

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain in detail about WAP protocol stack.

Or

- (b) Give a note on WAP resources.

12. (a) Compare web model with WAP model.

Or

- (b) Describe WML structures.

13. (a) Explain selection statement with example.

Or

- (b) Write about input & output statements with example.

14. (a) Write a XML document for product catalog.

Or

- (b) Write a XML document for displaying the covariant function of Maxwell's equation in math ML.

15. (a) How to create tables using XSL?

Or

- (b) Explain & give example for Attributes Elements.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain in detail about WAP architecture.

17. Explain how to position a WAP gateway in the network.

18. Give suitable example for
- (a) Looping statement (4)
 - (b) Automatic type conversion (4)
 - (c) Operators. (2)
19. Describe how to prepare a style sheet for document display.
20. Write a brief note on legacy character sets.
-

F-3045

Sub. Code

7MCE1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science

APPLIED MATHEMATICS FOR COMPUTER SCIENCE

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define tautology. Give example.
2. What is the condition for a statement A to tautologically imply a statement B?
3. What is existential Quantifier? Give example.
4. Define disjunctive normal form.
5. Define Rooted tree. Give example.
6. Define level and height of a rooted tree. Give example.
7. Define the canonical form of linear programming problem.
8. What is meant by optimum solution of an LPP?
9. State the mathematical formulation of an assignment problem.
10. What is meant by prohibited assignments?

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Prove that following implications

(i) $(P \wedge Q) \Rightarrow (P \rightarrow Q)$

(ii) $P \Rightarrow (Q \rightarrow P)$.

Or

(b) Show the following equivalence

$$\neg(P \supset Q) \Leftrightarrow (P \vee Q) \wedge \neg(P \wedge Q)$$
.

12. (a) Obtain the disjunctive normal form of $P \vee (Q \wedge R)$.

Or

(b) Obtain the disjunctive normal form of

$$\neg(P \vee Q) \supset (P \wedge Q)$$
.

13. (a) Explain spanning tree with example.

Or

(b) Explain binary tree with example.

14. (a) Use graphical method to solve the following problem

Maximize $z = 2x + 3y$

Subject to $x + y \leq 30$

$x - y \geq 0$

$y \geq 3, 0 \leq x \leq 20, 0 \leq y \leq 12$

Or

(b) An animal feed company must produce 200lbs of a mixture containing the ingredients X_1 and X_2 . X_1 costs Rs. 3 per lb and X_2 cost Rs. 8 per lb. Note that more than 80 lbs of X_1 can be used and minimum quantity to be used for X_2 is 60 lbs. Find how much of each ingredient should be used if the company wants to minimize the cost. Formulate the above problem.

15. (a) Obtain an initial basic feasible solution to the following transportain problem using Vogel's approximation method.

		To			Available
		7	3	4	2
From	2	1	3		3
		3	4	6	5
Demand	4	1	5		

Or

(b) The Head of the department has five jobs A, B, C, D, E and five sub-ordinates V, W, X, Y, Z . The number of hours each man would take to perform each job is as follows.

	V	W	X	Y	Z
A	3	5	10	15	8
B	4	7	15	18	8
C	8	12	20	20	12
D	5	5	8	10	6
E	10	10	15	25	10

How should the jobs be allocated to minimize the total time?

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Obtain an equivalent formula for the following which contains neither the biconditional or conditional

(a) $P \wedge (Q \supset R) \vee (R \supset P)$

(b) $((P \vee Q) \wedge R) \rightarrow (P \vee R).$

17. Obtain the principal disjunctive normal forms of the following and also identify whether they are tautologies or not

(a) $Q \wedge (P \vee \neg Q)$

(b) $(Q \rightarrow P) \wedge (\neg P \wedge Q).$

18. Discuss in detail about matrix representation of Graphs.

19. Use two-phase simplex method to solve the following LPP.

Maximize $Z = 5x_1 + 8x_2$

Subject to $3x_1 + 2x_2 \geq 3$

$$x_1 + 4x_2 \geq 4$$

$$x_1 + x_2 \leq 5, x_1, x_2 \geq 0.$$

20. Find the optimum solution to the following transportation problem using MODI method.

	T ₁	T ₂	T ₃	T ₄	Availability
B ₁	5	3	6	2	19
B ₂	4	7	9	1	37
B ₃	3	4	7	5	34
Requirement	16	18	31	25	

F-3046

Sub. Code

7MCE1C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science

DESIGN AND ANALYSIS OF ALGORITHMS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define space and time complexity.
2. Differentiate stack and queue.
3. Write the recurrence relation of divide and conquer algorithm.
4. Write the recurrence relation for computing time of quick sort.
5. What is feasible solution?
6. Write the purpose of Huffman codes.
7. Define multistage graph.
8. Give example for biconnected graph.
9. What is backtracking?
10. Give example for hamiltonian cycles.

Part B**(5 × 5 = 25)**Answer **all** questions, choosing either (a) or (b).

11. (a) Give a brief note on recursive function with example.

Or

- (b) Write an algorithm for stack operations.

12. (a) Explain how to use recursion for finding maximum and minimum of set of elements.

Or

- (b) Prove that the average computing time $T_A(n)$ of selection sort is $O(n)$.

13. (a) Find the feasible solution to the job sequencing instance $n = 4$, $\{p_1, p_2, p_3, p_4\} = \{100, 10, 15, 27\}$ and $\{d_1, d_2, d_3, d_4\} = \{2, 1, 2, 1\}$.

Or

- (b) Write greedy algorithm to generate shortest path.

14. (a) Explain Bellman Ford algorithm to compute shortest path.

Or

- (b) Write an algorithm for tree traversals.

15. (a) Explain how to estimate the efficiency of backtracking.

Or

- (b) Describe the function for Knapsack problem.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain different representation of Graph.
 17. Discuss about binary search with example.
 18. Describe the stages of Kruskal's algorithm.
 19. Explain breadth first search tree.
 20. Give a brief note on Graph Coloring.
-

F-3047

Sub. Code

7MCE1C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science

ADVANCED JAVA PROGRAMMING

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Section A

(10 × 2 = 20)

Answer **all** questions.

1. What is JDBC – ODBC Bridge?
2. What is the purpose of SQL Exception class?
3. What are the two kinds of TCP sockets in Java?
4. How is datagram implemented in Java?
5. What is the purpose of Bound property?
6. What is meant by persistence? How is it achieved in Java Bean?
7. What is servlet? What are the advantages of servlets over CGI?
8. What is a cookie?

9. Tabbed panes are encapsulated by _____ class, which extends _____.
10. What methods are used for drawing Ellipses and circles?

Section B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) What is JDBC? How does it work?
- Or
- (b) Explain JDBC metadata classes.
12. (a) Explain URL and URL connection classes with example code.
- Or
- (b) With a sample code, explain how the contents of a document is cached on a server.
13. (a) Explain JAR files.
- Or
- (b) What is Java Bean? Explain its advantages and disadvantages?
14. (a) What is meant by session Tracking? How is it achieved in HTTP servlet.
- Or
- (b) Draw a state diagram and explain the life cycle of servlet.
15. (a) Discuss the constructors and methods of color class.
- Or
- (b) How is a table created using swing class?

Section C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the Anatomy of a JDBC application and the classes and statements involved.
 17. Write a simple client/server application using RMI and explain the concepts.
 18. Discuss the Design patterns for properties and Events.
 19. Discuss any four important classes and interfaces in Javax.servlet package.
 20. How is a Tree created in an Applet? Explain the various classes and methods used?
-

F-3048

Sub. Code

7MCE1C4

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science

PRINCIPLES OF COMPILER DESIGN

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. Define a compiler.
2. Define a string with an example.
3. Construct a parse tree for $id + id * id$.
4. List down the four actions performed by a shift-reduce parser.
5. Draw the syntax tree for $a * (b + c) / d$.
6. Write about unconditional jumps.
7. Write down the format of symbol table.
8. Specify any two block structured languages.
9. Define a basic block.
10. What do you mean by an optimal ordering?

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Why do we need translators? Explain.

Or

- (b) Explain the method of constructing a deterministic finite automation from a non-deterministic one.

12. (a) Write about ambiguous grammar with an example.

Or

- (b) Write an algorithm for the construction of an SLR parsing table.

13. (a) Explain the method of evaluating the postfix expressions by an example.

Or

- (b) Discuss about the statements that alter the flow of control.

14. (a) Discuss about Hash tables.

Or

- (b) Explain about the storage allocation in Block-structured languages.

15. (a) How can you construct a DAG? Explain.

Or

- (b) Discuss in brief the problems in code generation.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe the structure of a compiler with a neat diagram.
 17. Explain the stack implementation of Shift-Reduce Parsing with an example.
 18. Discuss about any two kinds of intermediate codes used in compilers with examples.
 19. Discuss the storage allocation in brief.
 20. Explain a simple code generator in detail.
-

F-3049

Sub. Code

7MCE1E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science

**Elective — OBJECT ORIENTED ANALYSIS AND
DESIGN**

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are the characteristics of an object oriented systems?
2. What is meant by overriding?
3. Define scenarios and event trace.
4. What is a constraint? What are the different types of constraints?
5. What are the steps required in constructing an object model?
6. What is an operation in OOAD parlance? What are the different sources of operations?
7. What are the two forms of layered architecture? When is one preferred over the other?
8. Write down any four kinds of a system.

9. Draw the implementations of stack using Inheritance and delegation? Which one is better than the other?
10. What are the trade-offs between information hiding and optimization?

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) How do you establish relationships among objects and classes?

Or

- (b) Draw an object model of windowing system discuss the underlying O.O. concepts.

12. (a) Discuss state Generalization with example.

Or

- (b) Explain the relation of object and dynamic models.

13. (a) Discuss scenario, event and event trace with an example.

Or

- (b) How are object attributes identified and right attributes selected?

14. (a) How are sub systems allocated to processors and tasks?

Or

- (b) Discuss the two kinds of control flows in a software system.

15. (a) Discuss any three issues in designing algorithms.

Or

(b) What are the three different models in O.O. Design?
How are they combined?

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Discuss aggregation and multiple inheritance.
17. Discuss the components of DFD and explain how a functional model is designed using DFD.
18. Discuss the steps performed in constructing a dynamic model.
19. Discuss any four common architectural frameworks.
20. Explain design optimization. Why is it required?

F-3050

Sub. Code

7MCE1E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science

Elective : SYSTEM SOFTWARE

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. List down the language processing activities.
2. Define a production with its format.
3. Give an example for a DFA.
4. Write down the format of an assembly language statement.
5. Write any two expansion time statements with their syntax.
6. Write the post fix form of $a + b * c + d * e \uparrow f$.
7. What are the components of a interpreter?
8. Define linking.
9. Specify the two object program forms supported by MSDOS.
10. What is a programming environment?

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Write briefly about intermediate representation with its properties.

Or

- (b) Write short notes on Entry formats.

12. (a) How DFA's can be built? Explain with an example.

Or

- (b) Discuss about any two advanced assembler directives.

13. (a) Write about positional and keyword parameters with examples.

Or

- (b) Discuss about the various parameter passing mechanisms.

14. (a) Describe pure and impure interpreters.

Or

- (b) Write down the format of an object module.

15. (a) Discuss about program testing and debugging.

Or

- (b) Write about program environment with its components.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe any two types of table organization in brief.
 17. Describe top down parsing with its implementation with an example.
 18. Explain the design of a macro preprocessor.
 19. Discuss about some of the optimizing transformations used in compilers.
 20. Describe the structure of user Interface and UIMS.
-

F-3051

Sub. Code

7MCE1E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer science

Elective – SOFTWARE ENGINEERING

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. What is meant by system software and application software?
2. State the distinguishing feature of the spiral model.
3. What is QFD?
4. Define use-case and actor.
5. State the software equation for the cost estimation model.
6. Mention the ways in which LOC and FP are used during software project estimation.
7. What is the purpose of black– box and while–box testing?
8. State the benefit of smoke testing.
9. What are the three factors that have profound influence on software quality and organizational performance?
10. Define CBSE.

Part B**(5 × 5 = 25)**

Answer **all** the questions, choosing either (a) or (b).

11. (a) State the characteristics of software? Discuss.

Or

- (b) Write short notes on Legacy software.

12. (a) Describe the steps required to initiate requirements engineering.

Or

- (b) Explain how to write effective use-cases in detail.

13. (a) Explain process-based estimation with examples.

Or

- (b) Enlighten about empirical estimation models.

14. (a) Explain basis path testing in detail.

Or

- (b) Describe validation testing in detail.

15. (a) Write short notes on economics of CBSE.

Or

- (b) Describe in detail about Reusable components and Reuse environment.

Part C**(3 × 10 = 30)**Answer any **THREE** questions.

16. Elaborate on prescriptive models and incremental models in detail.
 17. Describe in detail about the function accomplished during the requirement engineering tasks.
 18. Discuss briefly about problem- based estimation and Use-Case based estimation with examples.
 19. Explain various black-box testing methods.
 20. Describe in detail about software measurement and also the metrics used for software quality.
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F-3052

Sub. Code

7MCE2C1

M.Sc DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science

COMPUTER SYSTEM ARCHITECTURE

(CBCS – 2017 onwards)

Time :3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is CPU? What are its major components?
2. Define Stack.
3. How do you define the internal hardware organization of a digital computer?
4. Define Selective complement operation.
5. What is the advantage of Microprogrammed Control unit?
6. What is the purpose of Control Address Register?
7. What is meant by Asynchronous data transfer?
8. Define Hit ratio.
9. What is meant by delayed branch?
10. Write any two characteristics of RISC architecture.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain Instruction formats.

Or

- (b) Discuss the purpose of Status Register in Program Control.

12. (a) A digital computer has a common bus system for 16 registers of 32 bits each. The bus is constructed with multiplexers.

- (i) How many selection input are there in each multiplexer?
(ii) What size of multiplexers are needed?
(iii) How many multiplexers are there in the bus?

Or

- (b) Discuss Input-Output configuration.

13. (a) Define the following

- (i) Micro operation
(ii) Microinstruction
(iii) Micro program
(iv) Microcode

Or

- (b) Explain Address Sequencing in Microprogram control unit.

14. (a) Explain Associative memory.

Or

(b) Explain I/O Interface and connection of I/O bus to Input and Output devices.

15. (a) Discuss the characteristics of Multiprocessors.

Or

(b) Explain Array Processing.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain any six Addressing modes with examples.

17. Explain Instruction Cycle with necessary flowchart.

18. Explain Microprogram sequencer.

19. Explain Parallel Priority interrupt hardware.

20. Explain Instruction Pipeline and the difficulties associated with it.

F-3053

Sub. Code

7MCE2C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science

.NET TECHNOLOGY

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is .NET Framework?
2. What is object oriented programming?
3. Define scope.
4. What is mean by docking a control?
5. What is the difference between Tree and list views?
6. What is Typography?
7. Define name space.
8. Why do we need validator control?
9. What is the difference between ADO and ADO .Net?
10. What is a Repeater?

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write a short note on .Net Assemblies.

Or

- (b) How will you create a structure? Explain with an example.

12. (a) Describe the facilities for handling sub procedures in VB Net.

Or

- (b) How will you create dialog boxes? Explain with an example?

13. (a) Describe the functionality of splitters and notify Icons

Or

- (b) Briefly describe file handling in VB .Net.

14. (a) Explain the usage of Global. asax file.

Or

- (b) Discuss on the creation of user custom controls.

15. (a) Explain the characteristics of ADO.Net

Or

- (b) How data binding is used in ASP.Net Applications? Explain with example.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. How is method overloading different from method overriding? Explain with example.
 17. Elaborate on conditional statement in VB.Net with an Example.
 18. Discuss about the significance of built in Dialog boxes.
 19. Give a detailed note on Http Request and Http response.
 20. Explain the step to implement forms- based security with Diagram.
-

F-3054

Sub. Code

7MCE2C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer science

DISTRIBUTED OPERATING SYSTEM

(CBCS – 2017 onwards)

Time : 3 hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are the two primary tasks of operating system?
2. What are PSEs?
3. What are the two basic methods for information sharing?
4. Define buffering.
5. Mention the four factors that are influencing the block size selection?
6. Why does a computer need timer mechanism?
7. Define: File system
8. What do you mean by mutable file model?
9. What do you mean by external security?
10. What are the main types of authentication in distributed system?

Part B

(5× 5= 25)

Answer **ALL** questions, choosing either (a) or (b).

11. (a) What is DCE? Explain its components in detail.

Or

- (b) Differentiate LAN and WAN using their key characteristics.

12. (a) Explain the role of synchronization in distributed system message passing.

Or

- (b) Explain the many-to many communication scheme in group communication of message passing.

13. (a) Write down the advantages of DSM.

Or

- (b) Explain the WFG- based distributed algorithm for deadlock detection.

14. (a) Write the difference between replication and caching.

Or

- (b) State the general principles for designing distributed file system.

15. (a) Explain about key distribution in asymmetric cryptosystems.

Or

- (b) Explain the mechanism of password based authentication system.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss about the issues in designing distributed system.
 17. What are the desirable features of a good message-passing system? Explain.
 18. Explain the different approaches used to implement mutual exclusion.
 19. What are the desirable features of good distributed file system? Explain.
 20. Explain the concept of digital signature for distributed system security in detail.
-

F-3055

Sub. Code

7MCE2E1

M.SC DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer science

Elective – MOBILE COMPUTING

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is meant by laptop computing?
2. Distinguish between mobility and portability.
3. Define Multiplexing.
4. What is mobility management?
5. What is agent discovery?
6. What do you mean by registration reply?
7. What is a Datagram?
8. What is foreign agent key?
9. What is smooth handoff?
10. Define Ingress filtering.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) What is mobile networking? Explain.

Or

- (b) Describe the architectural model of IETF Mobile IP protocol.

12. (a) Write a note on signal propagation.

Or

- (b) Briefly explain about handover in cellular systems.

13. (a) Explain the operation of mobile agent.

Or

- (b) Explain the procedure to register mobile node.

14. (a) Write a note on generic routing encapsulation.

Or

- (b) How do you bind caches? Explain.

15. (a) Write about DHCP protocol and its functions.

Or

- (b) What is reverse tunneling? Explain.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Explain the overview of IP and routing with neat diagram.
 17. Describe the GSM system architecture with appropriate diagram.
 18. Explain in detail about agent advertisement.
 19. Explain the different route optimization message formats.
 20. Explain in detail about Wireless Telephony Application.
-

F-3057

Sub. Code

7MCE2E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science

Elective — COMPUTER GRAPHICS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. Define Morphing.
2. Distinguish between image processing and computer graphics.
3. State the attributes of character.
4. Define Shear.
5. What is the purpose of input modes of input functions?
6. Define point clipping.
7. State any two applications of depth cueing.
8. What is meant by parallel and perspective projections?
9. Define cabinet projection.
10. What is vanishing point?

Part B**(5 × 5 = 25)**

Answer **all** the questions, choosing either (a) or (b).

11. (a) Describe midpoint circle algorithm in detail.

Or

- (b) Explain the techniques used for color displays.

12. (a) Write short notes on character attributes.

Or

- (b) Explain composite transformations with proper illustration.

13. (a) Describe in detail about text clipping.

Or

- (b) Write briefly about segment attributes.

14. (a) Explain the three dimensional graphics packages in detail.

Or

- (b) Discuss briefly about the three-dimensional display techniques.

15. (a) Explain general parallel-projection transformations in detail.

Or

- (b) Explain back-face detection method in detail.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Discuss briefly about interactive input devices.
 17. Explain in detail about the following transformations in detail.
 - (a) Reflection
 - (b) Shear
 - (c) Translation, Scaling and Rotation
 18. Enlighten about the interactive-picture construction methods.
 19. Explain the three dimensional transformations in detail.
 20. Explain depth buffer method in detail.
-

F3058**Sub. Code****7MCE2E4****M.Sc. DEGREE EXAMINATION, NOVEMBER 2019****Second Semester****Computer Science****Elective — PARALLEL PROCESSING****(CBCS – 2017 onwards)**

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **All** Questions.

1. Define parallelism.
2. What is hypercubes?
3. What is ring network?
4. What is control parallelism?
5. Write the types of mapping?
6. Define message passing.
7. Write any two performance laws.
8. Write any two parallel search algorithms.
9. What is multiport memory?
10. Expand NUMA.

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) How to implement parallel processing.
- Or
- (b) Describe the computational demands of parallel processing.
12. (a) Give a brief note on loosely coupled systems.
- Or
- (b) Describe mesh & hypercube architecture.
13. (a) Differentiate message passing & shared address space.
- Or
- (b) Discuss three types of Granularity.
14. (a) Explain Amdahl's & Gustafson's laws.
- Or
- (b) Write a note on types of complexities.
15. (a) Explain cross bar & multiport memory.
- Or
- (b) Discuss about cache coherence.

Part C $(3 \times 10 = 30)$

Answer any **Three** questions.

16. Describe the major issues in parallel processing.
17. Explain tightly coupled systems.

18. Discusses the types of mapping.
 19. Explain depth first & breadth first search algorithms.
 20. Describe memory Contention techniques.
-

F-3059

Sub. Code

7MCE2E5

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science

Elective : ADVANCED DATABASE SYSTEMS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. What is data dictionary?
2. Differentiate between schema and instances.
3. What are the main reasons for the delay in development and implementation of relational model.
4. Compare the derived attribute and stored attribute.
5. Describe the concept of full functional dependency.
6. Write the purpose of normalising data.
7. What is client/server computing? What are its main components?
8. What is semi-JOIN?
9. What are multimedia databases?
10. What are the newer modules available for MySQL stability.

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write short notion the functions and responsibilities of DBAs.

Or

- (b) Write a note on data model.

12. (a) Describe with example the different types of keys used in relational model.

Or

- (b) An enterprise database needs to store information as follows :

EMPLOYEE(EMP-ID, SALARY, PHONE)

DEPARTMENTS(DEPT-ID, DEPT-NAME, BUDGET)

EMPLOYEE-CHILDREN(NAME, AGE)

Employees 'work' in departments. Each department is 'managed by' an employee. A child must be identified uniquely by 'name' when the parent (who is an employee) is known. Once the parent leaves the enterprise, the information about the child is not required. Draw an E-R diagram that captures the above information.

13. (a) Illustrate the three Armstrong's axioms using diagrammatical representation.

Or

- (b) Consider the universal relation R (A, B, C, D, E, F, G, H, I, J) and the set of FDs are given as

$$F = (\{A, B\} \rightarrow \{A\} \rightarrow \{D, E\}, \{B\} \rightarrow \{F\}, \{F\} \rightarrow \{G, H\},$$

$$\{D\} \rightarrow \{I, J\}.$$

- (i) What is the key of R?
 (ii) Decompose R into 2NF, then 3NF relations.

14. (a) What is middleware system architecture? Explain with a neat sketch and an example.

Or

- (b) What is distributed locking? What are its advantages and disadvantages?
15. (a) What is a mobile database? Explain the architecture of mobile database with neat sketch.

Or

- (b) Write the features of MySQL 4.1.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the important operations performed on the data file with example.
17. What are the problems that arise when constructing an E-R model? How will you resolve them? Illustrate with examples.
18. Define the concept of multi valued dependency and describe how this concept relates to 4NF. Provide an example to illustrate your answer.
19. Explain the functioning of two-phase and three-phase commit protocols used in recovery control of distributed database system.
20. Define MySQL database. How will you create the MySQL tables? Explain with examples the insertion of data into and retrieval of information from the MySQL table.

F-3060

Sub. Code

7MCE2E6

**M.Sc. DEGREE EXAMINATION,
NOVEMBER 2019**

Second Semester

Computer Science

***Elective* — DIGITAL IMAGE PROCESSING**

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are the modalities of imaging based on CAT principle?
2. Define sampling and quantization.
3. What is meant by Bit-plane slicing?
4. Define histogram of a digital image.
5. What is spatial and temporal aliasing? Give examples.
6. Define 2-D ideal highpass filter.
7. List out order-statistic filters.
8. State Fourier-slice theorem.
9. What is meant by intensity slicing?
10. What is meant by Radiance and Luminance?

Part B**(5 × 5 = 25)**Answer **all** questions, choosing either (a) or (b).

11. (a) Explain image representation, sampling and quantization in detail.

Or

- (b) Explain the role of image transforms and probabilistic methods in image processing.

12. (a) Explain intensity-level slicing and bit-plane slicing in detail.

Or

- (b) Write short notes histogram matching.

13. (a) Explain the following properties of 2-D Discrete Fourier Transform:

- (i) Symmetry
- (ii) Fourier Spectrum and Phase angle.

Or

- (b) Describe Image Smoothing using frequency domain filters in detail.

14. (a) Describe Constrained Least Squares filtering.

Or

- (b) Explain the model of the image Degradation/Restoration Process in detail.

15. (a) Enlighten about color models.

Or

- (b) Discuss in brief about the image compression fundamentals.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Discuss in detail about the relationships between pixels in a digital image.
17. How fuzzy sets used in intensity transformations? Explain.
18. Describe image sharpening using frequency domain filters in detail.
19. Explain the three principal ways to estimate the degradation function for use in image restoration.
20. Discuss in detail about the following image compression methods.
 - (a) Huffman coding
 - (b) LZW coding
 - (c) Run-Length coding
 - (d) Wavelet coding.

F-3061

Sub. Code

7MCE3C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Computer science

CRYPTOGRAPHY AND NETWORK SECURITY

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are the services of security?
2. What is one-time pad?
3. What is block cipher?
4. State the difference between Rijndael and AES.
5. What are the keys used for asymmetric encryption?
6. Write the purpose of Diffie-hellman key exchange.
7. What is hash function?
8. What are the properties of digital signature?
9. What is S/MIME?
10. Write the use of Handshake protocol.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Briefly describe categories of passive and active security attacks.

Or

- (b) Explain Caesar cipher and play fair cipher with example

12. (a) Summarize the strength of DES.

Or

- (b) Briefly describe the key expansion algorithm.

13. (a) Explain the applications and requirements of public key cryptography.

Or

- (b) Discuss about Elliptic curve cryptography.

14. (a) Write a note on cryptanalysis.

Or

- (b) Explain public key encryption approach to deal with replay attacks.

15. (a) Explain different types of keys exchange methods.

Or

- (b) Discuss the principle services provided by PGP.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Briefly define categories of security services.
 17. Explain in detail about AES structure.
 18. Describe RSA algorithm with example.
 19. Discuss about Digital signature algorithm.
 20. Explain in detail about secure socket layer architecture.
-

F-3062

Sub. Code

7MCE3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Computer Science

PROGRAMMING IN PHP

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. State the added features of PHP 4 when compared to PHP 3.
2. Distinguish between Value assignment and Reference assignment.
3. What is the purpose of break and continue statement.
4. List out any four inbuilt string functions.
5. Write a code for checking existence of a file?
6. What is the use of forms?
7. Define a class.
8. Write a code to find the number of rows in a table?
9. What is session?
10. Expand AJAX and DOM.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain how PHP scripts work.

Or

- (b) What are Type-related functions and type identifier functions? Explain.

12. (a) Elucidate the For and For each looping statements with suitable example.

Or

- (b) Define function. Explain the concept of passing arguments to a function by reference.

13. (a) Write a short notes on file creation and deletion.

Or

- (b) How do you get input from user in PHP?

14. (a) Discuss about the base exception class and its methods.

Or

- (b) Write notes on creating session cookie?

15. (a) Explain in detail about Email creation in PHP?

Or

- (b) Write about methods and properties of Http Request?

Part C**(3 × 10 = 30)**Answer any **three** questions.

16. Discuss in detail about the PHP's supported Data types.
 17. How do you sort the arrays in PHP? Explain with example.
 18. How do you read the characters from a file? Explain it.
 19. Discuss in detail about table creation and update the table structure.
 20. Describe the concepts of starting a session and working with session variables.
-

F-3063

Sub. Code

7MCE3C3

M.Sc DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Computer Science

DATA MINING AND DATA WAREHOUSING

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. How is a data warehouse different from a database?
2. List out the strategies for data reduction.
3. What is a data cube?
4. Give the contents of metadata repository.
5. Define the accuracy of a classifier.
6. What is back propagation?
7. List out the categories of clustering methods.
8. What are the two types of hierarchical clustering methods?
9. Name the three types of dimensions in spatial data cube.
10. What is a signature file?

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain about classification and prediction with suitable example.

Or

- (b) Discuss about Principal Component Analysis.

12. (a) Write notes on snowflake schema for multidimensional databases.

Or

- (b) Discuss about the OLAP operations in the multidimensional data model.

13. (a) Describe the issues regarding classification and prediction.

Or

- (b) Write notes on Bayes' theorem.

14. (a) Write notes on binary variables.

Or

- (b) Discuss about grid based methods.

15. (a) Give explanation for text retrieval methods.

Or

- (b) How data mining can be applied for financial data analysis?

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Give detailed explanation for data cleaning process.
 17. Give the architecture for On-Line Analytical Mining and explain.
 18. Discuss in detail about classification by back propagation.
 19. Explain the k-means and k-medoid methods for partitioning.
 20. Explain the various dimensionality reduction techniques for text.
-

F-3064

Sub. Code

7MCE3E3

M.Sc DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Computer Science

Elective- MULTIMEDIA SYSTEM

(CBCS – 2017onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **All** questions.

1. What are the hardware/software components needed for a multimedia development system?
2. Mention some of the image formats used in multimedia.
3. What is the use of graphics in multimedia?
4. Mention the various CD formats.
5. What is meant by adaptive data pulse code modulation?
6. What are the key parameters need to be considered to evaluate compression performance?
7. What is voice mail?
8. Define HTML.
9. What is meant by Hoptic signals?
10. Define scientific visualization.

Part B**(5 × 5 = 25)**

Answer **All** questions, choosing either (a) or (b).

11. (a) Write briefly about Multimedia hardware.

Or

- (b) Discuss about Multimedia standards.

12. (a) Write short notes on Text.

Or

- (b) Discuss about Digital Audio.

13. (a) Write short notes on Transform representation of sounds.

Or

- (b) Describe the various file storage in video.

14. (a) Write short notes on MIME.

Or

- (b) Discuss briefly about the features of Authoring tools in multimedia.

15. (a) Discuss about the mode of interaction.

Or

- (b) Describe about the modelling virtual world.

Part C**(3 × 10 = 30)**

Answer any **Three** questions.

16. Explain in detail about the Multimedia Applications.
17. Write briefly about the video.

18. Discuss in brief about the digital representation of sound.
 19. Explain about the Internet content in Multimedia.
 20. Explain in detail about the sensor Hardware.
-

F-3065

Sub. Code

7MCE3E6

M.Sc DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Computer science

Elective-WAP AND XML

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. List the components of WAP.
2. Write the features of WAP.
3. Expand UML.
4. Define WAP gateway.
5. What is Event?
6. Write any 4 standard Libraries in WML.
7. What is the purpose of XML?
8. Write the use of CSS.
9. Write the difference between attribute & elements.
10. What is Unicode character set?

Part B**(5 × 5 = 25)**Answer **all** questions, choosing either (a) or (b).

11. (a) Explain in detail about WAP protocol stack.

Or

- (b) Give a note on WAP resources.

12. (a) Compare web model with WAP model.

Or

- (b) Describe WML structures.

13. (a) Explain selection statement with example.

Or

- (b) Write about input & output statements with example.

14. (a) Write a XML document for product catalog.

Or

- (b) Write a XML document for displaying the covariant function of Maxwell's equation in math ML.

15. (a) How to create tables using XSL?

Or

- (b) Explain & give example for Attributes Elements.

Part C**(3 × 10 = 30)**Answer any **three** questions.

16. Explain in detail about WAP architecture.

17. Explain how to position a WAP gateway in the network.

18. Give suitable example for
- (a) Looping statement (4)
 - (b) Automatic type conversion (4)
 - (c) Operators. (2)
19. Describe how to prepare a style sheet for document display.
20. Write a brief note on legacy character sets.
-

F-3071

Sub. Code

7MCI1C2

M.SC DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science and Information Technology

PROGRAMMING IN C

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. How are comments introduced in C?
2. What is the difference between & and &&?
3. What is a character array? How will you initialize a character array?
4. What is a dynamic array?
5. What is meant by call by value?
6. What are the advantages of using register variable?
7. How is a pointer variable initialized?
8. Write any two limitations of array of pointers to strings.
9. What is the use of getchar() and putchar() function?
10. Write the general format of fseek function.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Compare the while structure with the do-while structure.

Or

- (b) What are the types of programming languages? Describe.

12. (a) How are the one-dimensional array elements read and written?

Or

- (b) Write a C program to find the sum of given 'n' numbers.

13. (a) What is a function? Explain the different categories of functions.

Or

- (b) Name the storage classes used in C and explain them.

14. (a) What is a pointer? Explain the advantages of using pointers in C.

Or

- (b) Write C program to find the smallest number in an array using pointers.

15. (a) What are the different modes of files? Describe.

Or

- (b) What is macro and how is it different from a C variable name?

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. What are the fundamental data types supported by C? How are they declared? Give examples.
17. Write a C program to arrange the given names in an alphabetical order.
18. Write a C program to print the Fibonacci sequence of number using recursion.
19. Write a C program to Multiply two matrices using pointed.
20. Explain how defining, opening and closing a file are carried out in C with examples.
-

F-3072

Sub. Code

7MCI1C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science and Information Technology

DATA STRUCTURE AND ALGORITHMS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What do you mean by linear data structure?
2. What is sorting?
3. What is a singly linked list?
4. Find the postfix form of the following: $A+B+C+D$.
5. Define: Complete binary tree.
6. What are the ways to represent a binary tree?
7. What is the complexity of linear search and binary search?
8. What are the drawbacks of linear search?
9. What do you mean by Algorithm?
10. Define: Big 'O' notation.

Part B**(5 × 5 = 25)**

Answer **All** questions, choosing either (a) or (b).

11. (a) Write the algorithm for traversing a list and give an example.

Or

- (b) Write the procedures to perform predecessor and successor in a list.

12. (a) Write an algorithm to convert infix expression into postfix expression.

Or

- (b) What are the ways to represent a stack? Describe.

13. (a) What are the binary tree traversals? Explain any one.

Or

- (b) Explain any two popular hash functions.

14. (a) Write an algorithm for selection sort and give an example.

Or

- (b) Write a binary search algorithm and explain with examples.

15. (a) What are the components of space complexity? Describe.

Or

- (b) Write an algorithm for adding “n” natural numbers and find the time and space required by that algorithm.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Explain the implementation of list.
 17. Define a stack. What are the operations performed on it? Explain.
 18. Explain the Dijkstra's algorithm for finding the shortest path in a given graph.
 19. Explain about the merge sort with example.
 20. What are the basic asymptotic efficiency classes? Describe.
-

F-3073

Sub. Code

7MCI1C4

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science and Information Technology

COMPUTER FUNDAMENTALS AND ARCHITECTURE

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Find the binary number for the following decimal number : 10
2. What is the difference between 1's complement subtraction and 2's complement subtraction of binary numbers?
3. How many entries are there on a four-variable Karnaugh map?
4. What is the function of encoder?
5. What the use of counter?
6. What are inputs and outputs of full adder?
7. What is the function of ALU?
8. Write the polish and reverse polish notation: (A/B)-(C*D).

9. Distinguish between Main Memory and Auxiliary Memory.
10. What is the use of priority interrupt?

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write a short note on ASCII and EBCDIC codes.
- Or
- (b) Convert decimal 1000.500 into octal number.
12. (a) Draw the logic circuit and truth table for 4-to-1 multiplexer and explain it.
- Or
- (b) Write any five laws of Boolean algebra and Construct the truth table.
13. (a) What is a Half Adder? Explain.
- Or
- (b) Explain the different types of shift registers.
14. (a) What are the components of instruction format? Describe.
- Or
- (b) What are data transfer and data manipulation instructions? Describe.
15. (a) Draw the block diagram of Associative memory and explain it.
- Or
- (b) Explain the operations of Magnetic Tape.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Find the decimal, octal and hexadecimal number for the following binary numbers.
 - (a) 1111011
 - (b) 11000.0111
 17. Simplify the Boolean functions $F(w,x,y,z) \sum (1,3,7,11,15)$ and the don't care conditions : $d(w,x,y,z) = \text{sum of } (0,2,5)$.
 18. Describe the operation of Master-Slave Flip-flop.
 19. What are the arithmetic and logic micro operations? Explain with examples.
 20. Explain in detail the different mappings used for cache memory.
-

F-3074

Sub. Code

7MCI1E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Computer Science and Information Technology

Elective- OPERATING SYSTEM

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define: Multiprogramming.
2. Write down any two advantages of virtual memory.
3. Distinguish between process and processor.
4. Define: (a) Throughput (b) Turnaround Time.
5. What is parallel processing?
6. What are the four basic functions of device management?
7. Define: (a) Record (b) file.
8. What is distributed operating system?
9. Write down any two advantages of Unix system.
10. What is the use of fork command in Unix?

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) What are the types of operating systems? Explain.
- Or
- (b) Compare best-fit and first-fit allocations.
12. (a) What is PCB? Explain the contents of PCB.
- Or
- (b) What are the Strategies for handling deadlock? Explain.
13. (a) Explain about the readers and writers problem.
- Or
- (b) What are the three categories of system peripheral devices? Explain.
14. (a) Compare sequential and direct file organization.
- Or
- (b) Write a short note on NOS development.
15. (a) Write a short note on the history of Unix system.
- Or
- (b) What are the three types of files in Unix? Describe.

Part C $(3 \times 10 = 30)$

Answer any **Three** questions.

16. What are page replacement polices? Explain with examples.
17. Explain any two process scheduling algorithms.

18. Discuss any two multiprocessing configurations.
 19. Explain the different levels in a file management system.
 20. Discuss the processor management in Unix system.
-

F-3076

Sub. Code

7MCI2C2

M.Sc DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science and Information Technology

JAVA PROGRAMMING

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Write down any two features of Java Language.
2. How are constants and variables important in developing programs?
3. Write the syntax of switch statement.
4. Find the value of 10% (-3).
5. What is static import? How is it useful?
6. What do you mean by method overriding? Explain.
7. Differentiate between local applet and remote applet.
8. What is the use of Applet Tag?
9. What are the advantages of Enterprise bean?
10. What is RMI?

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) List the basic data types used in java. Explain with suitable example.

Or

- (b) What is World Wide Web? What is the contribution of Java to the World Wide Web?

12. (a) Write a Java program to find the factorial of a number.

Or

- (b) List out any five mathematical functions in Java and give examples.

13. (a) Write a Java program which will read a text and count all occurrences of a particular word.

Or

- (b) Compare and contrast overriding and overloading a method.

14. (a) How applets differ from applications?

Or

- (b) Describe the different stages in the life cycle of an applet.

15. (a) Explain any two SQL statements with example.

Or

- (b) Explain about the JSP tags.

Part C

(3× 10 = 30)

Answer any **three** questions.

16. Describe the structure of Java Program.
 17. What are the different types of if statements available in Java? Illustrate with an example.
 18. Write a Java program which will read a string and rewrite it in the alphabetical order. For example, the word STRING should be written as GINRST.
 19. Write an applet to draw the square inside a circle shape.
 20. Explain about the Servlet life cycle.
-

F-3077

Sub. Code

7MCI2C3

M.Sc DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science and Information Technology

COMPUTER NETWORKS

(CBCS – 2017onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **All** questions.

1. What do you mean by computer network?
2. Differentiate between connection-oriented and connectionless services.
3. What are the disadvantages of optical fiber?
4. How do guided media differ from unguided media?
5. What is framing?
6. What is the purpose of Hamming code?
7. What is Congestion Control?
8. What are the transport layer quality of service parameters?
9. Differentiate between Adaptive and Non-adaptive routing.
10. What is the purpose of FTP?

Part B**(5 × 5 = 25)**

Answer **All** questions, choosing either (a) or (b).

11. (a) What are the topologies for a Point-To-Point subnet? Describe.

Or

- (b) What is a Protocol? Explain the protocol Hierarchies.

12. (a) Describe the two forms of Twisted –pair Cable.

Or

- (b) Write a short note on Terminal handling.

13. (a) Discuss the design issues of Data link layer.

Or

- (b) Compare Local Area Network and Metropolitan Area Network.

14. (a) What is RPC? Explain.

Or

- (b) What are the duties of the Transport layer? Explain.

15. (a) Describe the design issues of presentation layer.

Or

- (b) What are the two fundamental cryptographic principles? Explain.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the function of seven layers of ISO OSI Reference Model.
 17. Discuss about the ISDN system architecture.
 18. Explain the simplex protocol for a noisy channel.
 19. Discuss the design issues of network layer.
 20. Discuss Email Architecture in brief along with its components.
-

F-3078

Sub. Code

7MCI2E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science and Information Technology

**Elective — COMPUTER ORIENTED NUMERICAL
METHODS**

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Section A

(10 × 2 = 20)

Answer **all** questions.

1. State the formula to find a root of the equation $f(x) = 0$ which hits between $x = a$ and $x = b$ of Regula-Falsi method.
2. State the condition of convergence of Newton-Raphson method.
3. Distinguish between direct and iterative methods of solving simultaneous equations.
4. What is the condition for convergence of Gauss-Jacobi method of iteration?
5. Define: Interpolation.
6. State Gauss's backward and Gauss's forward interpolation formula.

7. How the accuracy can be increased in trapezoidal rule of evaluating a given definite integral?
8. What do you mean by numerical differentiation?
9. What is a predictor-corrector method of solving a differential equation?
10. Write the merits of the Taylor method of solution.

Section B**(5 × 5 = 25)**Answer **all** questions, choosing either (a) or (b).

11. (a) Find the smallest positive root of the equation $3x^3 - 9x^2 + 8 = 0$ correct to 2 places of decimals, using Newton-Raphson method.

Or

- (b) Apply Horner's method to find the cube root of 25.
12. (a) How does the coefficient matrix A in the system $AX = B$ get transformed in Gauss-Elimination method.

Or

- (b) Solve the equations $10x + y = 7$ and $x - 10y = 31$ by Gauss-Seidel's iteration method.
13. (a) Using Newton's formula, find the value of $f(1.5)$ from the following data :

$x :$	0	1	2	3	4
$f(x) :$	858.3	869.6	880.9	892.3	903.6

Or

- (b) Describe the Lagrange's interpolation formula.

14. (a) Explain about the Trapezoidal and Simpson's rule.

Or

- (b) From the following table of values of x and y , find dy/dx and d^2y/dx^2 for $x = 1.25$

x :	1.00	1.05	1.10	1.15	1.20	1.25	1.30
y :	1.00	1.02470	1.04881	1.07238	1.09544	1.11803	1.14017

15. (a) Find $y(1.1)$, given $dy/dx = x + y$, $y(1) = 2$ by Euler's method.

Or

- (b) Use Runge-kutta of the fourth order to solve the equation and to find $y(0.2)$, $y(0.4)$ and $y(0.6)$ taking $h = 0.2$ given that $dy/dx = 1 + y * y$; $y(0) = 0$.

Section C

(3 × 10 = 30)

Answer any **three** questions.

16. Find a real root of the equation $x^3 - 2x - 5 = 0$, correct to 3 places of decimals, using Bisection method.
17. Using Crout's method, solve the system of equations
- $$2x - 6y + 8z = 24$$
- $$5x + 4y - 3z = 2$$
- $$3x + y + 2z = 16.$$
18. Use Gauss's forward and backward formulas to find $f(3.75)$ from the following data :
- | | | | | | | |
|----------|--------|--------|--------|--------|--------|--------|
| x : | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 |
| $f(x)$: | 22.145 | 22.043 | 20.225 | 18.644 | 17.262 | 16.047 |

19. Dividing the range into 10 equal parts, find the approximate value of $\int_0^{\pi} \sin x \, dx$ by
- (a) Trapezoidal
 - (b) Simpson's one third rule.
20. Solve numerically, using Milne method :
- $y' = 1/(x + y)$, $y(0) = 2$. Take the starting values $y(0.2) = 2.0933$, $y(0.4) = 2.1755$, $y(0.6) = 2.2493$. Find the values of $y(0.8)$ and $y(1.0)$.
-

F-3080

Sub. Code

7MCI2E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science and Information Technology

Elective – THEORY OF COMPUTATION

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. Define a Nondeterministic Finite Automata.
2. State the Induction principle.
3. State the pumping Lemma for Regular Languages.
4. Write closure properties of Regular Languages.
5. Define a context-free Grammar.
6. Define Deterministic Pushdown Automata.
7. Write the substitution theorem.
8. Define the Turing Machine.
9. State Rice's theorem.
10. Define a Recursive language.

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

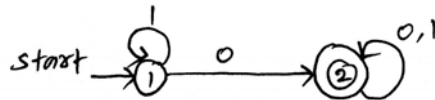
11. (a) Prove that for all $n \geq 0$, $\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}$

Or

(b) Convert to a DFA the following NFA.

	0	1
$\rightarrow p$	{p,q}	{p}
q	{r}	{r}
r	{s}	ϕ
*s	{s}	{s}

12. (a) Convert the DFA of the following figure to a regular expression:



Or

(b) Write the summary of the principal closure properties for regular languages.

13. (a) Write a grammar for an inherently ambiguous language.

Or

(b) Explain the Graphical notation for PDA's.

14. (a) Write a short notes on chomsky normal form.

Or

(b) Explain the Transition diagrams for Turing Machines.

15. (a) Write the post's corresponding problem.

Or

(b) Write a note on the classes P and NP.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. What is DFA? Explain about Finite Automatic with Epsilon transitions.
17. If h is a homomorphism from alphabet Σ to alphabet T and L is a regular language over T , then prove that $h^{-1}(L)$ is also a regular language.
18. How to construct parse Trees? Explain.
19. Prove that the context-free languages are closed under the following operations.
- (a) Union
 - (b) Concatenation
 - (c) Closure (*) and positive closure (+)
 - (d) Homomorphism
20. Explain the Modified PCP.

F-3082

Sub. Code

7MCI2E6

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Computer Science and Information Technology

Elective – COMPUTER GRAPHICS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What do you mean by computer graphics?
2. What are the disadvantages of DDA algorithm?
3. List out the attributes of characters.
4. What is Transformation?
5. What is the difference between a window and view port?
6. What is dragging?
7. What do you mean by Perspective projection?
8. Write the matrix representation of scaling transformation in three-dimensional.
9. Define : Axonometric orthographic projection.
10. Differentiate between object-space and image-space methods.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain how computer graphics is used in the field of art and image processing.

Or

- (b) Discuss Bresenham's approach for line drawing.

12. (a) What are the attributes of area fill? Describe.

Or

- (b) Describe shearing transformation with suitable example.

13. (a) Derive window to view port transformation.

Or

- (b) Write down the functions of stroke and string devices.

14. (a) What are transformation commands? Explain.

Or

- (b) Explain about the rotation transformation in three-dimensional.

15. (a) Explain the scan line method.

Or

- (b) Describe the hardware implementation of three-dimensional viewing operations.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. What is CRT? Explain the basic construction of CRT.
 17. What are the basic two dimensional transformations? Explain with examples.
 18. Explain any two interactive picture-construction techniques.
 19. Describe any two three-dimensional display methods.
 20. Explain :
 - (a) Back face Detection method
 - (b) Depth buffer method for detection.
-

F-3083

Sub. Code

7MCI3E4

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Computer Science and Information Technology

Elective: DATA MINING AND WAREHOUSING

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define: Data Mining.
2. What is machine learning?
3. What is data cube?
4. How are organizations using the information from data warehouses?
5. Define: Data cleaning.
6. What are the measures of central tendency?
7. Define: Gain ratio.
8. What is back propagation?
9. What are the different types of web mining?
10. What are the three types of dimensions in spatial data cube?

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain any two data mining techniques.

Or

- (b) Compare data mining and query tools.

12. (a) What are the different between OLTP and OLAP? Describe.

Or

- (b) What is metadata? What are the types of metadata? Explain.

13. (a) Explain the different forms of data preprocessing.

Or

- (b) What are the steps involved data transformations? Explain.

14. (a) What is classification? How does classification work?

Or

- (b) What are the two types of hierarchial clustering methods? Explain.

15. (a) Explain the requirements of clustering in data mining.

Or

- (b) Explain about the spatial mining tasks.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe the steps that are required in a typical Data Mining process.
 17. Describe the data warehouse backend process.
 18. What are the methods for concept hierarchy on data discretization? Explain.
 19. Explain about the Naive Bayesian classification.
 20. Discuss about the mining time-series and sequence data.
-

F-2960

Sub. Code

7MCH1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Chemistry

ORGANIC CHEMISTRY – I

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

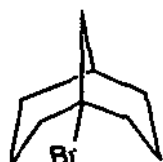
Part A

(10 × 2 = 20)

Answer **all** questions.

1. What do you understand by the term "negative hyper conjugation"?
2. State and explain the terms involved in Taft equation.
3. How will you distinguish asymmetric and dissymmetric molecules?
4. Define prochiral centre and give any one suitable example.
5. Mention the important difference between alterant and non-alterant hydrocarbon. Give one suitable example each.
6. State and explain Huckel's Rule for aromaticity.

7. State and explain Hammond's postulate.
8. What do you understand by the term "nucleophilic carbene"? Give an example.
9. State and explain Brecht's rule with suitable example.
10. The following compound fails to undergo nucleophilic substitution reactions (both S_N1 and S_N2). Give reason.



1 - bromobicyclo[3.3.1]nonane

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

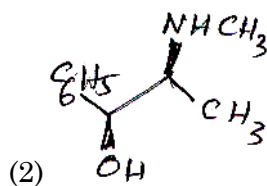
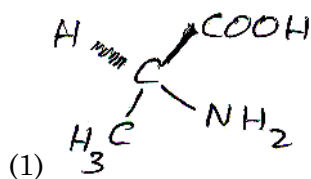
11. (a) Explain the significance and the factors that influence the reaction constant ρ and substituent constant σ in the Hammett equation with suitable examples.

Or

- (b) Explain the following terms with suitable examples:
 - (i) Inductive (3)
 - (ii) Cross conjugation (2)
12. (a) Illustrate the optical isomerism exhibited by biphenyl, allenes and spiranes.

Or

- (b) (i) Specify the configuration of the following by *R* and *S* system of notation.



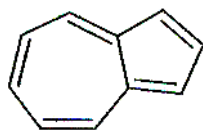
(3)

- (ii) State and illustrate the relationship between substrate symmetry and chirality. (2)

13. (a) Discuss how Craig's rule can be applied to determine aromaticity.

Or

- (b) (i) Azulene ($C_{10}H_8$) is a deep-blue compound with the structure shown below:



azulene

Account for its aromaticity and its dipole moment ($\mu = 1.0D$).

- (ii) Define mesoionic compounds? Explain the aromaticity of sydnone. (3+2)

14. (a) Explain the following:

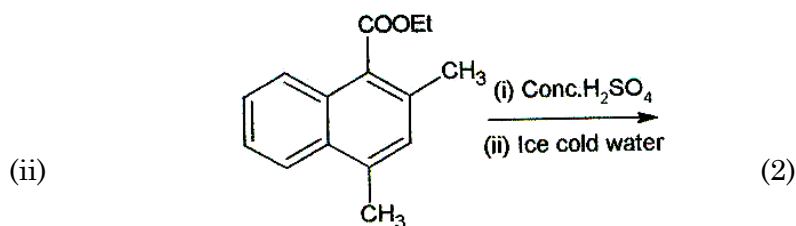
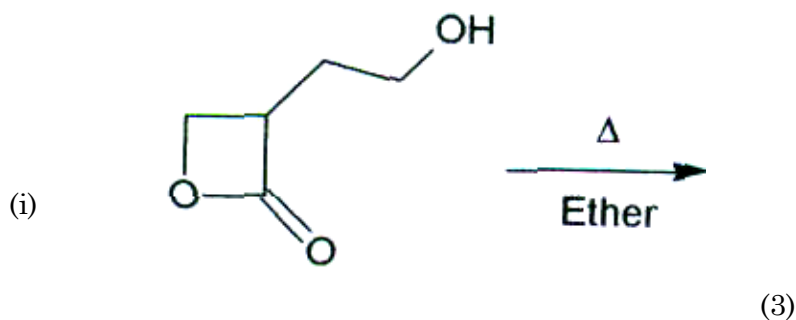
- (i) Nitration of anisole with fuming HNO_3 in Ac_2O yields mainly ortho product but with nitration mixture para isomer is the chief product? Give mechanism.
- (ii) Using resonance contributors, why a phenyl group is ortho/para director? (3+2)

Or

(b) Account for the following:

- (i) N-Alkyl derivatives of aniline and O-Alkyl derivatives of phenol have reactivity comparable to aniline and phenol respectively, while their acyl derivatives are very much less reactive in electrophilic substitution.
- (ii) Bromination of toluene is five times faster than that of t-butyl benzene. (2+3)

15. (a) Outline the mechanism for each of the following reactions:



Or

- (b) (i) Explain why CHCl_3 is more reactive than CHF_3 in $\text{S}_{\text{E}}1$ reaction?
- (ii) Outline the mechanism of aliphatic diazonium coupling reaction. (2+3)

Part C (3 × 10 = 30)

Answer any **three** questions.

16. What are the applications of Hammett equation? Illustrate with suitable examples. Comment on deviations from Hammett equation
17. (a) Define the term asymmetric synthesis and state and illustrate Cram's rule of asymmetric induction,
- (b) Write a brief note on stereoisomerism involving substituted cyclopropane systems. (5+5)
18. Write a note on the aromaticity of the following compounds:
- (a) Annulenes
- (b) Tropolones and
- (c) Cyclopentadienyl anion. (3+4+3)
19. (a) What are singlet and triplet carbenes? Explain the stereochemical outcome of these carbene additions to cis and trans 2- butenes.
- (b) Discuss the factors that affect the stability of free radicals. Explain captodative effect with suitable example. (5+5)

20. With suitable example, explain the following:
- (a) Pyrolytic cis elimination.
 - (b) Ambient nucleophile and substrates
 - (c) Neighbouring group participation involving σ electrons. (3+4+3)
- _____

F-2961

Sub. Code

7MCH1C2

**M.Sc. DEGREE EXAMINATION,
NOVEMBER 2019**

First Semester

Chemistry

INORGANIC CHEMISTRY – I

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. Define ionization energy.
2. BeCO_3 is thermally more unstable compared to MgCO_3 . Explain.
3. Draw the MO diagram of NO.
4. Calculate the number of bond pair and lone pair in XeO_2F_2 .
5. What are the basic features of Bronsted-Lowry concept of acids and bases?
6. The ionic mobility of H^+ and OH^- in water are very high. Explain.
7. How is S_2N_2 prepared?
8. Draw the structure of boron nitride.

9. Due to Frenkel defect, the dielectric constant in the ionic crystals increases. Explain.
10. Explain the conductivity mechanism of n-type semi conductors.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) What is hydrogen bond? Explain their applications.

Or

- (b) Explain the following:

- (i) many salts of lithium and magnesium are soluble in organic solvents
- (ii) Ge is more stable than C than its nearest neighbours Sn and Pb.

12. (a) Boron (B_2) is paramagnetic while Carbon (C_2) is diamagnetic. Discuss.

Or

- (b) Using Hybridization theory, deduce the geometry of XeF_4 .

13. (a) Discuss the factors affecting the strength of acid and bases.

Or

- (b) Discuss the solvolysis reaction in different protic and aprotic solvents.

14. (a) How is polymeric sulphur nitride prepared? Discuss its structure.

Or

- (b) How is Inorganic benzene prepared? Mention any four properties.

15. (a) Explain the role of semiconductors in solar energy conversion.

Or

- (b) How are solids classified? Explain the electronic structure of solids.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. (a) Explain the Pauling method of determining ionic radii.
- (b) What is lattice energy? Calculate the enthalpy of formation of KBr, which crystallises in NaCl lattice using Born Haber Cycle. Use these data in the calculation: $\Delta H_{\text{vap}}(\text{Br}_2) = 29.8 \text{ KJ/mol}$; Br_2 bond energy = 190.2 KJ / mol ; and $\Delta H_{\text{sub}}(\text{K}) = 79 \text{ KJ/mol}$.
17. (a) Construct the wave function of SP^3 hybridisation.
- (b) Draw and explain the MO diagram of carbon dioxide. (5+5)
18. (a) Discuss the chemistry of Liquid acetic acid as solvent.

Or

- (b) Explain HSAB principle. Discuss its applications. (4+6)
19. Discuss the preparation and structure of P_4S_7 and S_4N_4 .
20. What are the major effect of Schotky and Frankel defects on the ionic properties of the ionic crystal? What are the differences between these two types of defects?

F-2962

Sub. Code

7MCH1C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Chemistry

PHYSICAL CHEMISTRY – I

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Calculate the ionic strength of 0.2 molal $Bacl_2$ solution.
2. Write down the expression for Debye-Huckel limiting law at higher concentration. Identify the terms involved in it.
3. Define partial molar quantity.
4. What is the relation between fugacity and activity of a substance?
5. State and explain he-chatelier-Brawn principle.
6. Deduce the Gibbs phase rule.
7. Define micro canonical and macro canonical ensembles.
8. What is population inversion? How is it achieved?

9. What is meant by electrical double layer?
10. Write Ferundlich's adsorption isotherm and explain the terms involved.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) How will you determine the solubility product of a sparingly soluble salt using conductometric technique?

Or

- (b) Derive the Butler-Volmer equation. What are its high field and low field approximations?
12. (a) Derive Gibbs-Helmholtz equation.

Or

- (b) Explain an experimental method of determining fugacity of real gases.
13. (a) The equilibrium constant k_p for the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$ is 1.64×10^{-4} at m^{-2} at 400°C . What will be the equilibrium constant at 500°C if the heat of reaction in this temperature range is -105185.8J ?

Or

- (b) Draw a labelled phase diagram of $KI - H_2O$ system and describe the main features.
14. (a) Derive Boltzmann distribution law.

Or

- (b) Derive an expression for Fermi-Dirac statistics.

15. (a) What is electrophoresis? How does this phenomenon provide information about the sign of charge on particles?

Or

- (b) Derive Langmuir adsorption isotherm and discuss the effect of pressure on θ , surface covered.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Derive the Debye-Huckel-Onsager conductivity equation, giving clearly the assumptions made.
17. (a) Deduce Gibbs-Duhem equation. Explain its significance.
- (b) How do you determine the activity and activity co-efficient of an electrolyte? (5+5)
18. Draw the labelled phase diagram of $Na_2SO_4 - H_2O$ system and describe the main features.
19. (a) Explain the partition function and equilibrium constant.
- (b) Write a note on Quantum statistics. (5+5)
20. (a) Bring out the differences between chemisorption and physisorption.
- (b) Write a note on BET isotherm. (5+5)
-

F-2963

Sub. Code

7MCH1E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

First Semester

Chemistry

Elective – POLYMER CHEMISTRY

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. What are Homopolymer and Copolymer?
2. Explain the term 'Repeating units in Polymerisation.
3. Give the structure of PMMA
4. Mention the uses of polycarbonate.
5. Draw the planar zig-zag structure of polyethylene molecule.
6. Give the names of the polymers: PVC, PMMA, PAN and PTFE.
7. What is meant by photodegradation?
8. What are photoconducting polymers?
9. Mention the use of polymer used in blood cells.
10. Give any two examples of colorants.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Write a note on Block co-polymer.

Or

- (b) What is rubber? Explain the significance of vulcanization of rubber.

12. (a) How is polystyrene prepared? Mention their uses.

Or

- (b) Write the monomer of urethane and explain the preparation of polyurethane.

13. (a) Discuss the various factors affecting the glass transition temperature.

Or

- (b) Write a note on kinetics of polymerisation.

14. (a) Explain the role of photostabiliser in polymer.

Or

- (b) How are polymer degradation classified? Explain ultrasonic degradation of polymer.

15. (a) Write short notes on Calendering in Plastic processing.

Or

- (b) Polymers in biomedical sciences.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. (a) How are they classified on the basis of chemical structure?
(b) Discuss the mechanism of coordination polymerization. (5+5)
17. Describe the preparation, properties and uses of the following
(a) Polyethylene
(b) Epoxy resin. (5+5)
18. (a) Equal number of molecules with $M_1 = 10,000$ and $M_2 = 90,000$ are mixed.
Calculate Number - average molar mass and Mass-average molar mass.
(b) Explain the various geometrical structures of polymer. (5+5)
19. Discuss the following polymerization techniques:
(a) Bulk
(b) Solution. (5+5)
20. Using schematic diagram, explain the process of rotational casting and reinforcing.
-

F-2964

Sub. Code

7MCH2C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Chemistry

ORGANIC CHEMISTRY – II

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is meant by conformational free energy difference?
2. Which is the most stable conformation of methylcyclohexane and why?
3. Cis -1,2- dichloroethylene is IR active while its Trans isomer is IR inactive. Explain.
4. A parent ion with m/z 120 undergoes fragmentation and gives an ion with m/z 105. Calculate the mass of the metastable ion.
5. How will you distinguish among ortho -, meta- and para - xylenes on the basis of their proton decoupled CMR spectra?
6. ¹³C carbonyl chemical shift of acetophenone is 196 ppm, whereas that of 2,6- dimethylacetophenone is 206 ppm. Explain.
7. Explain any one synthetic use of osmium tetroxide.
8. What do you mean by Birch reduction? Give an example.

9. What happens when cholesterol is distilled with selenium?
10. How is dehydroepiandrosterone converted to androsterone?

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain how conformational free energy difference is calculated by kinetic method?

Or

- (b) Explain the terms stereoelectronic and steric factors with suitable examples.

12. (a) Write briefly on MaLafferty rearrangement in mass spectrometry.

Or

- (b) Discuss the various vibrational modes in a molecule.

13. (a) Describe briefly the difference in the position of absorption as notes in the case of ^1H NMR spectra of acetylene and benzene.

Or

- (b) Discuss the basic principle of FT technique.

14. (a) What is oppenauer oxidation? Discuss its mechanism.

Or

- (b) Write briefly on Meerwein-Pondorf–verly reduction.

15. (a) Describe about the conformation of A/B rings, B/C rings and C/D rings in steroids.

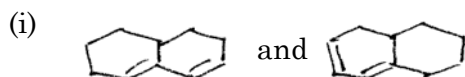
Or

- (b) Give an account on bile acids. Indicate how cholesterol is converted into cholanic acid?

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Give an account of the correlation of the conformation of acyclic and cyclic systems with their physical and chemical properties.
17. (a) How will you distinguish between the following pairs of compounds using spectral data?



- (ii) Acetamide and N-methylacetamide.

- (b) Write briefly on IR spectroscopy of organic molecules with respect to inter and intra molecular hydrogen bonding. (3)
- (c) How will you distinguish between 3-methyl and 4-methylcyclohexene on the basis of mass spectrometry? (3)
18. (a) Discuss the double resonance technique in ^1H NMR.
- (b) Write a note on spin-spin coupling.
- (c) What are NMR shift reagents? Indicate their uses? (4 + 3 + 3)

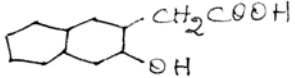
19. (a) Explain the applications of the following reagents in organic synthesis.

(i) LDA and

(ii) 1,3-Dithiane (4 + 4)

(b) Predict the major product of each of the following :

(i) $\text{C}_6\text{H}_5\text{CH}=\text{CH}\cdot\text{COOC}_2\text{H}_5 \xrightarrow{\text{LiAlH}_4} \rightarrow$

(ii)  $\xrightarrow{\text{DCC/Pyridine}}$ (1 + 1)

20. Discuss the following :

(a) Position and Configuration of hydroxyl group in cholesterol.

(b) Position of double bond in cholesterol

(c) Position of the angular methyl groups in cholesterol.

(4 + 3 + 3)

F-2965

Sub. Code

7MCH2C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Chemistry

INORGANIC CHEMISTRY — II

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. H_2S cannot precipitate Ag as AgS in presence of excess CN^- . Explain
2. What is meant by stepwise stability constant? How is it related to overall stability constant?
3. Generally, low spin complexes are more inert than the high spin complexes. Explain.
4. What is anation reaction? Give an example.
5. What is Bohr effect?
6. Give the structures of any two synthetic oxygen carriers.
7. What is meant by reductive elimination reaction?
8. Ziegler-Natta mixed catalyst produces the high density polythene. Explain.

9. What are magic numbers? What information do you know from these numbers?
10. Differentiate fissile and fertile isotopes.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Discuss the basic assumptions of CFT in understanding the bonding in the coordination compounds.

Or

- (b) State and explain Jahn Teller distortion.

12. (a) What are complementary and non-complementary reactions? Explain with suitable examples.

Or

- (b) Using the substitution reactions, synthesize any two six coordinated complexes.

13. (a) What are *in-vivo* and *in-vitro* nitrogen fixation? Explain with suitable examples.

Or

- (b) Discuss the structure of chlorophyll.

14. Discuss the mechanistic steps in the following reactions :

- (a) Hydroformylation reaction.

Or

- (b) Wacker's process.

15. (a) Explain the origin of energy in Sun and Stars.

Or

- (b) Discuss the applications of radioactive isotopes in the field of medicine and agriculture.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. (a) Explain the factors affecting CFSE values.
(b) Discuss the spinel and inverse spinel structures of the mixed oxides in terms of CFT. (5 + 5)
17. (a) Discuss the applications of trans-effect series in the preparation of isomers of Pt(II) complexes.
(b) Illustrate inner and outer sphere electron transfer reactions with suitable examples. (5 + 5)
18. (a) Discuss the mechanism of the intake of oxygen by myoglobin and haemoglobin.
(b) Write a note on iron-sulphur protein. (5 + 5)
19. (a) What is Wilkinson's catalyst? Discuss the mechanism of hydrogenation of olefin.
(b) Discuss the mechanism of Cyclooligimerisation of acetylene. (5 + 5)
20. (a) The activity of radioactive isotope falls to 75% in 90 days. Calculate the half life and decay constant.
(b) Discuss the theory of liquid drop model. (5 + 5)
-

F-2966

Sub. Code

7MCH2C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Chemistry

PHYSICAL CHEMISTRY – II

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are the assumptions of collision theory?
2. Mention any two characteristics of chain reactions.
3. How are fundamental and overtone frequencies in IR explained?
4. What is meant by normal modes of vibration?
5. Explain the term chemical shift in ESCA.
6. State frank condon principle.
7. Coupling constant in NMR spectroscopy is independent of applied magnetic flux density – Justify.
8. What are the limitations of NQR?
9. Explain with a suitable example the term improper axis of symmetry.
10. Give the symmetry based selection rule for vibrational Raman Spectroscopy.

Part B**(5 × 5 = 25)**Answer **all** questions, choosing either (a) or (b).

11. (a) What are the postulates of ARRT? Write thermo dynamic equation for rate constant of unimolecular reaction.

Or

- (b) Explain the mechanism and kinetics of N_2O_5 decomposition.

12. (a) Discuss the effect of isotopic substitution in rotational spectra.

Or

- (b) Describe the basic principles of FT-IR spectroscopy.

13. (a) Describe the different types of electronic transitions possible in poly atomic molecules.

Or

- (b) outline the classical theory of Raman effect.

14. (a) Discuss the theory of NQR spectroscopy.

Or

- (b) What is shift reagents? Discuss its applications.

15. (a) Construct the character table for C_{3v} point group.

Or

- (b) State and explain great ortho gonality theorem.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. (a) Discuss the theory of explosion reactions and explain the causes for the explosion limits of $\text{H}_2\text{-O}_2$ reactions. (5)
- (b) Discuss the kinetics of decomposition of acetaldehyde. (5)
17. (a) What is Fermi Resonance? How does it affect the intensities of spectral lines.
- (b) Deduce an expression for Einstein's coefficient of induced absorption. (5+5)
18. (a) Explain the basic principles of PES spectroscopy.
- (b) Describe the rotational fine structure of electronic spectra. (5+5)
19. (a) Discuss how NQR is used to study hybridisation and ionic character of the bond. (4)
- (b) Explain the terms zerofield splitting and kramer's degeneracy. (6)
20. By applying selection rule, predict the IR and Raman normal modes of water and ammonia.

F-2967

Sub. Code

7MCH2E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Second Semester

Chemistry

Elective-ENVIRONMENTAL CHEMISTRY

(CBCS – 2017 onwards)

Time: 3 Hours

Maximum: 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is green house effect?
2. What is the reason for ozone layer depletion?
3. What are industrial effluents?
4. Define the term eutrophication.
5. Mention any three reasons of soil pollution.
6. Write a short note on soil analysis.
7. What is incineration?
8. What are the biochemical effects of arsenic?
9. What is earthquake?
10. Why does tsunami happen?

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) What is acid rain? Explain how it happens and affects the environment.

Or

- (b) Illustrate the sulphur cycle in the environment.

12. (a) Discuss the water quality parameters and standards.

Or

- (b) What are the metallic in water? Give their harmful effects.

13. (a) What is soil fertility? Give the factors affecting it.

Or

- (b) Discuss the methods of controlling soil pollution.

14. (a) Explain about the pollution made by fertilizer and chemical industries.

Or

- (b) Give the chemical and biochemical properties of various species mercury found in the environment?

15. (a) What is cyclone? Give its types.

Or

- (b) Give the note on parameters of earthquake.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. (a) Give the harmful effects of global warming.
(b) What are the causes and the effects of ozone layer depletion?
 17. (a) What are the metallic pollutants in water? Give their harmful effects.
(b) What are the harmful effects of eutrophication?
 18. Discuss in detail about the parameters of soil analysis.
 19. (a) Mention five sources, which contribute to thermal pollution.
(b) Discuss about the procedures of protection from radiation.
 20. Describe the nuclear accidents and its effects on the lives of human being.
-

F-2969

Sub. Code

7MCH3C1

M.Sc. DEGREE EXAMINATION,
NOVEMBER 2019

Chemistry

ORGANIC CHEMISTRY – III

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is Stevens rearrangement?
2. Explain Vilsmeier-Haack reaction with an example.
3. Give any two important applications of Wittig reaction.
4. What is Sharpless asymmetric epoxidation?
5. How are the terpenoids classified?
6. Write down the structures of (a) camphor_ (b) α – pinene.
7. What are the requirements of an ideal synthesis?
8. Explain the term retro synthetic analysis with an example.
9. What is photosensitization? Under what condition does it effectively occur?
10. What do you mean by allowed and forbidden transitions?

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) What is Curtius rearrangement? Explain with mechanism.

Or

- (b) Narrate the mechanism of Arndt – Eistert reaction.

12. (a) Discuss the mechanism of Michael addition.

Or

- (b) Explain the stereochemistry of electrophilic addition of HBr to alkenes.

13. (a) Outline the synthesis of zingiberene from *p*-anisylmagnesium bromide.

Or

- (b) Give an account on biosynthesis of terpenoids.

14. (a) Write the role of blocking groups in organic synthesis.

Or

- (b) Discuss the synthesis of 2,4 – dimethyl – 2 – hydroxy pentanoic acid.

15. (a) Draw the molecular orbital diagram of 1,3,5 – hexatriene and depict the HOMO and LUMO.

Or

- (b) Explain the cycloaddition reaction between butadiene and ethylene using FMO method.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Explain Wagner – Meerwin and Di – Pi methane rearrangements with mechanism.
17. Explain the following reactions with mechanism.
- (a) Mannich reaction,
 - (b) Shapiro reaction
 - (c) Darzen's reaction. (4 + 3 + 3)
18. How will you synthesize the following?
- (a) Cadinene,
 - (b) Abietic acid
 - (c) α – pinene. (3 + 4 + 3)
19. (a) Schematically explain convergent synthesis is more advantageous than linear synthesis.
- (b) Write a notes on homogeneous hydrogenation. (7 + 3)
20. (a) Construct a correlation diagram for the disrotatory opening of cyclohexadiene to 1,3,5 – hexatriene. Consider whether the reaction is thermally or photochemically allowed.
- (b) Write a notes on Paterno – Buchi reaction. (7 + 3)
-

F-2970

Sub. Code

7MCH3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Chemistry

INORGANIC CHEMISTRY – III

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. How can you determine the structure of BF_3 from its IR and Raman spectra?
2. What is meant by Doppler shift?
3. What is the ground term for d4 high spin state of octahedral complex?
4. Predict ^{19}F NMR spectrum for SF_4 .
5. Give the structure of basic beryllium acetate.
6. What is meant by synergic effect?
7. How is Plutonium produced from Uranium?
8. Write down the electronic configuration of Europium ($z=63$).
9. How is diborane prepared? What happens when it is heated?
10. Give the preparation of any one isopoly acid.

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Distinguish between cis- and trans- isomers of $[\text{PtCl}_2(\text{NH}_3)_2]$ by using IR and Raman spectra.

Or

- (b) Explain the terms Mossbauer effect and isomer shift.

12. (a) Discuss the electronic spectra $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$ complex.

Or

- (b) Discuss the effect of chemical exchange on the nmr spectra.

13. (a) Mention the ores of selenium How is selenium extracted from its ore?

Or

- (b) What are π -acceptors? Discuss the nature of bonding in metal carbonyls.

14. (a) What is a shift reagent? Explain the importance of the shift reagent in the elucidation of complex NMR spectra.

Or

- (b) How does thorium occur in nature? How is the metal extracted from monazite sand?

15. (a) What are poly acids? How are they classified? Give an example for each.

Or

- (b) What is styx numbers? Calculate the styx number for B_4H_{10} and B_5H_{11} .

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. (a) Discuss the vibrational spectra of any three metal carbonyls.
- (b) Illustrate the nature of quadrupole splitting of the MB signal for ^{57}Fe and ^{119}Sn . (5 + 5)
17. (a) Explain Contact shift and Pseudo Contact shift with suitable examples.
- (b) The electronic spectrum of $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ has exhibited bands at 8100 (ν_1), 16000 (ν_2), and 19400 (ν_3) cm^{-1} . Calculate the 10 Dq and B values. (5 + 5)
18. (a) Discuss the preparation and properties of any two Germanium compounds.
- (b) How is ferrocene synthesised? Explain its structure and bonding. (5 + 5)
19. (a) What is lanthanide contraction? What are its consequences?
- (b) How is UO_3 prepared? How does it react with HCl, NaOH and Li_2CO_3 ? (5 + 5)
20. (a) What are Wade's rule? Discuss the application of these rules in classifying carboranes into closo, nido and arachno carboranes.
- (b) Discuss the Keggin structure of 12-hetero poly acids. (5 + 5)

F-2971

Sub. Code

7MCH3C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Chemistry

PHYSICAL CHEMISTRY – III

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is chemiluminescence? Explain with an example.
2. What are the differences between singlet and triplet excited states?
3. State and explain Heisenberg's uncertainty principle.
4. What is de Broglie's hypothesis?
5. What are orthogonal wave functions?
6. Define eigen values and eigen functions.
7. What are the limitations of perturbation theory?
8. Predict the shape of is orbital with the help of its wave function.
9. Define Acid-base catalysis.
10. Define mean free path and write the equation for it.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Derive Stern-Volmer equation? Discuss its applications.

Or

- (b) Explain the phenomenon of photo sensitization with an example and give its mechanism.

12. (a) State the postulates of quantum mechanics.

Or

- (b) Obtain the operator for kinetic energy.

13. (a) Explain the following

- (i) degeneracy
- (ii) normalisation of wave functions.

Or

- (b) Derive time independent schrodinger wave equation.

14. (a) Set up the schrodinger wave equation for a simple harmonic oscillator.

Or

- (b) Apply the variation method for solution of hydrogen atom problem.

15. (a) Explain the set up of flash photolysis and indicate its uses.

Or

- (b) State and explain the principle of equipartition of energy.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. (a) Discuss the salient features of Jablonski's diagram.
(b) Write briefly the elementary aspects of photosynthesis.
 17. Derive the quantum mechanical operator for potential energy and position.
 18. (a) For a particle in a one-dimensional box, show that the average value of the momentum along the x-axis is zero.
(b) Give the schrodinger equation for rigid rotor and obtain its solution.
 19. Using HMO theory calculate the delocalization energy for butadiene system.
 20. Derive Michaelis and Menton equation in enzyme catalysis.
-

F-2972

Sub. Code

7MCH3E1

M.Sc DEGREE EXAMINATION, NOVEMBER 2019

Third Semester

Chemistry

***Elective* - PHARMACEUTICAL CHEMISTRY**

(CBCS – 2017onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is meant by inductive effect? Give example.
2. Give the reasons for prodrug formation.
3. Draw the structure of penicillin- G.
4. What is AIDS? How can it be prevented?
5. What are antineoplastic agents?
6. Define general anaesthetics. Give examples.
7. What are local antiinfective drugs? Give example.
8. Write the synthesis of atenolol.
9. Give the preparation of nifedipine.
10. List out the ideal characteristic of anaesthetic agent.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Discuss occupancy and induced fit theory in detail.

Or

- (b) Explain in detail about the process of drug distribution and factors affecting drug distribution.

12. (a) Describe the structure activity relationship of chloramphenicol.

Or

- (b) Outline the synthesis of penicillin-V.

13. (a) Brief out the role of cytotoxic agent and antimetabolites in treatment of cancer.

Or

- (b) Write a short note on:

(i) Neurotransmitters.

(ii) CNS depressants.

14. (a) Give a brief account on cardiovascular diseases.

Or

- (b) Explain the central intervention of cardiovascular output.

15. (a) Describe the analgesic action of morphine.

Or

- (b) Explain the synthesis and therapeutic action of sodium nitroprusside and guanethidine.

Part C $(3 \times 10 = 30)$ Answer any **Three** questions.

16. Give a brief account on any five physiochemical parameters.
17. (a) Discuss the structural features and SAR of erythromycin. (7)
(b) Give the synthesis of chloroquine. (3)
18. (a) Give the synthesis for the following antineoplastic agents. (5)
(i) Mechlorethamine
(ii) Cyclophosphamide.
(b) Write a brief note on neurochemistry of mental diseases. (5)
19. (a) Discuss the drug inhibitors of peripheral sympathetic function. (5)
(b) Outline the synthesis for the following. (5)
(i) Methyldopa
(ii) Verapamil.
20. (a) Discuss the synthesis, properties and uses of aspirin and methyl salicylate. (7)
(b) Write the synthesis of pethidine. Give its uses. (3)

F-2973

Sub. Code

7MCH4C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Fourth Semester

Chemistry

INSTRUMENTAL METHODS OF ANALYSIS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. Round 5.21498 to
 - (a) three significant figures and
 - (b) five significant figures
2. A copper determination is having a standard deviation of 4 mg. If the sample is having a mean value of 50 mg of copper, calculate the variance.
3. How is purity of precipitates determined?
4. What are the disadvantages of organic precipitants?
5. Define standard electrode potential
6. What are the advantages of auxiliary electrode in three electrode system?
7. What is the property measured in DTA?
8. Define glass transition temperature.

9. A solution of thickness 2 cm transmits 40 % incident light. Calculate the concentration of the solution, given that $\epsilon = 6000 \text{ dm}^3/\text{mol}/\text{cm}$.
10. Why acetylene gas is used in AAS?

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write a note on student's 't' test to compare the precision of two methods

Or

- (b) What are determinate errors and indeterminate errors? Explain

12. (a) Enumerate the method of precipitation from homogeneous solution

Or

- (b) Give a brief account on drying and ignition of precipitates.

13. (a) Discuss the principle and applications of stripping voltammetry.

Or

- (b) What is the principle of amperometry? Discuss the applications of amperometric titration.

14. (a) Discuss the principle of DTA.

Or

- (b) Explain the factors affecting TG curves.

15. (a) Determine the amount of copper in colorimetric analysis in the presence of Nickel.

Or

- (b) Discuss the principle and applications of Turbidimetry.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Define correlation coefficient and linear regression. Discuss the method of least square to fit the set of data.
17. (a) What are organic precipitants? How are they classified? Give examples
- (b) What is meant by co-precipitation? In what ways, it differs from post-precipitation? (5 + 5)
18. (a) Explain the theory of electro gravimetric analysis
- (b) Discuss the applications of coulometry. (5 + 5)
19. (a) Explain TG and DTA of calcium oxalate monohydrate in N₂ and air atmosphere
- (b) How is DSC used to determine the degree of conversion of high alumina cement? (5 + 5)
20. Describe the principle, instrumentation and applications of Flame photometry.

F-2974

Sub. Code

7MCH4E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Fourth Semester

Chemistry

Elective — NANO CHEMISTRY

(CBCS – 2017 onwards)

Time : Three Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are Quantum dots? Give example.
2. What is meant by hydrodynamic cavitation?
3. What are fullerenes?
4. What are nanofibres? Give example.
5. What is carbon cluster? Mention its application.
6. Give the preparation of CdO nanoparticles.
7. Mention the advantage of AFM over electron microscopy.
8. Give the basic principle of particle size analyzer.
9. What are nanopipettes?
10. What are DNA knots?

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Write notes on Reverse Micelle synthesis of nanomaterials.

Or

- (b) Illustrate the unique properties of materials due to nano size and give explanation.

12. (a) Describe applications of carbon nanotubes.

Or

- (b) What are Graphenes? Give its unique properties and applications.

13. (a) Give an account of Catenanes and their applications.

Or

- (b) Write short notes on discovery of C₆₀.

14. (a) Give the principles and applications of Scanning Electron Microscopy (SEM).

Or

- (b) Discuss the principles and applications of Electron Spectroscopy for chemical analysis (ESCA).

15. (a) Give a brief account of nanomechanical device designed by Seeman.

Or

- (b) Explain the force measurements in simple protein molecules.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Describe :
- (a) Sol-Gel mediated synthesis of nanomaterials.
 - (b) synthesis of nanomaterials using biological agents. (5+5)
17. Describe the applications of nanomaterials in
- (a) Energy
 - (b) Environment
 - (c) Medicine and
 - (d) Defence. (4 × 2½ = 10)
18. (a) Discuss the methods of preparation TiO₂ and ZnO nanomaterials.
- (b) Write short notes on the superconductivity in C₆₀. (5+5)
19. Give the principles and applications of
- (a) X-Ray diffraction analysis (XRD) and
 - (b) Transmission Electron Microscopy (TEM). (5+5)
20. Give detailed account of
- (a) Self assembled nano transistors.
 - (b) Nanoparticles mediated transfection. (5+5)

F-2975

Sub. Code

7MCH4E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Fourth Semester

Chemistry

Elective : CORROSION CHEMISTRY

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is dry corrosion? Give an example.
2. Give any two factors influencing the rate of corrosion.
3. What are stress corrosion? Give an example.
4. Define the term Galvanic corrosion.
5. What is cladding?
6. What are the requirements of good paint?
7. Define energy density.
8. Explain the term polarization.
9. What are fuel cells?
10. What is limiting current density?

Part B

(5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Bring out the differences between chemical and electrochemical corrosion.

Or

- (b) Explain the theory of electrochemical corrosion.

12. (a) Write short notes on :

- (i) Waterline corrosion
- (ii) Erosion corrosion.

Or

- (b) What is soil corrosion? Explain the factors influencing the soil corrosion.

13. (a) What is protective coatings? Explain the classification of protective coatings.

Or

- (b) Define electroplating. Mention the factors influencing the electroplating.

14. (a) Write a note on thermodynamic reversibility.

Or

- (b) List out the applications of primary and secondary cells.

15. (a) Explain the electrocatalysis of hydrogen oxidation and oxygen reduction.

Or

- (b) Discuss the construction of phosphoric acid fuel cell system.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. (a) Write a note on EMF and Galvanic series.
(b) Explain the corrosion control methods. (5 + 5)
17. (a) What are the factors influencing the atmospheric corrosion?
(b) Discuss the microbiological corrosion. (5 + 5)
18. Explain the following :
(a) Chromate coating. (4)
(b) Phosphate coating. (3)
(c) Oxide coating. (3)
19. What are electrolytes? Explain the non-aqueous, molten salt and solid electrolytes.
20. (a) Write a note on porous electrodes.
(b) Discuss the construction and working of solid oxide fuel cell system. (5 + 5)

F-2976

Sub. Code

7MCH4E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Fourth Semester

Chemistry

Elective – GREEN CHEMISTRY

(CBCS 2017 Onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Suggest any two methods to prevent water pollution
2. What are green products? Give one suitable example.
3. Explain the term “Atom economy” with suitable example.
4. Mention any two green chemistry awards and their motive.
5. Mention any two health impacts of nickel.
6. Define heavy metals. Give suitable examples.
7. What is supercritical CO₂? Explain.
8. Explain how does the choice of catalyst impacts green synthesis.
9. Give any two important difference between microwave assisted and ultrasound assisted green synthesis.
10. Give any two examples of polymer supported catalysts.

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Describe in detail, the challenges before green chemist.

Or

- (b) Write a note on pollution control and prevention method.

12. (a) Write a note on the role of international organisations in promoting green chemistry.

Or

- (b) Describe the scope of green chemistry in the present scenario.

13. (a) Briefly describe the health impacts of lead and selenium.

Or

- (b) Describe any two methods for removal of cadmium and beryllium from water.

14. (a) Discuss the role of starting materials and solvents in designing green synthesis method.

Or

- (b) Illustrate Strecker synthesis in water by green method.

15. (a) Describe the role, advantages and special effects of microwave oven in microwave assisted green synthesis method.

Or

- (b) What are phase transfer catalyst? Describe their types, advantages and applications in synthesis of nitriles from alkyl and aryl halides.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Write a short notes on the following: (3 + 3 + 4)
- (a) eco-efficiency
 - (b) waste recycling
 - (c) environmental protection laws.
17. State and explain twelve principles of green chemistry.
18. Briefly discuss the impact of heavy metals like cobalt, arsenic and mercury on human health and ways to remove them from environment.
19. Describe the following: (5 + 5)
- (a) Kolbe-Schmidt synthesis using super critical CO₂.
 - (b) Suzuki coupling using ionic liquids.
20. Briefly describe the following: (3 + 4 + 3)
- (a) Oxidation of toluene by microwave assisted synthesis.
 - (b) Hydroboration reaction using ultra sound.
 - (c) Enzymatic hydrolysis
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F-2977

Sub. Code

7MCH4E4

M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

Fourth Semester

Chemistry

Elective — MOLECULAR PHOTOCHEMISTRY

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Distinguish between internal conversion and intersystem crossing in photochemical reactions.
2. What are radiationless transitions? Give any two examples.
3. Outline the mechanism of photoreduction.
4. Give an example of cycloaddition reaction.
5. With one suitable example, explain photo rearrangement reaction involving transition metal complexes.
6. What are photo-redox reactions? Give an example.
7. Give any one reaction involving singlet molecular oxygen.
8. What is photoisomerisation reaction?

9. Define LASER. Mention the type of LASERs used in photochemistry.
10. What is chemical actinometry?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Bring out the essential differences between the following :
- (i) Thermal and photochemical reaction
- (ii) Florescence and phosphorescence. ($2\frac{1}{2} + 2\frac{1}{2}$)

Or

- (b) Describe the photophysical kinetics of unimolecular processes in detail.
12. (a) With the help of woodword-Hoffman rules, discuss the stereochemical course of cyclisation of 1,3, 5-Hexatriene.

Or

- (b) What is singlet oxygen? Discuss its common reactions.
13. (a) Write a note on :
- (i) Photo substitution reaction. (2)
- (ii) Photochemistry of metallocenes. (3)

Or

- (b) Describe the photochemistry involved in storage and conversion of solar energy.

14. (a) Write a note on :
- (i) Barton reaction (3)
 - (ii) Di- π -methane rearrangement. (2)

Or

- (b) Write a note on Hoffmann-Loeffer-Freytag reaction.
15. (a) Describe the role of uranyl oxalate in chemical actinometry.

Or

- (b) What are the applications of LASER in photochemistry? Give suitable examples.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain with the help of Jablonski diagram, the various photophysical processes of an excited state.
17. Construct the correlation diagram for [2 + 2] cycloaddition and state the conditions under which the addition occurs.
18. Write a note on :
- (a) Photo-Fries rearrangement of ethers and anilides
 - (b) Photo-Cleavage reaction. (5 + 5)
19. Explain the following with any one suitable example and its mechanism.
- (a) Photo redox reaction using transition metal complexes
 - (b) Photo rearrangement reaction with transition metal complexes. (5 + 5)

20. Explain the following experimental technique in photochemistry :

(a) Reinecke's salt actinometers

(b) Photochromic actinometers. (5 + 5)
