

(Pages : 3)

L – 6422

Reg. No. :

Name :

First Semester M.Sc. Degree Examination, August 2021

Computer Science

CS 1613 : MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(2016 Admission onwards)

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer all questions. Each question carries 3 marks.

1. Define a reflexive relation. Give an example of the relation, which is both reflexive and transitive but not symmetric.
2. Show that if any eight positive integers are chosen, two of them will have the same remainder when divided by 7.
3. Show that $(P \rightarrow Q) \vee (Q \rightarrow P)$ is a tautology.
4. Write the formal definition of NFA.
5. Define a Regular Grammar.
6. Explain group isomorphism.
7. State Bayes' theorem.
8. Distinguish between finite graph and infinite graph. Give examples.
9. What do you mean by a complete graph? Give an example.

(9 × 3 = 27 Marks)

P.T.O.



SECTION – B

Answer **any two** questions from each module. Each carries **8** marks.

Module – I

10. Explain partition onsets. Let $S = \{1, 2, 3\}$. Write all the possible partitions of S .
11. Explain partial ordering and total ordering on sets. Give examples.
12. Let $A = \text{"Aldo is Italian"}$ and $B = \text{"Bob is English"}$. "

Formalize the following sentences using Mathematical logic:

1. "Aldo isn't Italian"
2. "Aldo is Italian while Bob is English"
3. "If Aldo is Italian then Bob is not English"
4. "Aldo is Italian or if Aldo isn't Italian then Bob is English"

(2 × 8 = 16 Marks)

Module – II

13. Define a monoid. Show that the set 'N' is a monoid with respect to multiplication.
14. Define a group. Prove that the identity element is unique for a group.
15. (a) State Lagrange's theorem.
(b) What do you mean by coset?

(2 × 8 = 16 Marks)

Module – III

16. Write short notes on Euler path and Hamiltonian path. Draw an example graph that is
- (a) Hamiltonian but not Eulerian
 - (b) Both Eulerian and Hamiltonian.
17. (a) State the axioms of Probability.
- (b) A Mathematics teacher gave her class two tests. 25% of the class passed both tests and 42% of the class passed the first test. What percentage of those who passed the first test also passed the second test?
18. Explain the following types of graphs:
- (a) Complete bipartite graph
 - (b) Null graph
 - (c) Planar graph
 - (d) Simple graph

(2 × 8 = 16 Marks)



(Pages : 2)

L – 6420

Reg. No. :

Name :

First Semester M.Sc. Degree Examination, August 2021

Computer Science

CS 1611 : COMPUTER ARCHITECTURE

(2016 Admission onwards)

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer all questions. Each question carries 3 marks.

1. What is a combinatorial circuit? Give example.
2. What is a microinstruction?
3. List the addressing modes of 8085.
4. Give the working principle of virtual memory.
5. What is a PRAM model?
6. What is an I/O processor?
7. What do you mean by a non-linear pipeline processor?
8. What do you mean by Pipeline chaining?
9. What do you mean by a multicore system?

(9 × 3 = 27 Marks)

P.T.O.



SECTION – B

Answer **any two** questions from each module. Each carries **8** marks.

Module – I

10. Discuss the features and advantages of RISC and CISC architectures.
11. Give a detailed account of linear pipeline processors.
12. Discuss register and stack organization of CPU.

(2 × 8 = 16 Marks)

Module – II

13. Discuss the different modes of data transfer.
14. Discuss the different cache mapping and cache replacement strategies.
15. Write short notes on :
 - (a) Distributed memory
 - (b) Serial communication.

(2 × 8 = 16 Marks)

Module – III

16. Discuss organization, memory organization and design issues of multiprocessor systems.
17. Write a note on Super scalar and super pipeline design.
18. Discuss instruction pipeline design.

(2 × 8 = 16 Marks)



(Pages : 2)

L – 6424

Reg. No. :

Name :

First Semester M.Sc. Degree Examination, August 2021

Computer Science

CS 1615 — COMPUTER NETWORKS

(2016 Admission onwards)

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer **all** questions. **Each** question carries **3** marks.

1. Write notes on Protocols and standards.
2. Identify the components of a data communication system.
3. Compare and contrast analog and digital signals.
4. Write short note on GSM in telecommunication systems.
5. Write short note on application of wireless network.
6. Write short note on wireless devices.
7. Explain requirements for a mobile IP and justify them.
8. Explain how tunneling works in general and especially for mobile IP.
9. What is HTML?

(9 × 3 = 27 Marks)

P.T.O.



SECTION – B

Answer **any two** questions from each module. Each question carries **8** marks.

Module – I

10. Write in detail about TCP/IP protocol suite.
11. Write in detail various internetworking devices in communication network.
12. Write short note on :
 - (a) Periodic analog signal
 - (b) Frequency
 - (c) Wavelength
 - (d) Composite signals
 - (e) Bandwidth
 - (f) Bit rate of Digital signal

(2 × 8 = 16 Marks)

Module – II

13. Explain the advantages of WLANs. Explain two different basic transmission technologies that can be used to set up WLANs.
14. What is Bluetooth? Explain Bluetooth protocol stack.
15. Explain in detail various multiplexing methods in wireless communication.

(2 × 8 = 16 Marks)

Module – III

16. Explain :
 - (a) Tunneling and Encapsulation (4)
 - (b) Optimization (2)
 - (c) Reverse Tunneling. (2)
17. Explain advantages and disadvantages of various mobile TCP mechanism.
18. Describe in detail components of wireless application protocol architecture with neat diagram.

(2 × 8 = 16 Marks)



(Pages : 2)

L – 6421

Reg. No. :

Name :

First Semester M.Sc. Degree Examination, August 2021

Computer Science

CS 1612 DATA STRUCTURES AND ALGORITHMS

(2016 Admission onwards)

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer **all** questions. Each carries **3** marks.

1. What is efficiency of an algorithm? How do you measure the time and space complexity of an algorithm?
2. What is complete binary tree and full binary tree? Illustrate with an example.
3. Give any one application of DFS on a connected undirected graph.
4. With suitable example describe the divide and conquer strategy.
5. Explain about single source shortest path problem.
6. Describe Knapsack problem.
7. Explain the travelling Salesman problem.
8. What is NP- Complete problem? List two examples.
9. Explain N-Queen's problem.

(9 × 3 = 27 Marks)

P.T.O.


SECTION – B

Answer **any two** questions from each module. Each carries **8** marks.

Module – I

10. What are B-trees? Explain basic operations on B-trees with suitable example.
11. Illustrate with a suitable example the BFS traversal.
12. Compare different balanced search trees with neat diagrams.

(2 × 8 = 16 Marks)

Module – II

13. What is greedy method for algorithm design? Explain in detail.
14. Write an algorithm for quick sort. Also state whether your algorithm is stable or not.
15. Explain Prim's algorithm for minimum cost spanning tree with an example.

(2 × 8 = 16 Marks)

Module – III

16. Explain Dijkstra's algorithm with a suitable example.
17. What are NP-Hard problems? Give an example. What is the difference between NP-Hard and NP-complete problems?
18. (a) Describe randomized algorithms.
(b) Describe longest common subsequence problem with example.

(2 × 8 = 16 Marks)

