

CLUSTER UNIVERSITY SRINAGAR

Examination: - UG 5th Semester (NEP) Subject Type: Major (CT-01) Subject: Information Technology
Paper Title: Operating Systems and Shell Programming Session: 2024-25 Batch: - 2022
Max. Marks: - 60 Min. Marks: - 24 Time: - 02 Hours

Note: (Attempt any two questions from Section "A", five from Section "B" & all questions from Section "C")

Section A: Long answer type. (400 Words) Attempt any two questions (2 x 10 = 20 marks)

- Q1: Explain Process Control Block in detail also draw Process state diagram.
- Q2: Why synchronization is required in a multi-process system? Explain Race condition.
- Q3: What are Semaphores? Explain Reader/Writer Problem.
- Q4: With the help of an example explain the concept of paging.

Section B: Medium answer type. (150 Words) Attempt any five questions (5 x 4 = 20 marks)

- Q5: What are various types of Operating Systems? Explain.
- Q6: With the help of an example explain Round Robin Scheduling algorithm.
- Q7: Discuss Mutual Exclusion.
- Q8: Explain Banker's algorithm.
- Q9: What is virtual memory? What are its uses?
- Q10: Explain C-SCAN disk scheduling method.
- Q11: Write a note on evolution of Operating Systems.

Section C: Short answer type. (20 Words) Attempt all questions (8 x 2.5 = 20 marks)

- Q12: Define Operating System.
- Q13: What are various types of process scheduling?
- Q14: What is a Thread?
- Q15: What are necessary conditions for deadlock?
- Q16: What is Cache memory?
- Q17: What is Segmentation?
- Q18: What do you mean by File organization?
- Q19: What is virtual memory.

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Examination: - UG 5th Semester (NEP)
Paper Title: Theory of Computation
Max. Marks: - 80

Subject Type: Major (CT-03) Subject: Information Technology
Session: 2024-25 Batch: - 2022
Min. Marks: - 32 Time: - 02 Hours

Note: (Attempt any two questions from Section "A", five from Section "B" & all questions from Section "C")

Section A: Long answer type. (400 Words) Attempt any two questions (2 x 13 = 26 marks)

- Q1: Differentiate between Mealy and Moore machines. Provide an example for each.
- Q2: Explain Pushdown automata (PDA) and describe how PDAs are equivalent to CFGs.
- Q3: Define Turing machines and explain their role in the Church-Turing thesis.
- Q4: Discuss NP-completeness. Why is it important in computational complexity theory?

Section B: Medium answer type. (150 Words) Attempt any five questions (5 x 6 = 30 marks)

- Q5: Define regular operations and explain their closure properties with examples.
- Q6: Discuss the role of finite automata in recognizing languages.
- Q7: Define context-free grammar (CFG) and explain its components.
- Q8: Explain in detail Chomsky hierarchy of grammars.
- Q9: Explain the components and working of a Turing machine.
- Q10: Provide an example of a language that is recursively enumerable but not recursive.
- Q11: Explain asymptotic notations and their use in analyzing time complexity.

Section C: Short answer type. (20 Words) Attempt all questions (8 x 3 = 24 marks)

- Q12: What are the key features of deterministic finite automata (DFA)?
- Q13: Define regular expressions and give an example.
- Q14: What is ambiguity in a CFG? Give a simple example.
- Q15: What is a pushdown automaton?
- Q16: List the components of a Turing machine.
- Q17: Give one example of a recursive language.
- Q18: What is the class P in computational complexity?
- Q19: What is the significance of the P vs NP problem?

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Examination: - UG 5th Semester (NEP)
Paper Title: Microprocessor Systems
Max. Marks: - 80

Subject Type: Major (CT-02)
Session: 2024-25
Min. Marks: - 32

Subject: Information Technology
Batch: - 2022
Time: - 02 Hours

Note: (Attempt any two questions from Section "A", five from Section "B" & all questions from Section "C")

Section A: Long answer type. (400 Words) Attempt any two questions (2 x 13 = 26 marks)

- Q1: Explain the architecture of the 8086 microprocessor with a detailed block diagram.
- Q2: Write a detailed note on the assembly process and tools.
- Q3: Explain the ARM memory organization and addressing modes.
- Q4: Describe the trends in microprocessor technology.

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Section B: Medium answer type. (150 Words) Attempt any five questions (5 x 6 = 30 marks)

- Q5: Explain the key features of Von Neumann architecture.
- Q6: Explain the addressing modes of the 8086 microprocessor with examples.
- Q7: Describe the steps involved in the assembly process.
- Q8: Write an assembly language program for adding two 16-bit numbers using the 8086 instruction set.
- Q9: Explain the register organization in an ARM processor.
- Q10: Describe the various data types used in ARM programming.
- Q11: Compare any two emerging microprocessor architectures in terms of features and applications.

Section C: Short answer type. (20 Words) Attempt all questions (8 x 3 = 24 marks)

- Q12: Define microprocessor, microcomputer, and embedded systems.
- Q13: What is the significance of memory addressing in microcomputers?
- Q14: Define the role of assemblers in assembly language programming.
- Q15: What is the function of control flow instructions in 8086?
- Q16: What is the role of registers in ARM processors?
- Q17: What are ARM development tools? Name two.
- Q18: List three applications of the 8086 microprocessor in real-world systems.
- Q19: Define the term "emerging microprocessor architecture."

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Examination: - UG 6th Semester (NEP)

Paper Title: Data Communication and Networks

Max. Marks: - 60

Subject Type: Major (CT-01)

Session: 2025

Min. Marks: - 24

Subject: Information Technology

Batch: - 2022

Time: - 02 Hours

Note: (Attempt any two questions from Section "A", five from Section "B" & all questions from Section "C")

Section A: Long answer type. (400 Words) Attempt any two questions (2 x 10 = 20 marks)

Q1: Explain Shannon Law of a Noisy channel.

Q2: Explain OSI reference model.

Q3: Differentiate between circuit-switched and packet-switched techniques.

Q4: Explain digital to analog conversion.

Section B: Medium answer type. (150 Words) Attempt any five questions (5 x 4 = 20 marks)

Q5: Discuss Bus and hybrid network topologies.

Q6: What is difference between Digital and analog signal? Explain with suitable examples.

Q7: What is Circuit Switching?

Q8: Explain Time Division Multiplexing.

Q9: Explain QoS in switched networks.

Q10: What are various layers available in TCP/IP model.

Q11: What is multicasting? Explain PIM.

Section C: Short answer type. (20 Words) Attempt all questions (8 x 2.5 = 20 marks)

Q12: Define media.

Q13: What is Bit Rate?

Q14: What is unguided media?

Q15: Define ISDN.

Q16: Define Ethernet.

Q17: What is uni-cast routing?

Q18: What is a Domain Name?

Q19: Define SMTP.

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Examination: - UG 6th Semester (NEP)

Paper Title: Data Science with Python

Max. Marks: - 80

Subject Type: Major (CT-02)

Session: 2025

Min. Marks: - 32

Subject: IT

Batch: - 2022

Time: - 02 Hours

Note: (Attempt any two questions from Section "A", five from Section "B"& all questions from Section "C")

Section A: Long answer type. (400 Words) Attempt any two questions (2 x 13 = 26 marks)

- Q1: Explain the complete CRISP-DM process with its phases.
- Q2: Discuss the purpose of Jupyter Notebook in data science.
- Q3: Explain various techniques for handling missing data, duplicates, and inconsistent data types.
- Q4: Explain how Matplotlib and Seaborn help in visualizing data?

Section B: Medium answer type. (150 Words) Attempt any five questions (5 x 6 = 30 marks)

- Q5: Explain the importance of data modeling and deployment.
- Q6: What are the key steps in a typical data science workflow?
- Q7: Describe the use of Pandas Series in data science.
- Q8: Explain the structure and purpose of Jupyter Notebook.
- Q9: What is the purpose of data cleaning? Mention any three techniques.
- Q10: Write a Python code using Seaborn to create a scatter plot.
- Q11: What are histograms? How do they help in data distribution analysis?

Section C: Short answer type. (20 Words) Attempt all questions (8 x 3 = 24 marks)

- Q12: Mention any three applications of data science.
- Q13: What is the purpose of data exploration?
- Q14: What is NumPy used for?
- Q15: Mention any two operations that can be performed on dictionaries.
- Q16: What are summary statistics? Give an example.
- Q17: Name any three file formats supported by Pandas for reading data.
- Q18: What is a scatter plot used for?
- Q19: List any three types of plots used for data visualization.

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Examination: - UG 6th Semester (NEP)

Subject Type: Major (CT-03)

Subject: IT

Paper Title: Software Engineering with Mini Project

Batch: - 2022

Max. Marks: - 80

Min. Marks: - 32

Session: 2025

Time: - 02 Hours

Note: (Attempt any two questions from Section "A", five from Section "B" & all questions from Section "C")

Section A: Long answer type. (400 Words) Attempt any two questions (2 x 13 = 26 marks)

- ✓ Q1: Explain the Capability Maturity Model Integration (CMMI) in detail. ~~Handwritten scribble~~
- ✓ Q2: Compare and contrast the Waterfall Model, Incremental Process Model, and Agile Methodology. ~~Handwritten scribble~~
- Q3: Write a detailed note on Software Quality Assurance (SQA)?
- Q4: Discuss various software testing techniques with suitable examples.

Section B: Medium answer type. (150 Words) Attempt any five questions (5 x 6 = 30 marks)

- ✓ Q5: Discuss the concept and advantages of a Layered Technology in software engineering.
- Q6: Explain the importance of Software Metrics in measuring software project performance.
- ✓ Q7: Discuss the process of Eliciting Requirements. ~~Handwritten scribble~~
- ✓ Q8: Differentiate between Verification and Validation in Software Engineering? ~~Handwritten scribble~~
- ✓ Q9: Describe the Basic COCOMO Model in detail. ~~Handwritten scribble~~
- ✓ Q10: Discuss Lean Software Development.. ~~Handwritten scribble~~
- Q11: Explain the Object-Oriented Analysis approach in system modeling.

Section C: Short answer type. (20 Words) Attempt all questions (8 x 3 = 24 marks)

- ✓ Q12: Write a short note on software process.
- ✓ Q13: What is the purpose of Capability Maturity Model Integration (CMMI)? ~~Handwritten scribble~~
- ✓ Q14: Differentiate between Continuous Integration and Continuous Delivery.
- ✓ Q15: State any three principles of Lean Software Development.
- Q16: What is a Software Requirements Document (SRD)? ~~Handwritten scribble~~
- Q17: What is the role of a Feasibility Study in software development? ~~Handwritten scribble~~
- Q18: Define Software Risk Management. ~~Handwritten scribble~~
- Q19: Distinguish between Static Testing and Dynamic Testing. ~~Handwritten scribble~~

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