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M.TECH II SEM

SUPPLEMENTARY EXAMINATIONS

MARCH 2025

Narasaraopeta Engineering College (Autonomous)
Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: 19MSE2TH01

M.Tech - II Semester Supple Examinations, March-2025
RESEARCH METHODOLOGY
(SE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

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1. Define and explain the term "Research". Explain its importance and objectives. [12]

2. Describe different types of research pointing out the distinctions among them and the purposes of those types. [12]

3. What is the importance of data collection in research and also mention the different methods of data collection. [12]

4. (a) Elaborate on the role of statistics in research. [06]
   (b) Explain various sources of obtaining data for the selected research problem. [06]

5. (a) Explain the terms arithmetic mean, median, mode, geometric mean and harmonic mean. [06]
   (b) Find out the standard deviation for the following data 17,13,15,17,25,21,23. [06]

6. What is Hypothesis? What is the significance of formulating the hypothesis in research work? [12]

7. Assume a research topic of your choice and give the complete format of its research report. [12]

8. (a) What are the data presentation tools? Explain them in brief. [06]
   (b) Explain with neat sketches various charts used in presentation of data. [06]

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Subject Code: 19MSE2TH02

M.Tech - II Semester Supple Examinations,March-2025
FINITE ELEMENT METHOD
(SE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

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1. (a) Discuss the importance of kinematic and static variables in various types of structural problems.
   (b) Discuss the Rayleigh-Ritz method and apply it to determine the approximate deflection of a simply supported beam under uniform loading.

2. (a) Explain the advantages and disadvantages of the Finite Element Method (FEM) over conventional methods.
   (b) Compare the performance of linear and quadratic elements in finite element modeling.

3. (a) explain the significance of nodal displacement parameters and discuss the convergence criteria in FEM.
   (b) Explain the compatibility requirements and geometric invariance in finite element formulations.

4. (a) Define natural coordinates and explain their significance in finite element formulation.
   (b) Discuss the shape functions for two-dimensional triangular and quadrilateral elements.

5. (a) Explain isoparametric elements and differentiate between sub-parametric, isoparametric, and super-parametric elements.
   (b) Develop the strain-displacement matrix and stiffness matrix for a 4-node quadrilateral element.

6. (a) Formulate the stiffness matrix for a beam element using FEM principles.
   (b) Discuss the application of FEM in the analysis of plane trusses and derive the stiffness matrix for a single truss element.

7. (a) Explain plane stress and plane strain problems in FEM and discuss their significance in structural analysis.
   (b) Derive the stiffness matrix for an axisymmetric element.

8. (a) Explain the formulation of quadrilateral elements in FEM and their advantages over triangular elements.
   (b) Develop the consistent load vector for a quadrilateral element subjected to distributed loading.

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Subject Code: 19MSE2TH03

M.Tech – II Semester Supple Examinations, March-2025
SEISMIC RESISTANT DESIGN
(SE)

Time: 3 hours   Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

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1. (a) Explain the characteristics of different types of seismic waves.   [6]
   (b) Define Intensity of earthquake. What is the basis of establishing the intensity of   [6]
      Earthquake?

2. (a) Explain the seismic zoning of India from the beginning and also explain its significance.   [6]
   (b) Define earthquake size and write detailed classification of earthquakes.   [6]

3. (a) write a short note on following code based seismic analysis: [9]
      i). Response spectrum method
      ii). Equivalent static analysis
   (b) Explain the elastic rebound theory   [3]

4. (a) Explain briefly about different types of vertical irregularities and their consequences.   [6]
   (b) Distinguish between soft storey and weak storey.   [6]

5. (a) Write the code provisions for ductile detailing of beams and columns.   [6]
   (b) State the assumptions involved in seismic design as per IS 1893.   [6]

6. A rectangular shear wall is of size 350 mm × 5000 mm. It is subjected to a factored axial load [12]
   of 4200 kN and a factored moment of 4600 kNm. Design and detail the shear wall as per IS
   13920. Use Fe 415 steel and M 30 concrete.

7. (a) Explain the factors influencing the damage of building during earthquake.   [6]
   (b) What are the reasons for failure of masonry building during earthquake?   [6]

8. Explain the following: [4 x 3 = 12]
      i). Effect of Local site conditions on the behavior of structures during an earthquake
      ii). Mass and Stiffness Irregularities
      iii). Strong column and weak beam concept

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Subject Code: 19MSE2TH04

M.Tech - II Semester Supple Examinations, March-2025
STABILITY OF STRUCTURES
(SE)

Time: 3 hours   Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

(Note: Use IS456, IS1343 Codes)

1. Find the maximum bending moment of a simply supported beam-column of span 'l'   [12M]
    subjected to a concentrated load '$W/2$' at its mid-span and an axial compressive load
    'P'?

2.(a) Derive the relation for Euler's crippling load for a column with both ends hinged.   [8M]
  (b) Derive column differential equation.   [4M]

3.(a) Explain the various assumptions made in the double modulus theory.   [4M]
  (b) Explain the buckling of cantilever column under distributed loads.   [8M]

4.(a) Explain the Stability analysis by finite element approach   [4M]
  (b) Explain the behavior of member of thin-walled open cross-section subjected to   [8M]
       combined torsion and flexure

5. Explain the geometric stiffness matrices for a discretised column with different   [12M]
    boundary condition.

6.(a) Explain the pure bending.   [4M]
6.(b) Explain the Lateral buckling of beams   [4M]
6.(c) Explain non-uniform torsion of thin walled bars   [4M]

7.(a) Explain the orthogonal relation of buckling problems.   [4M]
7.(b) Explain the factors influencing the lateral buckling of beams.   [8M]

8.(a) Difference between uniaxial load and biaxial load.   [4M]
8.(b) Derive the expression for strain energy in plate bending.   [8M]

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NEC

Subject Code: 19MSE2PE06

M.Tech - II Semester Supple Examinations, March-2025
THEORY OF PLATES AND SHELLS
(SE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

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1. (a)What are the assumptions in pure bending.**[6M]**

    (b)Derive the relations between bending moments and curvature in pure bending of plates?**[6M]**

2. (a)Derive the differential equation governing the cylindrical bending of plates in cartesian co-ordinates.**[12M]**

3. Derive the Navier solution for simply supported rectangular plates and obtain the maximum deflections.**[12M]**

4. Derive expressions for deflection, shear force and bending moment for a circular plate with simply supported boundary conditions subjected to uniformly distributed loading.**[12M]**

5. Derive the equation for governing equation for Bending of plate under the combined action of in-plane loading.**[12M]**

6. Derive the membrane equation for shells.**[12M]**

7. Write a short note on **[12M]**
a) Anti-symmetric shells
b) Singly curved shells
c) ISI classification of shells

8.a) Derive the moment curvature in the case of pure bending of plates. **[6M]**
b) Give a brief account of classification of plates.**[6M]**

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Subject Code: 19MSE2PE12

M.Tech - II Semester Supple Examinations, March-2025
ALTERNATIVE BUILDING MATERIALS
(SE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

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1. Explain the environmental friendly and cost effective building technologiesin detail.**[12M]**

2. Describe the manufacturing process of Lime-Pozzolana Cement. **[12M]**

3. Discuss the building materials used from Agro and industrial wastes in brief.**[12M]**

4. Explain Ferrocement and ferroconcrete and its properties.**[12M]**

5. Discuss the factors affecting compressive strength of a masonry.**[12M]**

6. Explain the Cost saving techniques in planning, design and construction.**[12M]**

7. Write a short note on **[12M]**
a) Steam cured stabilized blocks.   b) Masonry vaults and domes.

8. What are the Flexure and shear, Elastic properties of masonry materials and masonry.**[12M]**

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Narasaraopeta Engineering College (Autonomous)

NEC Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: 19MCS2TH01

M.Tech - II Semester Supple Examinations, March-2025
BLOCK CHAIN TECHNOLOGIES
(CSE)

Time: 3 hours   Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

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1. (a) What is Bitcoin and write the history of Bitcoin
(b) Write in detail about how Blockchain works with an example

2. (a) Write about the generation of Public key along with Address-Base 58 Check Encoding
(b) What is the differences between Multi-Sig Addresses and Vanity Address alsong with Pay to Script Hash(P2PH)

3. (a) write in detail about the Transaction Lifecycle
(b) What do you mean by Transaction Chaining and Orphan Transactions

4. (a) Explain Peer-to-Peer Architecture along with node types in Bitcoin Network
(b) Consider an example to explain Transaction Pools and Alert messages

5. (a)What do you mean by Balancing Risk, Diversifying Risk and Survivability
(b) Explain in detail about Merkle Trees and Simplified Payment Verification

6. (a) What is the purpose of Miner in mining . Write about the construction of the Block Header
(b) Explain in detail about Mining and the Hashing Race - The Extra Nonce Solution

7. (a)Explain about Bit coin Economics and the currency creation
(b)Write in detail about the Structure of the generation of Transaction

8. (a) Explain in detail the importance of Proof of Work Consensus algorithm
(b) Write in detail about various Consensus attacks that are possible

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Subject Code: 19MCS2TH02

M.Tech - II Semester Supple Examinations, March-2025
FOUNDATIONS OF DATA SCIENCE
(CSE)

Time: 3 hours   Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

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1. (a) What do you mean by slicing operation in string of python? Write an example of slicing to fetch first name and last name from full name of person and display it. [6M]

   (b) What is the core competencies needed to become a data scientist? Explain in brief. [6M]

2. (a) Draw a neat diagram and explain Library Architecture of panda. [6M]

   (b) Explain about selection and filtering with example. [6M]

3. (a) How XPath is useful for analysis of html data? Explain in brief. [6M]

   (b) Explain with an example of storing and loading data with mongoDB. [6M]

4. (a) Define the term Data wrangling. Explain the steps to perform data wrangling. [6M]

   (b) Explain the procedure to remove duplicate values with an example. [6M]

5. (a) What is the use of scatter-plot in data visualization? Can we draw trendline in scatter plot? Explain it with example. [6M]

   (b) Illustrate Matplotlib with an example. [6M]

6. (a) Illustrate the procedure to group data by dictionaries and series. [6M]

   (b) Explain about data aggregation with example. [6M]

7. (a) Compare bar graph and histogram with respect to their applicability in data visualization. [6M]

   (b) Explain how to remove duplicates with an example. [6M]

8. List the techniques to handle missing data. Explain various techniques with example. [12M].

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Subject Code: 19MCS2TH03

M.Tech - II Semester Supple Examinations, March-2025
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
(CSE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

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1. (a) List and explain the applications of Artificial Intelligence.
(b) How do you define a problem as a state space search? Explain.

2. (a) Describe the heuristic search technique applied to a hill-climbing problem with an example?
(b) Write about A* algorithm with example.

3. (a) How to represent instance and ISA relationships? Explain.
   (b) What is predicate logic? Explain the predicate logic representation with reference to suitable example?

4. (a) Explain the process of designing a learning system in machine learning.
(b) List out various issues and challenges in machine learning.

5. (a) Write the basic decision tree algorithm and explain it with an example.
(b) Describe different measures of best-split in decision tree algorithm.

6. (a) Explain the working principle of perceptron.
(b) What is back propagation? List out its limitations.

7. (a) Describe multi-later network and its uses.
(b) Write the difference between procedural knowledge and declarative knowledge.

8. (a) Describe the mini max algorithm with an example.
   (b) Distinguish between supervised learning and Reinforcement learning. Illustrate with an example.

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Subject Code: 19MCS2TH04

M.Tech - II Semester Supple Examinations, March-2025
SERVICE ORIENTED ARCHITECTURE
(CSE)

Time: 3 hours   **Max Marks: 60**

Answer any FIVE questions.
All questions carry EQUAL marks

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1. (a) Summarize the various principles of service orientation in detail.   [6M]
   (b) Explain the characteristics of SOA in detail.   [6M]

2. (a) How does service oriented architecture promote interoperability   [6M]
   (b) Describe how SOA can be compared to client- server architecture   [6M]

3. (a) Discuss the contribution of standards to SOA by various organizations.   [6M]
   (b) Explain the basics of web services description language in detail.   [6M]

4. (a) Briefly explain about WSDL basics in service oriented design   [6M]
   (b) Discuss the step by step process of service modelling in detail   [6M]

5. (a) Explain in detail about Atomic Transaction Process with suitable diagrams.   [6M]
   (b) Explain briefly about technical requirements for orchestration and choreography   [6M]

6. (a) What are the features of contemporary SOA? Also state common pitfalls of SOA   [6M]
   (b) Explain the importance of messaging with SOAP and message exchange patterns in
web services   [6M]

7. (a) Briefly explain the characteristics of Web service framework and web service roles.   [6M]
   (b) Explain briefly about WS-choreography model description.   [6M]

8. (a) Differentiate WS-notification and WS-eventing   [6M]
   (b) Describe Metadata exchange specification   [6M]

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Subject Code: 19MCS2PE05

M.Tech - II Semester Supple Examinations,March-2025
MOBILE COMPUTING
(CSE)

Time: 3 hours
Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

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1. (a) Explain the architecture of mobile computing
   (b) Discuss the different types of handover

2. (a) Explain the fixed TDM and slotted aloha mechanisms
   (b) Compare and contrast SDMA, FDMA, TDMA and CDMA

3. (a) Explain the IP packet delivery procedure in detail
   (b) Explain about route optimization in detail

4. (a) Explain about Snooping TCP
   (b) Discuss about transaction oriented TCP

5. Explain any TWO reactive routing protocols

6. (a) Explain the issues related to mobile computing systems
   (b) Compare and contrast android and windows OS

7. Explain the GSM architecture with neat sketch

8. (a) Explain the characteristics and applications of MANET
   (b) Discuss about minimal encapsulation mechanism

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NEC

Subject Code: 19MCS2PE09

M.Tech - II Semester Supple Examinations, March-2025
CLOUD COMPUTING
(CSE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

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1. Explain the different types of virtualization techniques

2. (a) Explain the characteristics of cloud computing
   (b) Discuss about cloud scale

3. Explain the service levels for cloud applications

4. (a) How to achieve Transactional integrity through stored procedures. Explain

   (b) What Belongs in a Machine Image? Explain

5. Explain IaaS, PaaS and SaaS indeail

6. (a) Discuss about storage as a service
   (b) Explain the different types of clouds

7. Explain the disaster management in cloud

8. (a) Explain the different types of database backups
   (b) How to implement the network intrusion detection in the cloud. Explain

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