



Subject Code: 19MSE2TH01

M.Tech - II Semester Regular Examinations, December-2020

RESEARCH METHODOLOGY

(SE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. Discuss the various research designs, with examples. How do you decide the applicability of research designs in engineering research?
2. Explain the types of research in detail
3. Explain in detail, the different methods of data collection in research.
4. What are the various sources of primary and secondary data? Discuss data collection and data analysis in the context of research
5. What is meant by factor analysis? What is its utility? How is it different from cluster analysis?
6. Explain in detail about simple and multiple correlation and regression
7. Describe in brief all the steps required by researcher for the procedure of testing hypothesis
8. Explain the significance of a research report and narrate the various steps involved in writing a report.



Narasaraopeta Engineering College (Autonomous)

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

Subject Code: 19MSE2TH02

M.Tech - II Semester Regular Examinations, December-2020

FINITE ELEMENT METHOD

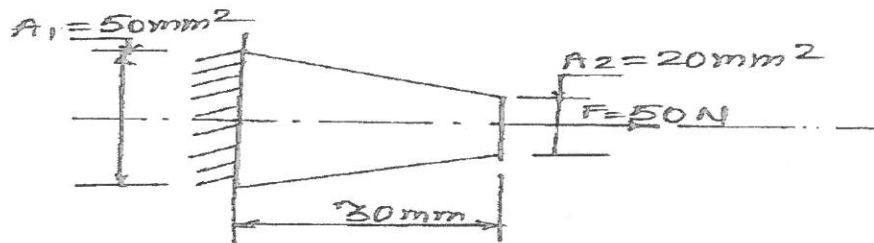
(SE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

- (a) What is Finite element method(FEM) ? Write the steps involved in FEM
(b) Discuss how finite element method is evolved in the engineering field
- (a) Discuss the advantages and disadvantages of finite element method over conventional methods
(b) Explain the principles of finite element method
- Derive the shape functions of two dimensional four noded iso-parametric elements. Plot the shape functions.
- Derive the shape functions for four noded bar element using Lgrangian interpolation function. Nodes are equally spaced
- Derive elemental stiffness matrix and force vector for two-nodded (linear) bar element using Principle of Minimum Potential Energy (PMPE) Method. The bar element is oriented in x direction. Assume that only concentrated forces are acting on the nodes of bar element. Ignore surface tractions and the body forces
- Determine the shape functions for a constant strain triangular elements in terms on natural coordinate system
- Analyze the bar for axial displacements. Take three elements. $E=2 \times 10^5 \text{Mpa}$



- Define the following terms with suitable examples
i) Plane stress, ii) Plane strain iii) Node, iv) Element, v) Shape functions vi) Iso-parametric element



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Subject Code: 19MSE2TH03

M.Tech - II Semester Regular Examinations, December-2020

SEISMIC RESISTANT DESIGN

(SE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. (a) Distinguish between earthquake magnitude and intensity and also explain the various types of earthquake magnitude scale.
(b) Classify different intensities of earthquake based on 1) MMI Scale ii) MSK Scale
2. (a) Explain the base isolation and describe the design principle of base isolation of structures.
(b) Discuss the different damping devices
3. (a) Distinguish between seismic coefficient and response spectrum methods.
(b) The following details are available for a multistory moment resisting building. Compute the lateral forces developed at various levels using I.S code 1893- 1984. Number of stories = 4, Constant $\beta = 1.2$. Basic horizontal seismic coefficient $\alpha_0 = 0.055$. Importance factor $I = 1.0$. Performance factor $K = 1.0$. Load at each i th floor $W_i = 500$ KN. Height of each i th floor $H_i = 3.0$ m
4. (a) What are the various types of irregularities? Explain the different types of vertical irregularities, with sketches
(b) Explain the behaviour of masonry buildings during earthquakes
5. (a) Explain the importance of ductility in earthquake resistant structures and describe the different types of ductility.
(b) Draw the ductile detailing provisions of a beams and columns in reinforced concrete buildings.
6. (a) Write about a) Seismic demand, b) seismic capacity
(b) Explain the different method of seismic retrofitting of various components of reinforced concrete structures.
7. (a) Define Intensity of earthquake. What is the basis of establishing the intensity of Earthquake?
(b) Explain the seismic zoning of India from the beginning and also explain its significance.
8. (a) Write the code provisions for ductile detailing of beams and columns.
(b) Discuss about the strength of masonry in shear and flexure,

Subject Code: 19MSE2TH04

M.Tech - II Semester Regular Examinations, December-2020
STABILITY OF STRUCTURES
(SE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. Derive the deflection equation for a beam-column of length 'l' on the two simple supports and carrying continuous load 'q' and axial load 'p'. Also determine the maximum deflection. [12]
2. Find the buckling load of the fixed –fixed column shown in Fig.1 either by differential equation [12] or by energy approach.

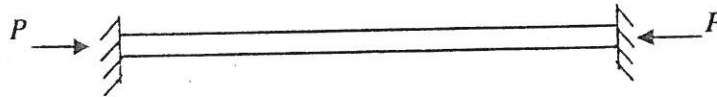


Fig.1

3. (a) Enumerate beam column action? List out a few examples that are subjected to beam column action. [8]
- (b) What is stress stiffness matrix? [4]
4. Briefly describe about torsional buckling, combined torsional and flexural buckling. [12]
5. Determine the buckling load for simply supported beam of I- section subjected to central concentrated load. [12]
6. Determine the buckling load of an axially loaded fixed-free column using Rayleigh-Ritz method? [12]
7. (a) Explain Galarkins method for solution of buckling problem [5]
- (b) Using appropriate mathematical technique derives expression for approximate buckling load for a column fixed at one end and hinged at the other end. [7]
8. Derive the expression for deflection when buckling of simply supported rectangular plate uniformly compressed in one direction. [12]

Subject Code: 19MSE2PE06

M.Tech - II Semester Regular Examinations, December-2020

THEORY OF PLATES AND SHELLS

(SE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. (a) State the assumptions made in the analysis of thin plates. 2
(b) Find out the expression for deflection of a long rectangular plates, uniformly loaded with intensity 'q' over its surface and simply-supported along the long edges. 10
2. Derive the governing differential equation for plates under pure bending. 12
3. (a) Write a short note on Levy's method. 9
(b) Explain the constitutive relationship for an orthotropic material. 3
4. A circular plate of radius 'a' is subjected to a uniformly distributed load 'q' over its entire surface. The plate is clamped at its edges. Find the maximum deflection in the plate and mention the point of occurrence of it. 12
5. A simply-supported rectangular plate is subjected to a uniformly distributed load of intensity 'q' on it. Find the expression for deflection of the plate using Navier's method. 12
6. What should be the amount of N_x to produce buckling in the plate. Assume simply-supported boundary conditions along all the edges (Refer Fig. 1). 12

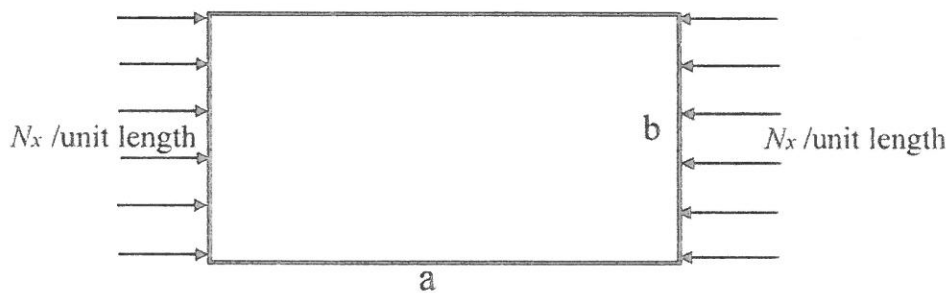


Fig. 1

7. (a) Write the advantages of using Shell structures. 5
(b) Write a short note on the classification of shells. 7
8. Derive the equilibrium equations for a circular dome considering the membrane theory. 12



Subject Code: 19MSE2PE12

M.Tech - II Semester Regular Examinations, December-2020

ALTERNATIVE BUILDING MATERIALS

(SE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. (a) Explain the need for alternate building materials. [04]
(b) Explain the concept of energy embodied in building materials. [08]
2. (a) Discuss the different sources of lime stones. [05]
(b) Write the properties and uses of lime-pozzolana cement. [07]
3. (a) List out matrix materials and reinforcing materials in fiber reinforced cement composites and explain behaviour of FRC in compression. [06]
(b) What are the different industrial wastes used effectively in construction industry. Explain any three materials. [06]
4. (a) Explain the materials used for ferrocement. [04]
(b) What are the concept and details of composite beam panel roof? [08]
5. (a) List the factors affecting the compressive strength of masonry. Discuss any two in detail. [06]
(b) Give the IS code provisions for the design of masonry compression elements. [06]
6. (a) Explain the application of cost effective construction technologies. [07]
(b) Explain the methods of production of precast elements. [05]
7. Write a short note on
(a) Fal G Blocks (b) Hollow concrete block walls
(c) Types of concrete mixer (d) Filler slabs [12]
8. Write a short note on
(a) Life-cycle energy (b) Agro wastes and its application
(c) Properties of ferrocement (d) Elastic property of masonry materials. [12]



Subject Code: 19MPI2TH01

M.Tech - II Semester Regular Examinations, December-2020

**CONTROL OF DC AND AC DRIVES
(P&ID)**

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Explain about dynamic characteristics of permanent magnet and DC shunt motors. [8M]
(b) Explain the use of freewheeling diode in the converter fed DC drives. [4M]
2. Explain the operation of Three phase full convertor and half-convertor fed dc drives [12M]
for continuous and discontinuous mode of operation with neat waveforms.
3. (a) Explain the operation of chopper for forward motoring and braking control of separately excited DC motor aid of diagram, waveforms and speed torque curves. [6M]
(b) A DC chopper controls the speed of DC series motor. The armature resistance $R_a = 0.04\Omega$, field circuit resistance $R_f = 0.06\Omega$, and back EMF constant $K_v = 35M$ v/rad/sec. The DC input voltage of the chopper $V_s = 600V$. If it is required to maintain a constant developed torque of $T_d = 547N\cdot m$, plot the motor speed against the duty cycle K of the chopper. [6M]
4. Explain the operation of three phase voltage source inverter fed three phase induction motor drive with 180° conduction with the help of circuit diagram and waveforms. Also sketch speed-torque characteristics for sub-synchronous speeds. [12M]
5. (a) Develop the mathematical expression for minimum and maximum currents for a class- A chopper operated DC motor with back EMF. [8M]
(b) Distinguish between VSI and CSI [4M]
6. (a) Explain briefly what is variable frequency drive (VFD) and how does it works. [6M]
(b) Explain open loop V/f control of voltage fed inverter drive. [6M]
7. Explain the operation of a two-quadrant d.c. chopper fed separately excited d.c. motor exhibiting forward motoring and forward regeneration modes with neat circuit diagram and waveforms. Also explain speed-torque characteristics. [12M]
8. Explain the operation of VSI fed three phase synchronous motor drive when self-control is employed with the help of neat circuit diagram and waveforms. [12M]



Subject Code: 19MPI2TH02

M.Tech - II Semester Regular Examinations, December-2020
SOFT COMPUTING TECHNIQUES
(P&ID)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. (a) What is an artificial neural network? Describe the characteristics of artificial neural networks? [6 M]
(b) What is back propagation network? Write the testing algorithm of back-propagation network. [6 M]
2. (a) Draw the architecture of Learning Vector Quantization [6 M]
(b) Write the operating phases of Adaptive Resonance Theory Networks [6 M]
3. (a) Explain the properties of commutativity, associativity, distributivity and identity with respect to crisp sets and fuzzy sets. [8 M]
(b) Define membership function and universe of discourse in fuzzy logic. [4 M]
4. (a) With a neat sketch discuss the major components of fuzzy controller. [8 M]
(b) What is Ex-OR problem? How is it solved? [4 M]
5. (a) What is meant by genetic algorithm? Draw a neat flowchart and explain the operation of a simple genetic algorithm. [12 M]
6. (a) What is the intuition of a large margin classifier? [6 M]
(b) How can you say that Support Vector Machine is an example of a large margin classifier? [6 M]
7. (a) Compare supervised learning with unsupervised learning. [4 M]
(b) Discuss any two membership value assignment [8 M]
8. (a) Write the seven methods of the defuzzification techniques [6 M]
(b) Describe the learning strategies of artificial neural networks [6 M]

Subject Code: 19MPI2TH03

M.Tech - II Semester Regular Examinations, December-2020
POWER ELECTRONICS IN RENEWABLE ENERGY SYSTEMS
(P&ID)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. Briefly explain the following i) MOS turn off Thyristor ii) Integrated gate commutated Thyristor [12M]
2. Explain the cell properties and block diagram of solar photo voltaic system? [12M]
3. Discuss the principle of operation in buck-boost converters and multi level inverters? [12M]
4. Briefly explain the maximum power point tracking and self commutated inverters? [12M]
5. (a) What is the basic principle of wind energy conversion? [6M]
(b) What are the components of wind energy conversion systems and explain? [6M]
6. Explain the following i) Uncontrolled rectifiers ii) PWM inverters [12M]
7. Write short notes on
a) Line commutated inverters in wind power systems
b) Geothermal Heat energy [12M]
8. Briefly explain the PV and diesel hybrid systems? [12M]



Subject Code: 19MPI2TH04

M.Tech - II Semester Regular Examinations, December-2020

POWER SYSTEM DEREGULATION

(P&ID)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Explain economic load sharing and reliability of power system.
(b) What are the advantages of load forecasting?
2. (a) Explain different restructuring models available in open electrical markets
(b) What is congestion pricing? Explain Congestion pricing.
3. (a) What is Open Accesses Same-Time Information System (OASIS). Explain the structure of OASIS.
(b) Define various terms of Transfer Capability issues
4. (a) What are different challenges involved in Electricity pricing, Explain?
(b) Explain short term price forecasting
5. What are Operational Planning Activities of ISO, explain?
6. How reactive power can be used as an Ancillary Service Provider, explain?
7. (a) What are Operational Planning Activities of GENCO, explain?
8. (a) Explain ISO in Pool markets
(b) Explain ISO in Bilateral markets



Subject Code: 19MPI2PE05

M.Tech - II Semester Regular Examinations, December-2020
SMART GRID

(PID)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

-
1. (a) Define smart grid concept and explain its necessity? [6M]
(b) What are the major global smart grid initiatives in India and explain? [6M]
 2. Briefly explain the overview of the technologies required for the smart grid? [12M]
 3. Explain the following i) Circuit Switching ii) Cellular mobile communication [12M]
 4. Discuss the Multi-Protocol label switching and power line communication? [12M]
 5. Explain how the reliability of smart grid can be enhanced by intelligent electronics drives (IEDS) in to it? [12M]
 6. (a) Explain the evolution of Electricity marketing? [6M]
(b) Discuss the meter data management system? [6M]
 7. (a) Explain the concept of customer information system? [6M]
(b) Explain the super conducting magnetic energy storage systems? [6M]
 8. (a) Describe power quality issues of grid connected Renewable energy sources? [6M]
(b) Explain the concept of power quality and EMC in smart grid? [6M]



Subject Code: 19MPI2PE08

M.Tech - II Semester Regular Examinations, December-2020

CUSTOM POWER DEVICES

(P&ID)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

-
1. (a) What are the different power quality issues related to distribution systems? ✓ 6
(b) Explain the terms over voltage, under voltage and voltage flicker. ✓ 6
 2. (a) Briefly discuss about the significance of custom power devices for the enhancement of power quality. 6
(b) Explain how voltage source converter used for compensation of voltage sag. ✓ 6
 3. What are the advantages of static var compensators? Discuss the operation of static series compensators. ✓ 12
 4. (a) Sketch the circuit of solid state transfer switch and explain it's operation. ✓ 6
(b) Explain the principle of operation of solid state breaker. ✓ 6
 5. (a) Discuss the role of Dynamic Voltage Restorer in power quality enhancement. ✓ 6
(b) Explain how Unified Power Quality Conditioner improves quality of power at load end. 6
 6. (a) Discuss various power quality issues affected by distributed generation. ✓ 6
(b) Write a short note on solutions to wiring and grounding problems. ✓ 6
 7. (a) Explain the significance of solid state current limiter for limiting high currents. 6
(b) Differentiate between STATCOM and DSTATCOM. ✓ 6
 8. (a) Discuss the operation of Interline Power Flow Controller. ✓ 6
(b) Explain the role of super conducting magnetic storage for reactive power compensation. ✓ 6

Subject Code: 19MMD2TH01

M.Tech - II Semester Regular Examinations, December-2020

FINITE ELEMENT METHODS AND APPLICATIONS

(MD)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

- (a) Give your comment on the difference in Finite Element Method, Classical Method and Finite Difference Method. [6]
 - (b) Find the nodal displacements and element stresses for the stepped bar as shown in figure 1. Take, Density (ρ) = 7850 kg/ m³, Young's modulus (E) = 200 GPa. [6]

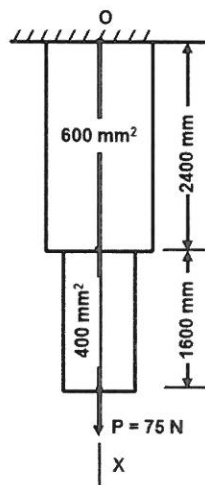


Figure 1.

- (a) Explain the elimination method and penalty approach of imposing boundary conditions. [6]
 - (b) Determine the shape function of Linear Strain Triangle (LST) element in terms of natural coordinate system. [6]
- A four bar truss is shown in figure 2. It is given that Young's modulus $E = 200 \times 10^9$ N/m² and element area, $A_e = 645$ mm². (a) Determine the element stiffness matrix for each element, (b) Assemble the structural stiffness matrix (\mathbf{K}) for entire truss and (c) Using the elimination approach, find the nodal displacement. [12]

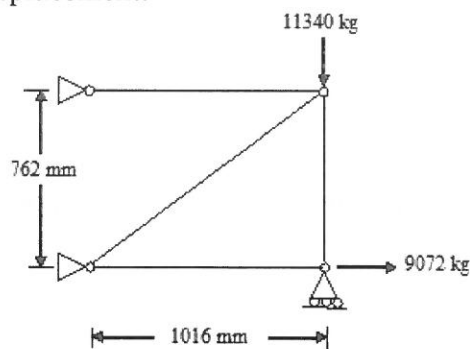


Figure 2

4. Determine the end reaction and the deflections at mid span by finite element concept of the beam shown in figure 3. [12]

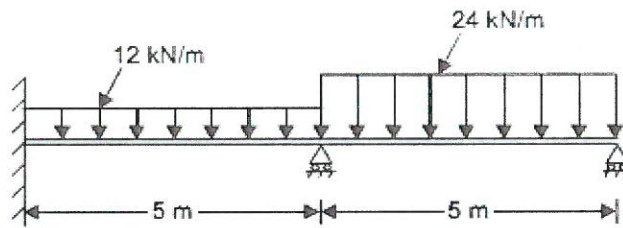


Figure 3

5. Determine the nodal temperatures and rate of heat transfer through a composite wall as shown in figure 4. Thermal conductivities, $K_1 = 45 \text{ W/m } ^\circ\text{C}$, $K_2 = 0.5 \text{ W/m } ^\circ\text{C}$, convective heat transfer coefficient, $h = 20 \text{ W/m}^2 \text{ } ^\circ\text{C}$, temperature of left face of the wall = $80 \text{ } ^\circ\text{C}$, ambient temperature, $\Phi_\infty = 25 \text{ } ^\circ\text{C}$. Assume the area normal to the direction of heat flow $A = 1 \text{ cm}^2$ use linear elements. [12]

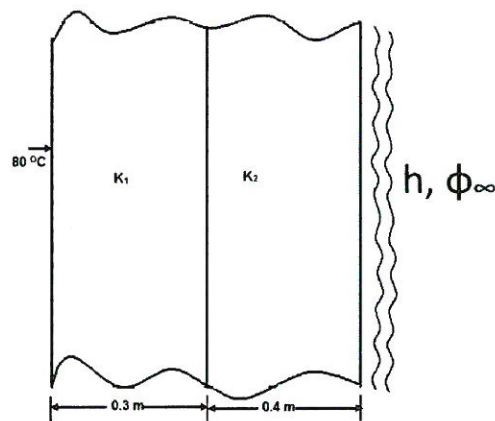


Figure 4.

6. Derive the general equation for determining the stiffness of an element with usual notations in the form: $[k]_e = [B]^T[D][B] dV$. [12]

7. Evaluate $\int_{\xi=-1}^{+1} [N]^T[N]d\xi$ for one dimensional quadratic elements to illustrate the application of Gaussian quadrature method. [12]

8. (a) Distinguish between consistent mass matrices and lumped mass matrices. [6]
 (b) State the method used for obtaining natural frequencies and corresponding eigenvectors. [6]



Subject Code: 19MMD2TH02

M.Tech - II Semester Regular Examinations, December-2020
GEOMETRICAL MODELING
(MD)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. (a) Explain about Non – Parametric representation of curves. [4 M]
(b) The nonparametric implicit equation of a circle with centre at the origin and radius R is given by $X^2+Y^2 = R^2$. Find the circle parametric equation. Using the resulting equation Find the slope at the angles $0^\circ, 45^\circ$ and 90° . [8 M]
2. (a) What are the properties of parametric curves? [4 M]
(b) Define, describe and bring out the difference among explicit, implicit and parametric form of curves. [8 M]
3. (a) Consider the four dimensional position vectors $P_1 [0 0]$, $P_2 [1 1]$, $P_3 [2 -1]$, $P_4 [3 0]$. Determine the piecewise cubic spline curve through them using chord approximation for the t_k 's. the tangent vectors at the end are P_1' [1 1] and P_4' [1 1]. Calculate intermediate points at $\tau = 1/3, 2/3$ for each segment. [8 M]
(b) Explain the methods of defining synthetic curves [4 M]
4. (a) Explain about the properties of Bezier curve. [4 M]
(b) A cubic spline curve is defined by the equation $P(U) = C_3U^3 + C_2U^2 + C_1U + C_0, (0 \leq U \leq 1)$, Where, C_3, C_2, C_1 and C_0 are the polynomial coefficients. Assuming these coefficients is known, find four control points that define an ideal Bezier curve. [8 M]
5. Fit a B-spline curve with the following control points $P_1(0,0)$, $P_2(2,2)$, $P_3(4,4)$, $P_4(6,6)$. [12 M]
6. (a) What is Coon's surface write its applications. [4 M]
(b) Determine the point on bilinear surface defined by $P(0,0)=[0 0 1]$, $P(0,1)=[1 1 1]$, $P(1,0)=[1 0 0]$, $P(1,1)=[0 1 0]$, i.e., the ends of opposite diagonals on opposite faces of unit cube in object space, corresponding to $u=w=0.5$ in parametric space. [8 M]
7. (a) Explain about Boundary representation. [6 M]
(b) What is Solid Modelling? Write the advantages and disadvantages of Solid Modelling [6 M]
8. Explain the following in detail. [4 X 3 = 12 M]
 - (a). Half space modeling
 - (b). Tricubic solid
 - (c). Discuss the properties of composite objects.



Subject Code: 19MMD2TH03

M.Tech - II Semester Regular Examinations, December-2020

EXPERIMENTAL STRESS ANALYSIS

(MD)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. Explain three-dimensional stress-strain relations.
2. (a) What are the important properties of semi conductor strain gauges?
(b) Why a null-balance bridge is preferred over the out-of-balance type? Derive an expression for the sensitivity of a null balance bridge.
3. (a) Sketch the block diagram for multiplexing telemetry system.
(b) Sketch and explain the operating principle of low strain frequency recording system.
4. (a) Sketch and explain the 'circular polariscope'.
(b) What are Isoclinics and list the important properties of it?
5. (a) Explain the Resin based brittle coating.
(b) Derive an expression for coating stresses.
6. (a) Discuss the displacement approach to Moire-Fringe analysis.
(b) Explain the fringe sharpening technique used to increase the sensitivity of the Moire method.
7. (a) Write a short notes on machining of models.
(b) Explain the brief different methods of slicing.
8. (a) Explain in brief various coating materials with their properties.
(b) Explain the strip coatings method used for stress separation.



Subject Code: 19MMD2TH04

M.Tech - II Semester Regular Examinations, December-2020
FATIGUE, CREEP AND FRACTURE MECHANICS
(MD)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. (a) Explain why brittle fracture has rapid rate of crack propagation.
(b) Explain about cleavage fracture. Distinguish between intergranular and transgranular fracture.
2. (a) What are R curves? Explain in detail. What is their significance? Explain about the applications of R curves.
(b) Explain about:
 - i. Fracture energy and,
 - ii. Concept of energy release rate.
3. (a) Discuss the effect of component thickness on plane stress and plane strain. Also bring out the difference between plane stress and plane strain.
(b) What is LEFM? What is its significance? Discuss limits on the applicability of LEFM.
4. Effect of local crack tip plasticity. An aluminum alloy of yield stress 400 MPa, is tested in wide sheets for a central crack length 25.4mm the fracture stress is observed to be 200 MPa. For a central crack of length 16.6mm the fracture stress is 240 MPa. Calculate values of fracture toughness for the alloy (a) Using Simple LEFM analyses (b) Applying the plasticity correction.
5. (a) With the help of a neat sketch explain the process of crack initiation explain the stages of crack initiation.
(b) Explain the phenomenon of crack propagation.
6. Discuss in detail the following:
 - (a) creep resistance materials (b) Multi axial Creep
 - (c) Creep-fatigue interaction.
7. (a) What are the various types of fractures? Discuss the affect of microstructure on these fractures.
(b) With the help of neat sketches explain the various stages of ductile fractures.
8. (a) Explain the various structural changes that take place during creep deformation in materials.
(b) Explain parametric methods of creep correlation for predicting long time properties of materials.



Subject Code: 19MMD2PE07

M.Tech - II Semester Regular Examinations, December-2020

CONDITION MONITORING

(MD)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. a) What is condition monitoring and explain it? What types of condition monitoring are normally used in machining industry? 8Marks
- b) Write a short note on the role of non-destructive testing in condition monitoring. 4Marks
2. Classify the different types of wear with a diagram. Explain the working mechanism and applications of the Ferrography to measure the abrasion wear. 12Marks
3. a) What is temperature monitoring and what temperature monitoring are commonly used in industries? Explain the principle and uses of Thermograph. 8Marks
- b) Differentiate between active and passive thermography, give suitable examples. 4Marks
4. Explain the working mechanism and application of the following NDT methods 12Marks
(a) Magnetic particle inspection.
(b) Ultrasonic testing.
5. a) What are different causes and effects of corrosion? 6Marks
- b) Explain about Cathodic protection. 6Marks
6. Discuss the appropriate condition monitoring methods to diagnose the condition of the following and draw the necessary sketches. 12Marks
(a) Antifriction bearings
(b) Gearbox of automobile's.
7. Explain briefly about Spectrometric oil analysis program (SOAP). Give its advantage and limitations. 12Marks
8. a) What are different types of vibration analysis techniques? Explain any one in detail. 6Marks
- b) Write short notes on vibration signature analysis and its benefits. 6Marks



Subject Code: 19MMD2PE12

M.Tech - II Semester Regular Examinations, December-2020
RESEARCH METHODOLOGY
(MD)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

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- | | |
|---|----|
| 1. (a) Classify the types of Research | 3M |
| (b) Narrate each type of Research Process | 9M |
| 2. (a) Explain Experimental vs Theoretical Research | 6M |
| (b) Write a note on the Importance of reasoning in research. | 6M |
| 3. (a) Explain the detailed procedure for Literature Review leading to problem definition | 9M |
| (b) Narrate the Tools for identifying literatures | 3M |
| 4. (a) Explain the detailed procedure for Statistical Design of Experiments | 6M |
| (b) Write a note on Validity of experiments | 6M |
| 5. (a) What are the procedures followed for Data collection? Explain. | 6M |
| (b) Discuss the Numerical and Graphical Data Analysis | 6M |
| 6. (a) Mention the Guidelines for writing the abstract | 6M |
| (b) How the dissertation will be prepared? Explain | 6M |
| 7. (a) Write a short note on Intellectual property rights (IPR) - patents-copyrights | 9M |
| (b) Appraise the importance of Plagiarism? | 3M |
| 8. (a) Build a research Problem | 6M |
| (b) Write a note on Understanding Modelling & Simulation | 6M |

Subject Code: 19MTE2TH01

M.Tech - II Semester Regular Examinations, December-2020
COMPUTATIONAL FLUID DYNAMICS

(TE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. (a) Show that the classification of the following PDE is different for different values of the parameter M. 6M

$$(1 - M^2) \frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} = 0$$

- (b) Explain the implications of the classification of the above PDE on its solution strategies. 6M

2. (a) Explain in detail the similarities, differences, advantages and disadvantages between finite difference methods, finite volume methods and finite element methods used for solving fluid flow problem. 6M

- (b) What are the different types of boundary conditions encountered in solving fluid flow problems? 6M

3. Discuss the properties of discretization schemes and explain upwind discretization applied to FVM. 12M

4. (a) Consider the first order wave equation given below

$$\frac{\partial u}{\partial t} + a \frac{\partial u}{\partial x} = 0 \quad a > 0$$

Discretize the above PDE using Forward Time Forward Space (FTFS) finite difference scheme. 6M

- (b) Describe Elliptic type of Equations. 6M

5.) Define Vorticity? How the pressure gradient term is eliminated from the momentum equations using Vorticity – Stream Function method? What are the disadvantages of this method in determination flow field? 12M

6. Discuss the applications of CFD in aerospace and elaborate on turbulence modelling techniques 12M

7. a. Illustrate the Checker board pressure condition in a fluid flow scenario with a neat sketch. 6M

- b. Illustrate the Checker board velocity condition in a fluid flow scenario with a neat sketch. 6M

8. a. What are different methods to evaluate matrix inverse for the solution of simultaneous algebraic equations? Compare them. 6M

- b. What are the four basic rules for discretization using Finite Volume Method? 6M



Subject Code: 19MTE2TH02

M.Tech - II Semester Regular Examinations, December-2020

DESIGN OF THERMAL SYSTEMS

(TE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. a) Explain the principle of heat exchanger?
b) Derive an expression for LMTD of parallel flow arrangement in heat exchanger?
2. a) Explain the importance of shell and tube heat exchanger?
b) Derive an expression for the effectiveness- NTU of Counter flow arrangement in heat exchanger?
3. a) Draw the effective temperature difference diagram for the parallel flow arrangement?
b) Define Fouling? What are the effects of fouling on thermo hydraulic fundamentals? What are different stages of fouling?
4. Explain the common types of shell and tube heat exchangers and different types of tube layouts.
5. a) Explain why fins are used in tubes in shell and tube heat exchanger?
b) Define fin efficiency and fin effectiveness and write the expressions for fin efficiency and fin effectiveness for three cases of i) Infinitely long fin ii) Insulated fin tip iii) Corrected length.
6. a) What are the methods of suppression of standing wave vibration? Explain Anti vibration baffles and removing of tubes to suppress the standing wave vibration?
b) Write the classification of heat exchangers with neat tree diagrams
7. A counter-flow double-pipe heat exchanger is to heat water from 20°C to 80°C at a rate of 1.2 kg/s. The heating is to be accomplished by geothermal water available at 160°C at a mass flow rate of 2 kg/s. The inner tube is thin-walled and has a diameter of 1.5 cm. If the overall heat transfer coefficient of the heat exchanger is 640 W/m².K, determine the length of the heat exchanger required to achieve the desired heating.
8. a) Explain the factors to be considered for the internal construction of shell and tube heat exchanger?
b) Write the parameters involved in correction factor method and also write the difference in using ϵ - NTU method and LMTD correction factor method.



**Answer any FIVE questions.
All questions carry EQUAL marks**

Note: Refrigeration and Air-Conditioning tables are allowed. Psychrometric chart is allowed.

1. (a) Classify and explain desirable properties of an ideal refrigerant. [5 marks]
(b) With a neat sketch explain the working of a refrigeration cycle with two stages of compression. Represent the process on $T-s$ and $p-V$ diagrams. [7 marks]
2. (a) What are the different methods to produce low temperatures? Explain with a neat sketch working of any one of such systems. [6 marks]
(b) With a neat diagram explain the working of Lithium Bromide-Water vapor absorption refrigeration system. [6 marks]
3. (a) Explain the function of absorber and generator in a vapor absorption refrigeration system.
(b) Explain the working principle of steam jet refrigeration system using $T-s$ diagram and discuss the merits and demerits over conventional vapour compression refrigeration system. [4M+8M]
4. (a) With a Psychrometric chart explain the following Psychrometric processes [6 marks]
 - (i) Cooling and dehumidification
 - (ii) Heating and humidification
 - (iii) Sensible heating and sensible cooling
(b) Explain with a neat sketch the working of a summer air-conditioning system. [6 marks]
5. State the conditions of the indoor environment that should be satisfied for a person to feel comfortable. Which of these conditions are under the control of the air-conditioning system? How can the design engineer arrange for the other conditions to have values likely to achieve comfort?
6. (a) An air-conditioning plant handles $4400 \text{ m}^3/\text{min}$ of dry air which contains of 25% fresh air at 40°C DBT and 22°C WBT and 75% recirculated air at 25°C DBT and 50% RH. Air leaves the cooling coil at 14°C and in saturated condition. Determine (i) total cooling load on the coil and (ii) room heat gain.
(b) Write the function of the following components in air-conditioning systems.
 - (i) Humidifier (ii) Air filter (iii) Diffuser and (iv) Heating coil. [8M+4M]
7. (a) Explain the working of boot-strap air refrigeration with the help of $T-s$ diagram. [7 marks]
(b) With a neat sketch list the salient features of thermoelectric refrigeration system. [5 marks]
8. Consider an air-conditioned room with sensible and latent heat loads equal to $90,500 \text{ kJ/h}$ and $45,000 \text{ kJ/h}$ respectively. The fresh/make up air is 45% of the total air supplied to the room. Ambient conditions are 40°C DBT and 30°C WBT and inside room condition is 26°C and relative humidity is equal to 60%. The conditioned air leaves the cooling coil at 20°C . The return air mixed after the cooling coil. Show the processes on the psychrometric chart and determine (a) RSHF (b) State of air entering the room (c) Amount of total air and fresh air and (d) ADP and by-pass factor. [12 marks]



Subject Code: 19MTE2TH04

M.Tech - II Semester Regular Examinations, December-2020

GAS TURBINES AND JET PROPULSION

(TE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

-
1. (a) Discuss the advantages of Gas turbine power plant over a reciprocating Engine.
(b) Derive expression for specific work output and efficiency in trends as a function as a pressure ratio of simple cycle.
 2. (a) Illustrate Gas turbine fuel properties and their handling.
(b) Explain the basic requirements of compressors for Aircraft application and its suitability with Axial flow compressors.
 3. (a) Derive an expression for work input to the compressor and work done factor.
(b) Air at 1.0 bar and 288 K enters an axial flow compressor with an axial velocity of 150 m/s. There are no inlet guide vanes. The rotor stage has a tip diameter of 60 cm and a hub diameter of 50 cm and rotates at 100 rps. The air enters the rotor and leaves the stator in the axial direction with no change in velocity or radius. The air is turned through 30.2° as it passes through the rotor. Assume an overall pressure ratio of 6 and a stage pressure ratio of 1.2. Find
a) the mass flow rate of air, b) the power required to drive the compressor, c) the degree of reaction at the mean diameter, d) the number of compressor stages required if the isentropic efficiency is 0.85.
 4. (a) A turbojet power plant uses aviation kerosene having a calorific value of 43 MJ/kg. The fuel consumption is 0.18 kg/hr/N of thrust, when the thrust is 9kN. The aircraft velocity is 500 m/s, the mass flow of air passing through the compressor is 27 kg/s. Calculate the air fuel ratio and overall efficiency.
(b) Combustion gases enter the first stage of a gas turbine at a stagnation temperature and pressure of 1200 K and 4.0 bar. The rotor blade tip diameter is 0.75m, the blade height is 0.12 m and the shaft speed is 10,500 rpm. At the mean radius, the stage operates with a reaction of 50%, a flow coefficient of 0.7 and a stage loading coefficient of 2.5. Determine
(a) the relative and absolute flow angles for the stage; (b) the velocity at nozzle exit; (c) the static temperature and pressure at nozzle exit assuming a nozzle efficiency of 0.96 and the mass flow.
 5. (a) A single stage gas turbine operates at its design condition with an axial absolute flow at entry and exit from the stage. The absolute flow angle at the nozzle exit is 70 deg. At stage entry, the total pressure and temperature are 311 kPa and 850oC respectively. The exhaust static pressure is 100 kPa, the total to static efficiency is 0.87 and mean blade speed is 500 m/s. Assuming constant axial velocity through the stage, determine (a) the specific work done (b) the Mach number leaving the nozzle (c) the axial velocity (d) total to total efficiency (e) stage reaction.

- (b) A single stage axial flow turbine operates with an inlet temperature of 1100 K and total pressure of 3.4 bar. The total temperature drop across the stage is 144 K and the isentropic efficiency of the turbine is 0.9. The mean blade speed is 298 m/s and the flow coefficient is 0.95. The turbine operates with a rotational speed of 12000 rpm. If the convergent nozzle is operating under choked condition determine (a) blade loading coefficient (b) pressure ratio of the stage and (c) flow angles.
6. (a) Explain the working of turbojet with neat diagram.
- (b) Define propulsive efficiency and derive its expression. State the condition for 100 percent propulsive efficiency and comment on this situation.
7. (a) Describe in detail the classification of rockets
- (b) Discuss various methods of ignition employed in liquid propellant rockets.
8. (a) Define mass ratio and propellant mass fraction of a chemical rocket stage and derive a relation between them.
- (b) Derive the expression for thrust produced by a chemical rocket and discuss the importance of molecular weight of the propellants.



Subject Code: 19MTE2PE07

M.Tech - II Semester Regular Examinations, December-2020

RENEWABLE ENERGY TECHNOLOGY

(TE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. a) State different major renewable energy sources in the order of most viable and successful resources.
b) Discuss about different types of solar cell and their features.
2. a) With neat sketches discuss the principle of electrical energy generation from a solar cell.
b) With a neat sketch, describe the working of solar water heating system.
3. a) Distinguish between horizontal axis wind turbine and vertical axis wind turbine.
b) Illustrate with neat sketches different Wave profile Devices.
4. a) Explain with a neat diagram the working of double basin tidal power plant?
b) Illustrate the principle of OTEC power plant.
5. a) Describe the following: a) Kinetic energy of air b) Power of air c) Blade swept area of Wind Turbine d) Yaw mechanism.
b) With neat sketch, discuss in detail about one of Vertical Axis Wind Turbine.
6. a) Discuss in detail about various industrial applications of Biofuel
b) Explain with a neat sketch the construction and working of Floating Drum type biogas Plant?
7. a) List the advantages and limitations of Geothermal energy.
b) Describe with a neat diagram of Dry steam open system geothermal power generation? And state its environmental aspects?
8. a) Discuss the features of Fuel cell.
b) Discuss in detail about the salient features of earth's inner Core



Subject Code: 19MTE2PE08

M.Tech - II Semester Regular Examinations, December-2020
ENVIRONMENTAL POLLUTION AND MANAGEMENT
(TE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. (a) Give an overview of Air pollutants and its types.
(b) How is water polluted? Explain.

2. (a) Discuss about pollution caused through automobiles.
(b) What is Industrial pollution? Explain with examples.

3. (a) Write about the International Standards for safety or of acceptable risk for human health with regard to air pollution.
(b) Explain the Preliminary considerations and stages of sampling air pollutants.

4. (a) How do you carryout analysis of air pollutants? Explain.
(b) Discuss about ambient air sampling.

5. (a) Explain briefly the major pollutants of water.
(b) Describe the water quality requirements for different uses.

6. (a) Write about the coastal pollution due to industrial effluents.
(b) Discuss briefly about Nuclear Radiation and also its disasters.

7. (a) Write about soil pollution and explain the effects of urbanization on land degradation.
(b) Write about the impact of modern agriculture on Soil.

8. (a) Explain the sources of noise.
(b) Give an overview of thermal pollution.



Subject Code: 19MEC2TH01

M.Tech - II Semester Regular Examinations, December-2020

CODING THEORY AND APPLICATIONS

(DE&CS)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) What are different types of errors and explain the control strategies. [6M]
(b) Explain the different Error Control Strategies in digital transmission in detail [6M]
2. (a) State and prove the theorems related to minimum distance of linear block codes [6M]
(b) Explain the following terms in detail [6M]
(i) Entropy (ii) Coded Modulation
3. (a) Explain the concept of Error-correcting Capabilities of a Block code in detail [6M]
(b) Explain the following terms in detail [6M]
(i) Syndrome decoding (ii) Hamming Codes
4. (a) List out and prove any five theorems related to cyclic codes. [6M]
(b) Design an encoder and decoder for the (7,4) cyclic code generated by $1+X+X^3$ [6M]
5. (a) Explain the following terms in detail [6M]
(i) Cyclic Product Codes (i) Quasi-Cyclic Codes
(b) Consider (4,3,2) convolutional code. Find the generator sequences of the code. Find the generator matrix G. Find the code word v corresponding to the information sequence $u = (110, 011, 110)$ [6M]
6. (a) Explain about viterbis decoding algorithm [6M]
(b) Explain the application of sequential decoding of convolutional codes. [6M]
7. (a) Explain the syndrome computation circuit for the double error correcting (15,7) BCH Code.
(b) Explain the following terms in detail [6M+6M]
(i) Single-Burst-Error-Correcting (ii) Burst-Error-Correcting Convolutional Codes
8. Write short notes on the following [4+4+4]
(i) Bounds on Burst Error Control
(ii) Encoder of the Burst Error control Code
(iii) Interleaved Cyclic



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M.Tech - II Semester Regular Examinations, December-2020
DSP PROCESSORS AND ARCHITECTURES
(DE&CS)

Subject Code: 19MEC2TH02

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

-
1. (a) Explain the necessity of FFT with respect to computational complexity. 6M
(b) Find DFT of a sequence $x(n) = \{1, -1, 0, 1, -1, 0, 1, -1\}$ using DIFFFT algorithm. 6M
 2. (a) Compute the dynamic range and the percentage resolution for a block floating point format with a 4-bit exponent used in a 16-bit fixed point processor. 6M
(b) Show that the dynamic range of a signal increases by 6 db for each additional bit used to represent its value. 6M
 3. (a) What is the difference between a micro coded program control and a hardwired program control? Why is the later preferred for DSP implementation? 6M
(b) List the major architectural features used in a digital signal processor to achieve high speed of program. 6M
 4. (a) Explain the Data Addressing modes of TMS320C54XX DSPs. 6M
(b) Write a sequence of TMS320C54xx instructions to configure a circular buffer with a start address at 0300h and an end address at 031fh with current buffer pointer (AR6) pointing to address 0305h. 6M
 5. (a) Write a brief note on Micro Signal architecture. 4M
(b) Explain the base architecture of ADSP 2181 8M
 6. (a) How does DMA help in increasing the processing speed of a DSP processor? 6M
(b) What is the significance of interfacing? Explain the procedure to interface memory and I/O peripherals to programmable DSP devices. 6M
 7. (a) What are the characteristics of analog devices family of DSP devices? 6M
(b) Explain FFT algorithm for round of errors. 6M
 8. (a) Explain about Hardware processing Unit 6M
(b) What are the various classifications of interrupts for the TMS320C54XX processor? 6M

Subject Code: 19MEC2TH03

M.Tech - II Semester Regular Examinations, December-2020

CMOS ANALOG AND DIGITAL IC DESIGN

(DE&CS)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) In Pseudo NMOS Logic, show and explain the exclusive or function (EXOR) realization circuit along with schematic. [8M]
(b) What is Sub-threshold operation of the MOS model? [4M]
2. Show and explain the NMOS two input NOR gate and calculate the output voltage levels for all four valid input voltage combinations. (Consider these parameters: Depletion-load nMOS NOR2 gate $\mu_n C_{ox} = 25 \mu\text{A}/\text{V}^2$, $V_{T0,driver} = 1.0 \text{ V}$, $V_{T0,load} = -3.0 \text{ V}$, $\gamma = 0.4 \text{ V}^{1/2}$, and $|2\Phi_F| = 0.6 \text{ V}$. The transistor dimensions are given as $(W/L)_A = 2$, $(W/L)_B = 4$, and $(W/L)_{load} = 1/3$. The power supply voltage is $V_{DD} = 5 \text{ V}$.) [12M]
3. (a) Implement the CMOS D-Latch gate level schematic and show the simplified D-Latch schematic with timing diagrams. [6M]
(b) Explain the Master Slave flip-flop concept including NAND based JK flip-flop. [6M]
4. (a) Draw the Domino CMOS which can implement the Z expression. [6M]
$$Z = \overline{(A+B+C+D)(E+F+G)(H+I)}$$

(b) Show the SRAM Cell gate level logic and explain its Static Read and Write operation. [6M]
5. (a) What is Current mirror and derive the basic n-channel current mirror circuit output. [6M]
(b) Describe the concept of bandgap reference and current voltage reference in analog CMOS circuits. [6M]
6. Explain these: Cascaded amplifier, Positive PSRR, single-ended input current amplifiers. [12M]
7. (a) Draw and explain the small signal model of the basic MOS transistor. [6M]
(b) Draw gate level and transistor level schematic of the 1 bit full adder MOS circuit. [6M]
8. (a) Differentiate CMOS AOI and OIA NOR latch circuit. [6M]
(b) Describe about NOR flash memory and NAND flash memory. [6M]



Subject Code: 19MDE2TH04

M.Tech - II Semester Regular Examinations, December-2020
DETECTION AND ESTIMATION THEORY
(DE&CS)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. (a) What is a Random Process?. Write about Poisson Point Processes and Gaussian processes.
(b) When does the LRT test under minimum probability of error criterion become identical to that under Neyman Pearson criterion?
2. (a) Derive the decision metric used in Bayes detector for the binary hypothesis testing problem.
(b) List out any four properties of receiver operating characteristics for simple binary hypothesis tests
3. (a) Explain about Minimum Probability of error criterion for the detection of signals in Noise with necessary derivations?
(b) Explain about Bayes Decision Rule?
4. (a) What is the significance of Linear Minimum Mean Squared Error Estimators?
(b) What are the applications of Kalman Filters?
5. (a) Explain Nonparametric Estimators of Probability Distribution and Density Functions?
(b) Discuss about the various Tests of Hypotheses?
6. (a) Explain the differences between Model-free Estimation and Model-based Estimation of Autocorrelation Functions?
(b) Explain about Tests for Stationary and Ergodicity?
7. (a) Derive the relationship between the autocorrelation and power spectral density.
(b) What are the measures of quality of various estimators? Define and explain them.
8. Write Short notes on
 - a) Simple Linear Regression
 - b) Markov Sequences and Processes



Subject Code: 19MDE2TH05

M.Tech - II Semester Regular Examinations, December-2020

ADVANCED COMPUTER ARCHITECTURE

(DE&CS)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) What are the major factors that influence the cost of a computer and how these factors are changing over time? (6M)
(b) What are different addressing modes that are to be considered to be very popular? Explain in detail. (6M)
2. (a) What is the major hurdle of pipelining? How do they reduce the performance? What are the techniques to be used to improve the performance? (8M)
(b) What are the parameters used to describe the performance of cache? Explain. (4M)
3. (a) What are the limitations of instruction level parallelism? (6M)
(b) How the performance of a system can be measured and reported. (6M)
4. (a) Describe briefly about Dynamic Scheduling. (6M)
(b) Write about Branch target buffers. (6M)
5. (a) How VLIW approach improves the performance of pipelines? (6M)
(b) Write about the taxonomy of parallel architectures. (6M)
6. (a) Explain about Virtual memory. (6M)
(b) How use of virtual machine has gained popularity? How the processes are protected from each other through virtual machines? (6M)
7. (a) Differentiate between centralized shared memory multiprocessors and distributed memory multiprocessors. (6M)
(b) What is multi threading? How do you define thread level parallelism? (6M)
8. Explain about Interconnection network media. (12M)



Subject Code: 19MDE2TH11

M.Tech - II Semester Regular Examinations, December-2020

ADVANCED DIGITAL COMMUNICATION

(DE&CS)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

-
1. (a) Explain about Response of Bank of Correlators to Noisy Input [6M]
(b) Discuss about Equivalence of Correlation and Matched filter receivers [6M]
 2. (a) Briefly explain the coherent binary FSK method [6M]
(b) Discuss coherent minimum shift keying [6M]
 3. (a) Discuss about Differential phase shift keying [6M]
(b) Explain about Synchronization-carrier and symbol synchronization. [6M]
 4. (a) Briefly explain about different types of cyclic codes [6M]
(b) Explain Viterbi algorithm [6M]
 5. (a) Discuss about Error Probability and Bandwidth Efficiency Plane [6M]
(b) Explain Nyquist's Criterion for Distortion less Baseband Binary Transmission. [6M]
 6. (a) With a neat schematic, explain about non coherent detection of binary FSK [6M]
(b) Explain about Trellis-Coded Modulation [6M]
 7. (a) Discuss about Band-width Efficiency of M-ary PSK signals and M-ary FSK signals [6M]
(b) Explain how a signal with unknown phase can be detected [6M]
 8. Write a short note on
a) Direct sequence Spread Spectrum systems b) Frequency hopping. [6M+6M]



Subject Code: 19MCS2TH01

M.Tech - II Semester Regular Examinations, December-2020

BLOCK CHAIN TECHNOLOGIES

(CSE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

-
1. (a) Discuss about different Bitcoin Wallet categories (6M)
(b) With neat diagram explain about Overview of Bitcoin. (6M)
 2. (a) Explain about conversion procedure of a public key into a bitcoin address with neat Sketch. (6M)
(b) How entropy and encoding converted as mnemonic words? Explain with example. (6M)
 3. (a) Discuss about Transaction Outputs and Inputs. (6M)
(b) Explain about P2SH in detail. (6M)
 4. (a) Briefly explain about four functions of Bitcoin. (6M)
(b) Write about simplistic bloom filter, with a 16-bit field and three hash functions. (6M)
 5. (a) What is Security? Explain different Bitcoin security principles. (6M)
(b) How Merkle trees are used in SPV nodes? Explain. (6M)
 6. (a) List out Checklist criteria for Independent Verification of Transactions for a Node. (6M)
(b) Discuss about Proof-of-Work Algorithm. (6M)
 7. (a) What are the necessary fields to construct the Block header. (6M)
(b) Discuss about Public Key Compression (6M)
 8. (a) Write a Short note on Transaction Scripts and Script Language (6M)
(b) Explain the procedure for Physical Bitcoin Storage (6M)



Subject Code: 19MCS2TH02

M.Tech - II Semester Regular Examinations, December-2020

FOUNDATIONS OF DATA SCIENCE

(CSE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) What is the data scientist role in the Data Science?
(b) Explain various operations that can be applied on Array in python.
2. (a) Explain the steps to create data frame using list
(b) What are the key features of Pandas Library?
3. (a) How do you write Data Out to Text Format in python
(b) What is format of JSON data and how do you read the json data in python
4. (a) Explain the procedure to remove duplicate values with an example
(b) Illustrate Concatenating along an Axis of arrays in numpy
5. (a) Explain the process of creating subplots in python?
(b) How do you plot functions in Panda?
6. (a) Compute group summary statistics unique values, value counts in data frame format.
(b) Explain the Group-wise Operations in Pandas with example.
7. Explain in detail the process of Returning Aggregated Data in “unindexed” Form in python
8. How do you deal with missing values in the data frame



Subject Code: 19MCS2TH03

M.Tech - II Semester Regular Examinations, December-2020

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

(CSE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

- 1.(a) Illustrate AI techniques. Write an AI technique to play Tic-Tac-Toe game.
 (b) Define production system. Discuss control strategy to decide which rule to apply next during the process of searching for a solution to a problem.

- 2.(a) Solve the 8-puzzle problem given below using steepest ascent hill climbing. Use the below heuristic function and compute the score for each state. (Heuristic Function: For every matching tile, add one point. For every non-matching tile, subtract one point.)

INITIAL STATE

GOAL STATE

2	8	3
	6	4
1	7	5

1	2	3
8		4
7	6	5

- (b) Explain how A* search algorithm can help to identify the shortest possible route from source to destination. Illustrate your answer with an example

3. (a) Represent the following sentences in Prolog:-

- $\forall x: \text{pet}(x) \wedge \text{small}(x) \rightarrow \text{apartmentpet}(x)$
- $\forall x: \text{cat}(x) \vee \text{dog}(x) \rightarrow \text{pet}(x)$
- $\forall x: \text{poodle}(x) \rightarrow \text{dog}(x) \wedge \text{small}(x)$
- $\text{poodle}(\text{fluffy})$

- (b) Explain briefly the various approaches to knowledge representation.

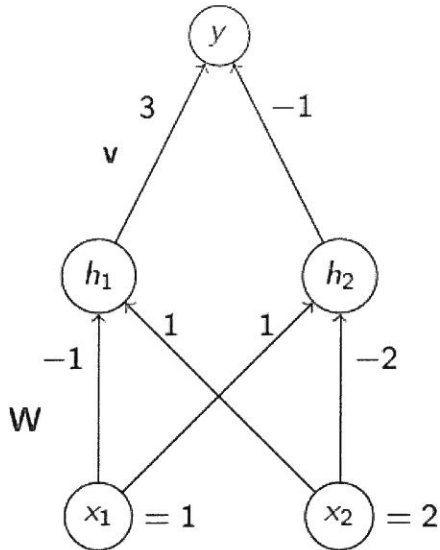
4. (a) Differentiate heuristic search with blind search.

- (b) Solve the following crypt-arithmetic problem using constraint satisfaction.

Find A, B, C, and D. The digits that we can pick from are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9

$$\begin{array}{r}
 ABCD \\
 x \quad 4 \\
 \hline
 DCBA
 \end{array}$$

5. (a) Apply the Back propagation algorithm for the following Network to compute net weight, output of “Y” and Error difference where the Input: (1,2) Output: 1 : Use Sigmoid function.



- (b) Demonstrate the usage of activation function in back propagation neural network algorithm.
6. (a) Outline the key properties of the PROLOG-EBG algorithm
 (b) Discuss Genetic Operators with example.
7. (a) Demonstrate the machine learning approach “Explanation based Learning”, for the task of ‘learning to play chess’
 (b) Identify Experience, Task and Performance for Spam E-Mail Detection.
8. (a) Discuss about over fitting issue in decision trees.
 (b) Discuss how learning sets of rule algorithms differ from decision trees/genetic algorithm with examples.

Subject Code: 19MCS2TH04

M.Tech - II Semester Regular Examinations, December-2020

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) Give an overview of SOA and explain the characteristics of SOA [8M]
(b) Explain the common principles of service orientation in detail [4M]
 2. (a) Discuss Tangible benefits of SOA. [6M]
(b) How SOA is reshaping XML and Web services [6M]
 3. (a) Outline an XML schema with an example [6M]
(b) Differentiate service oriented Architecture and Distributed Internet architecture [6M]
 4. (a) Compare Service-orientation and object-orientation [6M]
(b) Explain primitive service oriented architecture [6M]
 5. (a) Discuss Service endpoints and service descriptions [8M]
(b) Write short notes on message paths. [4M]
 6. (a) Discuss the protocols of Atomic transaction in detail [6M]
(b) Briefly explain the messaging with SOAP and service discovery [6M]
 7. (a) Explain briefly about WS-Choreography model description [6M]
(b) Explain Correlation in reliable messaging [6M]
 8. (a) Demonstrate WS-security framework in terms of the security elements with an example
(b) Compare WS-Notification and WS-Eventing [8M+4M]



Subject Code: 19MCS2PE05

M.Tech - II Semester Regular Examinations, December-2020

MOBILE COMPUTING

(CSE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

1. (a) Explain Architecture of Mobile Computing.
(b) What are the applications of Mobile Computing?
2. (a) Explain Hidden and exposed terminals and Near and far terminals.
(b) Explain TDMA and FDMA.
3. (a) Explain Entities and Terminologies used in Mobile IP.
(b) Discuss IP packet delivery with diagram.
4. (a) Explain congestion control and slow start in traditional TCP
(b) Explain Indirect TCP and snooping TCP – classical improvement techniques of TCP in wireless and mobile environments
5. (a) What are characteristics of MANETs? Give applications of MANETs.
(b) Explain AODV and DSDV routing algorithms..
6. (a) Discuss issues related to Mobile Computing Systems.
(b) Explain Blackberry and Android Mobile operating systems
7. (a) Explain tunneling and encapsulation.
(b) Explain Dynamic Host Configuration Protocol (DHCP).
8. Give notes on any two of the following
 - a) GSM Architecture
 - b) Transaction oriented TCP
 - c) Hybrid Routing Algorithms



Subject Code: 19MCS2PE09

M.Tech - II Semester Regular Examinations, December-2020

CLOUD COMPUTING

(CSE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

1. (a) Briefly explain about Desktop Virtualization and Network Virtualization?
(b) What are the advantages and disadvantages of virtual machines?
2. (a) Briefly explain about the following
 - (i) Grid Computing
 - (ii) Transactional Computing
3. (a) Write a s short note on Private Cloud and Public Cloud?
(b) What are the advantages of cloud infrastructure?
4. (a) Describe about the Service levels for Cloud applications?
(b) Write short note on Security as a Service?
5. (a) Explain the Host Intrusion Detection in the Cloud?
(b) Write a short note on Privacy Design in the Cloud?
6. (a) Briefly explain about the following
 - (i) Information as a Service
 - (ii) Application as a Service
 - (iii) Integration as a Service
7. (a) Briefly explain about the following
 - (i) Load Balancer Recovery
 - (ii) Application Server Recovery
8. (a) What is Storage Virtualization ? Explain.
(b) Write a short note on Cloud Servers and Cloud Files?
