AR19

CODE: 19MTE1007 **SET-2**

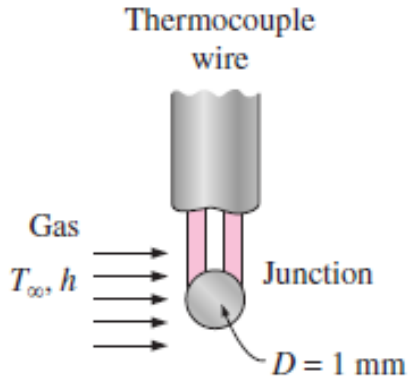
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular Examinations, December-2020

ADVANCED HEAT TRANSFER
Thermal Engineering

Time: 3 Hours Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1.	a)	Write a short note on convection heat transfer mechanism.	4
	b)	A 3 mm thick copper plate of 0.4×0.4 m^2 area at 300°Cis suddenly dipped into oil at 20°C. Calculate the time required for the plate to reach 40°C temperature. Assume h = 90 W/m^2K, ρ = 8000 kg/m^3, k = 350 W/m K and Cp = 380 J/kg K.	8
2.	a)	What is boundary condition? How is the boundary condition on an insulated surface expressed mathematically?	4
	b)	A very thick copper slab is exposed to a medium that offering a very large value of h and provided a uniform heat flux at the surface at a rate of 0.32 MW/m^2. Initially the copper slab was found to be 30°C. Calculate the surface temperature of the Copper slab after lapse of 5 min. Further, calculate the temperature at a distance of 15 cm from the surface after the lapse of the above time.	8
3.	a)	Distinguish between steady state and transient conduction.	4
	b)	The temperature of a gas stream is to be measured by a thermocouple whose junction can be approximated as a 1-mm-diameter sphere, as shown in Fig. 1. The properties of the junction are k = 35 W/m·°C, ρ = 8500 kg/m3, and Cp= 320 J/kg · °C, and the convection heat transfer coefficient between the junction and the gas is h = 210 W/m2 · °C. Determine how long it will take for the thermocouple to read 99 percent of the initial temperature difference.	8



4.	a)	What do you understand from a semi-infinite solid? Give any two examples.	4

b) A potato of average diameter 6 cm is initially at a uniform temperature 20oC on a given winter day. Thermophysical properties of potato are given as k = 0.68 W/m K and $\alpha = 1.6\times10^{-7}$ m^2/s. It is suddenly dropped into the boiling water in an application with water at temperature 100°C and offering a convection heat transfer 100 W/m^2 K. Calculate the time that the potato takes for its geometric centre to rise up to a temperature 95°C. Also calculate the heat that is taken in by the potato during the above time of its processing in the water. 8

5. a) Consider steady, laminar, two-dimensional flow over an isothermal plate. Does the thickness of the velocity boundary layer increase or decrease with (a) distance from the leading edge, (b) free-stream velocity, and (c) kinematic viscosity? 4

b) Water at temperature of 20°C is forced past a flat plate that is maintained at temperature of 60°C at the characteristic velocity 0.5 m/s. Calculate the boundary layer thickness and also the local convection heat transfer coefficient at a distance 80 cm from the leading edge of the flat plate. Further, calculate the net rate of convection heat transfer coefficient over the above length of flat plate. 8

6. a) Describe the pool boiling regimes and the pool boiling curve with a neat sketch 6

b) Define condensation and distinguish the film condensation and dropwise condensation 6

7. a) Differentiate between the total and spectral emissive powers of a body. 4

b) Two black rectangular surfaces of dimensions 0.8 m × 1.6 m and 1 m × 1.6 m with a common edge along 1.6 m length are respectively held at temperatures measured to be 500 K and 1000 K. Calculate the net radiation heat exchange between these two surfaces by ignoring the role if any played by the other surfaces. 8

8. a) How does transient heat transfer differ from steady heat transfer? How does one-dimensional heat transfer differ from two-dimensional heat transfer? 4

b) A vertical cylinder in a given application is supposed to be maintained at 0°C. The dimensions of the cylinder are 1 m outside diameter and 0.9 m height. The above cylinder is working quiescent environment of air at a characteristic temperature 20°C. Calculate the net rate of convection heat transfer from the ambient to the cylinder. 8

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CODE: 19MPE1009 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular Examinations, December-2020

POWER ELECTRONIC CONTROL OF AC DRIVES
(PED)

Time: 3 Hours **Max Marks:60**

Answer any FIVE questions
All questions carry EQUAL marks

1.	a)	Explain Speed control with torque and Flux control- Current controlled voltage fed Inverter	6 Marks
	b)	What happens to the performance of AC motor if the stator voltage control technique is adopted with frequency being constant	6 Marks
2.		Explain static Scherbius drive of induction motor drives in detail with neat sketches and their modes of operations.	12 Marks
3.		What is vector control with respect to induction motor? Explain the operation with neat legible sketch of induction motor when direct method of vector control is adopted.	12 Marks
4.		Discuss different control strategies of synchronous motor with reference to its characteristics.	12 Marks
5.		Illustrate how flux weakening operation and hence speed control can be employed in synchronous motor drive with neat legible sketch.	12Marks
6.		Discuss the various Characteristics of PMSM and explain the vector control with suitable phasor diagrams and block diagrams.	12 Marks
7.	a)	Describe the speed controlled PMBDM drive scheme without flux-weakening.	6 Marks
	b)	Elaborate current controlled Brushless dc motor Servo drive with neat legible sketch.	6 Marks
8.	a)	Predict the different control techniques of the SRM drives briefly?	6 Marks
	b)	Explain the principle of operation of reluctance motor servo drive and its applications	6 Marks

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CODE: 19MVL1009 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular Examinations, December-2020

MIXED SIGNAL IC DESIGN
(VLSI System Design)

Time: 3 Hours Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1.	a)	Derive an integrator using switched capacitor circuit.	6
	b)	If C1 = C2 = C, find the value of C that will emulate a 1MΩ resistor if the clock frequency is 200 KHz.	6
2.	a)	Explain the techniques adopted in resistor equivalence of switched capacitor.	6
	b)	With the help of necessary waveforms, explain about the non-ideal effects in PLLs.	6
3.	a)	Draw the block diagram of a D-A converter in signal processing applications.	6
	b)	Explain the static and dynamic characteristics of DAC.	6
4.	a)	Explain the concept of weighted resistor type DAC.	6
	b)	Write about flash type ADC.	6
5.	a)	Explain about deterministic approach and statistic approach of quantization noise in data converters	12
6.	a)	Discuss about Delta-Sigma ADC.	6
	b)	Explain about successive approximation type ADC.	6
7.	a)	Design a binary to Therometer code converter for 3 Bit	6
	b)	What is use of Hybrid converters and explain with one example	6
8.	a)	Explain about 4 bit folding A/D converters with folding rate of 4	6
	b)	Explain about Pipelined A/D converters with example	6

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CODE: 19MCS1009 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular Examinations, December-2020

MACHINE LEARNING
Computer Science Engineering

Time: 3 Hours Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1.	a)	What is S algorithm apply the technique with an example.	6M
	b)	What is candidate elimination algorithm and explain with an example.	6M
2.	a)	How Decision tress are trained on a ML problem. Use DT training algorithm to support.	6M
	b)	What are random forests. What is the link between decision tress and random forests in ML.	6M
3.	a)	What is a convergence theorem and explain.	6M
	b)	Describe K-nearest algorithm with an example.	6M
4.	a)	Explain the architecture and training algorithm of ADLINE network.	6M
	b)	Apply delta learning rule for training a ANN and why it is the popular model for updating the weight parameters in ANNs.	6M
5.	a)	How to select a specific model for a particular problem in ML. Specify rules of model selection.	6M
	b)	What do you understand by ANN ensemble? Can you train a ANN ensemble network to solve a specific problem?	6M
6.	a)	What is locally weighted regression and how it is different from linear regression.	6M
	b)	Explain bayes theorem and the need for conditional probability.	6M
7.	a)	What do you understand by learning with perfect domain theories? Explain with an example.	6M
	b)	How searching can be implemented with explanation-based learning.	6M
8.	a)	Explain Task Q Learning algorithm.	6M
	b)	Write short notes on temporal difference learning.	6M

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CODE: 19MSE1005 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular Examinations, December-2020

FINITE ELEMENT ANALYSIS
Structural Engineering

Time: 3 Hours Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1.	a)	Enumerate the advantages of FEM.	6M
	b)	Explain the Principle of minimum potential energy.	6M
2.	a)	Explain the formulation of Element load vector of axial element.	6M
	b)	Explain how boundary conditions are incorporated in the formulation of Finite Element Equations.	6M
3.	a)	Explain about Weighted Residual Methods.	6M
	b)	Explain finite element formulation by using Galerkin Method.	6M
4.	a)	Derive the shape function for Two-Dimensional rectangular Element .	6M
	b)	Explain about higher order and lower order elements.	6M
5.	a)	Illustrate different types of One -dimensional and Two -dimensional elements	6M
	b)	Formulate the shape functions for quadrilateral element.	6M
6.	a)	Explain with an example Plain Stress conditions also specify the stress strain relations for 2 D plane stress conditions.	6M
	b)	Determine the strain displacement matrix and constitutive matrix for the elements shown in Figure.1.Assume plane strain conditions. The coordinates shown in figure are in mm. Take E=200GPa ,t=10 mm and v=0.3.	6M

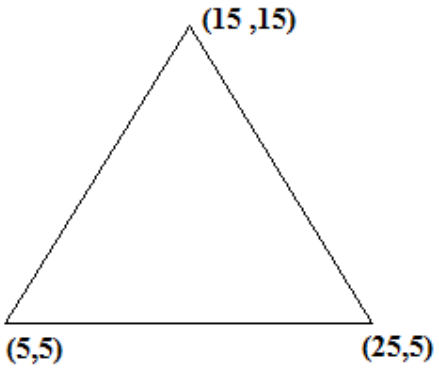

Figure. 1

7. a) Explain about Isoparametric representation of quadrilateral elements. 5M

b) For the quadrilateral element shown in the Figure. 2 obtain the equations for Isoparametric mapping. The coordinates shown in figure are in mm. 7M

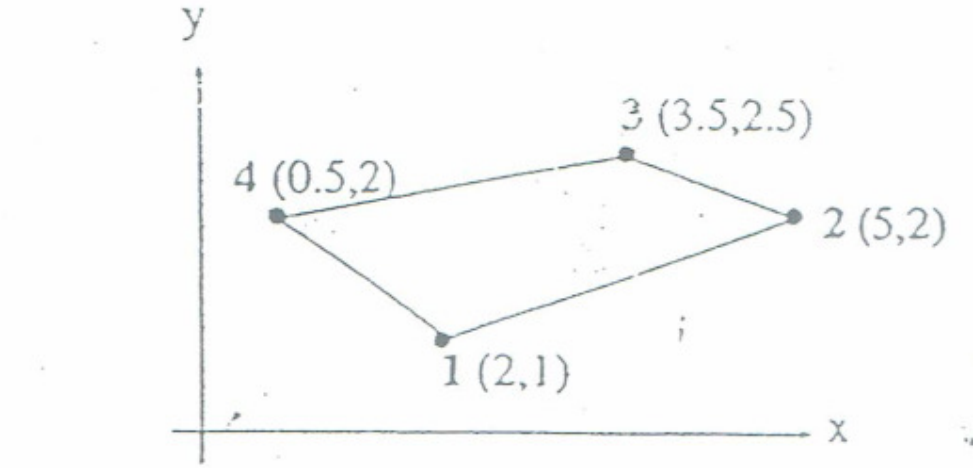

Figure.2

8. a) Specify the non zero strain and stress components of axisymmetric element. 4M

b) Evaluate the strain displacement matrix and stress-strain matrix / constitutive matrix for the axisymmetric element shown in the Figure.3. The coordinates shown in figure are in mm. Take E=200 GPa and ν = 0.3. 8M

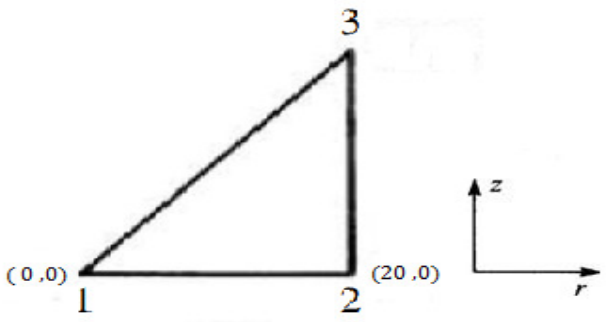

Figure. 3