# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
**(AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram-521 230 :: Krishna Dist. :: A.P
Approved by AICTE, New Delhi. Affiliated to JNTUK, Kakinada

## M.Tech.(II Semester) (R20) Regular Examinations, September / October 2021

## TIME TABLE

**Time : 10.00 AM to 01.00 PM** **A.Y. 2020-21**

| Date | VLSI and Embedded Systems | Thermal Engineering |
|---|---|---|
| 27-09-2021 (Monday) | 20VE09 - Analog VLSI Design | 20TE09 - Computational Fluid Dynamics |
| 29-09-2021 (Wednesday) | 20VE10 - Real Time Operating Systems | 20TE10 - Renewable Energy Technology |
| 01-10-2021 (Friday) | PE-III<br>20VE11 - CPLD and FPGA Architectures | PE-III<br>20TE11 - Thermal Measurement and Process Control |
| 04-10-2021 (Monday) | PE-IV<br>20VE15 - ASIC Design | PE-IV<br>20TE14 - Hybrid Electric Vehicles |

**Note: Any omissions or clashes in this time table may please be informed to the Controller of Examinations immediately.**

**Date: 17-09-2021**

**CONTROLLER OF EXAMINATIONS**

**PRINCIPAL**

Copy to:
1. Vice-Principal, Deans & HoDs
2. Transport in-charge & Librarian
3. Canteen, Security & Hostels
4. All Notice Boards

29 SEP 2021

| H.T.No | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

R20

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
**(AUTONOMOUS)**
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

M.Tech. (II Semester) Regular Examinations

**20VE10-REAL TIME OPERATING SYSTEMS**
(VLSI&ES)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Outline the commands and utilities, files and directories of unix. | 6M | CO1 | L2 |
| (b) | Distinguish between real time operating system and operating system. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Infer the components and features of linux system. | 6M | CO1 | L2 |
| (b) | Illustrate process control-exit, wait and waitpid functions. | 6M | CO1 | L2 |
| | | | | |
| 3(a) | Illustrate the use of message queues. | 6M | CO2 | L2 |
| (b) | Define RTOS and explain components of Kernel. | 6M | CO2 | L1 |
| | **(OR)** | | | |
| 4(a) | Classify different types of schedulers and elaborate. | 6M | CO2 | L2 |
| (b) | Define semaphore and provide different operations for acquiring and releasing semaphores. | 6M | CO2 | L1 |
| | | | | |
| 5(a) | How pipe is used to exchange data between two tasks and also describe which operation is useful for multiple pipes? | 6M | CO3 | L2 |
| (b) | Summarize different standard I/O functions in an I/O Subsystem. | 6M | CO3 | L2 |
| | **(OR)** | | | |
| 6(a) | Illustrate how signals notify tasks of events with a neat sketch. | 6M | CO3 | L2 |
| (b) | Analyze the remote procedure call component of RTOS. | 6M | CO3 | L2 |
| | | | | |
| 7(a) | Define exception and classify types of exceptions. | 6M | CO4 | L2 |
| (b) | Interpret the applications of exceptions and interrupts. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | Examine the nature of spurious interrupts. | 6M | CO4 | L2 |
| (b) | Outline the real-time clocks and system clocks. | 6M | CO4 | L2 |
| | | | | |
| 9(a) | Interpret the features of micro C/OS-II. | 6M | CO5 | L2 |
| (b) | Explain the VxWorks communication options. | 6M | CO5 | L2 |
| | **(OR)** | | | |
| 10(a) | Choose the common options available for selecting an RTOS. | 6M | CO5 | L2 |
| (b) | Illustrate why is the real-time kernel given higher priority than linux kernel. | 6M | CO5 | L2 |

| H.T.No | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

1 OCT 2021

R20

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
**(AUTONOMOUS)**
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

M.Tech. (II Semester) Regular Examinations

**20VE11-CPLD AND FPGA ARCHITECTURES**
(VLSI&ES)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Distinguish the features of PAL, PLA and ROM devices. Mention their applications. | 6M | CO1 | L2 |
| (b) | Differentiate PLDs, CPLDs and FPGAs. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Based on architecture explain how FPGAs are different from CPLDs. | 6M | CO1 | L2 |
| (b) | Model SOP and POS forms using PAL , PLA and PROM. | 6M | CO1 | L2 |
| | | | | |
| 3(a) | Realize and implement Parallel adder with accumulation of CPLD. | 6M | CO2 | L2 |
| (b) | Compare Altera Series Max-5000 and 7000 Series PLDs. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | Describe the Architecture of Xilinx Cool runner XCR3064XL CPLD. | 6M | CO2 | L2 |
| (b) | Outline Altera FLEX logic 10000 series CPLDs. | 6M | CO2 | L2 |
| | | | | |
| 5(a) | How programmable interconnects map the I/O devices in FPGA? Explain in detail. | 6M | CO3 | L2 |
| (b) | Summarize about Technology mapping for FPGAs. | 6M | CO3 | L2 |
| | **(OR)** | | | |
| 6(a) | Differentiate FPGA with CPLD with programming technologies, explain FPGA programming technologies. | 6M | CO3 | L2 |
| (b) | Classify and explain programming technologies of FPGA. | 6M | CO3 | L2 |
| | | | | |
| 7(a) | Illustrate XC 4000 series Architecture with neat sketch. | 6M | CO4 | L2 |
| (b) | Compare and contrast SRAM programmable FPGAs and Anti fuse Programmed FPGAs. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | Summarize XC 3000 series FPGAs with neat diagram. | 6M | CO4 | L2 |
| (b) | Compare and contrast the Actel ACT1,ACT2 and ACT3 Architectures. | 6M | CO4 | L2 |
| | | | | |
| 9(a) | Describe the process of designing counters with ACT devices. | 6M | CO5 | L2 |
| (b) | Outline fast DMA controller with neat sketch. | 6M | CO5 | L2 |
| | **(OR)** | | | |
| 10(a) | Explain fast video controller. | 6M | CO5 | L2 |
| (b) | Illustrate how to design adders and accumulators with the ACT architecture? | 6M | CO5 | L5 |

**********

H.T.No. | | | | | | | | | | |

4 OCT 2021

R20

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
**(AUTONOMOUS)**
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

M.Tech. (II Semester) Regular Examinations

**20VE15-ASIC DESIGN**
(VLSI&ES)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Interpret CMOS process and design rules specific to ASIC design. | 6M | CO1 | L2 |
| (b) | Outline Data path logic cells of ASIC design for combinational and sequential logic cells. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Classify ASIC and explain design flow of ASIC. | 6M | CO1 | L2 |
| (b) | Summarize data logic path cell – I/O cells and Cell compilers. | 6M | CO1 | L2 |
| | | | | |
| 3(a) | What are the Choices of ASIC cell library? Explain. | 6M | CO2 | L2 |
| (b) | Discuss Data path cell design of ASIC. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | Calculate logical effort of inverter followed by 2 input CMOS NAND gate. | 6M | CO2 | L3 |
| (b) | Compare anti-fuse and static Ram technologies. | 6M | CO2 | L2 |
| | | | | |
| 5(a) | List out PLA tools target to Low level designs of ASIC. | 6M | CO3 | L2 |
| (b) | Compare and contrast logic simulation and synthesis in ASIC design flow. | 6M | CO3 | L4 |
| | **(OR)** | | | |
| 6(a) | What is EDIF when it comes in ASIC? Explain the process to reach EDIF. | 6M | CO3 | L2 |
| (b) | Compare and contrast VHDL and Verilog HDLs. | 6M | CO3 | L4 |
| | | | | |
| 7(a) | Outline Logic Synthesis in VHDL and Verilog. | 6M | CO4 | L2 |
| (b) | Classify different types of simulation and explain. How formal verification takes place in ASIC? | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | Summarize memory synthesis of ASIC targeted to Logic design. | 6M | CO4 | L2 |
| (b) | Describe static timing analysis of ASIC. | 6M | CO4 | L2 |
| | | | | |
| 9(a) | Describe floor planning and placement specific to physical design of ASIC. | 6M | CO5 | L2 |
| (b) | Explain floor planning tools. | 6M | CO5 | L2 |
| | **(OR)** | | | |
| 10. | Compare and contrast Global routing, Detailed routing and special routing in ASIC design. | 12M | CO5 | L4 |

**********

6 OCT 2021

| H.T.No. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

R20

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
**(AUTONOMOUS)**
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

M.Tech. (II Semester) Regular Examinations

**20VE09-ANALOG VLSI DESIGN**
(VLSI&ES)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | List the MOS Device Models. | 6M | CO1 | L1 |
| (b) | Solve the expressions for CS stage with source degeneration. | 6M | CO1 | L3 |
| | **(OR)** | | | |
| 2(a) | Demonstrate the source follower for single stage amplifier. | 6M | CO1 | L2 |
| (b) | State the second order effects in MOS devices. | 6M | CO1 | L1 |
| | | | | |
| 3(a) | Explain the Basic Current mirrors. | 6M | CO2 | L2 |
| (b) | Relate the Differential pair with MOS Loads in Single stage amplifier. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | State about the Differential amplifiers. | 6M | CO2 | L1 |
| (b) | Sketch the Frequency response in Common Gate Stage. | 6M | CO2 | L1 |
| | | | | |
| 5(a) | Explain about Common Mode Feedback in Op-Amp. | 6M | CO3 | L2 |
| (b) | Demonstrate the Non-Ideal effects in PLL. | 6M | CO3 | L3 |
| | **(OR)** | | | |
| 6(a) | Explain about LC Oscillators. | 6M | CO3 | L2 |
| (b) | Solve the noise expressions in Op-Amp. | 6M | CO3 | L3 |
| | | | | |
| 7(a) | Explain about Band gap references. | 6M | CO4 | L2 |
| (b) | Discuss about Switched Capacitor Amplifiers. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | Discuss about the supply independent Biasing | 6M | CO4 | L2 |
| (b) | Solve the expressions in Constant Gm Biasing. | 6M | CO4 | L3 |
| | | | | |
| 9(a) | Explain about R-2R Ladder Network. | 6M | CO5 | L2 |
| (b) | Discuss about Successive Approximation ADC. | 6M | CO5 | L2 |
| | **(OR)** | | | |
| 10(a) | List the specifications of DAC and ADC. | 6M | CO5 | L1 |
| (b) | Discuss about the Current Steering DAC. | 6M | CO5 | L2 |

**********

| H.T.No | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

29 SEP 2021

R20

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
**(AUTONOMOUS)**
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

M.Tech. (II Semester) Regular Examinations

**20TE10-RENEWABLE ENERGY TECHNOLOGY**
(TE)

Time : 3 hours Max.Marks :60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Differentiate between conventional and non-conventional energy sources. | 6M | CO1 | L1 |
| (b) | Outline the working principle of solar photovoltaic power plant with suitable sketch. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Define (i) Beam radiation (ii) Diffuse radiation (iii) Global radiation. | 6M | CO1 | L1 |
| (b) | Illustrate the working of pyrometer for solar energy measurement. | 6M | CO1 | L2 |
| 3(a) | Enumerate different types of concentrating solar collectors. | 6M | CO2 | L1 |
| (b) | Describe the working principle of cylindrical parabolic concentrator. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | Illustrate the non-concentrating solar power plants. | 6M | CO2 | L2 |
| (b) | How do you estimate the efficiency of non-concentrating solar collector? | 6M | CO2 | L3 |
| 5(a) | What is solar cell? Explain the important characteristics of solar cell. | 6M | CO3 | L2 |
| (b) | Demonstrate the design of solar photovoltaic power plants. | 6M | CO3 | L1 |
| | **(OR)** | | | |
| 6(a) | Estimate the required storage battery capacity for the solar power plant. | 6M | CO3 | L3 |
| (b) | Analyze the design and sizing of Off-Grid Standalone Photovoltaic Power Plants. | 6M | CO3 | L4 |
| 7(a) | State the basic principle for wind power generation with suitable sketch. | 6M | CO4 | L1 |
| (b) | Formulate the expression for the maximum power generation from the wind energy. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | Outline the power curve of a wind turbine with suitable sketch. | 6M | CO4 | L2 |
| (b) | Discuss about the wind power control systems. | 6M | CO4 | L1 |
| 9(a) | Demonstrate the embodied energy analysis and energy density. | 6M | CO5 | L1 |
| (b) | What is overall thermal energy and energy -payback time? | 6M | CO5 | L1 |
| | **(OR)** | | | |
| 10(a) | Illustrate the various energy metrics for different solar systems. | 6M | CO5 | L2 |
| (b) | Illustrate the PVT solar concentrator . | 6M | CO5 | L2 |

**********

| H.T.No | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

1 OCT 2021 **R20**

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
**(AUTONOMOUS)**
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

M.Tech. (II Semester) Regular Examinations

**20TE11-THERMAL MEASUREMENT AND PROCESS CONTROL**
(TE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | How do we measure the temperature through EMF in a thermocouple? | 6M | CO1 | L2 |
| (b) | Describe the various issues in Heat flux measurement. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Explain briefly Seebeck effect, thermal EMF and thermocouple. | 6M | CO1 | L2 |
| (b) | How a thermocouple is measured using a potentiometer? | 6M | CO1 | L2 |
| | | | | |
| 3(a) | Explicate the working of Pirani gauge with neat sketch. | 6M | CO2 | L2 |
| (b) | Describe the working of magnetic flow meter with neat sketch. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | Why Rotameter is called variable is flow meter? Describe its construction and working with a neat sketch. | 6M | CO2 | L2 |
| (b) | What do you mean by low pressures? List out various indirect methods for measurement of low pressure and explain any two methods. | 6M | CO2 | L2 |
| | | | | |
| 5(a) | Sketch reference beam system and state its application. | 6M | CO3 | L2 |
| (b) | With the help of hot wire bridge circuit explain the working of hot wire anemometer in constant current mode and constant temperature mode. | 6M | CO3 | L2 |
| | **(OR)** | | | |
| 6(a) | What is LDA Principle? Explain the working principle of operation of Laser droplet anemometer with neat sketch. | 6M | CO3 | L2 |
| (b) | Illustrate the working principle of operation of Fluid jet anemometer. | 6M | CO3 | L2 |
| | | | | |
| 7(a) | Sketch the working principle of Hale Shaw Apparatus . | 6M | CO4 | L2 |
| (b) | What do you mean by Hydraulic Analogy?List out its application. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | Describe the working principle of Electrolytic tank with neat sketch. | 6M | CO4 | L2 |
| (b) | Distinguish Circular and cyclic frequency. | 6M | CO4 | L2 |
| | | | | |
| 9(a) | Elucidate the digital circuitry in digital computers and state its applications. | 6M | CO5 | L2 |
| (b) | Outline the microcomputers and list out merits,demerits. | 6M | CO5 | L2 |
| | **(OR)** | | | |
| 10(a) | List out applications of analog to digital conversions digital to analog conversions. | 6M | CO5 | L1 |
| (b) | Describe various types of digital to analog convertor, Explain any one of them in detail. | 6M | CO5 | L2 |

**********

H.T.No. | | | | | | | | | | |

14 OCT 2021

R20

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
**(AUTONOMOUS)**

L.B. Reddy Nagar: Mylavaram – 521 230: Krishna Dist.:A.P.

M.Tech. (II Semester) Regular Examinations

**20TE14-HYBRID ELECTRIC VEHICLES**

(TE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Draw and explain the configuration of hybrid electric drives. | 6M | CO1 | L2 |
| (b) | With a neat sketch, describe the configuration of series hybrid electric drive train. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Give a brief history of hybrid electric vehicles and fuel cells. | 6M | CO1 | L1 |
| (b) | What is parallel hybrid electric drive train? Demonstrate with a neat sketch. | 6M | CO1 | L2 |
| | | | | |
| 3(a) | Illustrate the operating principle of DC motors related to hybrid electric vehicles. | 6M | CO2 | L2 |
| (b) | Demonstrate the operating principle of Induction motor. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | What are different modes of operation in switched motor reluctance drives? Elucidate them. | 6M | CO2 | L2 |
| (b) | Describe self-tuning techniques of SRM drives with a neat layout. | 6M | CO2 | L2 |
| | | | | |
| 5(a) | Demonstrate different modes of operation of series hybrid electric drive train. | 6M | CO3 | L2 |
| (b) | Illustrate how power rating of engine/generator is designed in series hybrid electric drive train? | 6M | CO3 | L3 |
| | **(OR)** | | | |
| 6(a) | Enlist the design objectives of parallel hybrid electric drive train. | 6M | CO3 | L2 |
| (b) | Enumerate the advantages and disadvantages of parallel configuration drive train over series Configuration drive train. | 6M | CO3 | L2 |
| | | | | |
| 7(a) | Illustrate the working of electrochemical battery cell with neat layout. | 6M | CO2 | L2 |
| (b) | Discuss the electrochemical processes during the discharge and charge of a lead-acid battery cell. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 8(a) | What are two types of lithium based battery technologies? Explain Lithium-Polymer (Li-P) based battery technology. | 6M | CO3 | L2 |
| (b) | Justify the need of Ultracapacitors in hybrid electric vehicles. | 6M | CO3 | L2 |
| | | | | |
| 9(a) | Demonstrate the operating principle of a fuel-cell. | 6M | CO4 | L2 |
| (b) | Enumerate various fuel cell technologies. Elucidate the operation of direct methanol fuel cell. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 10(a) | What is meant by reforming? Describe the process of extraction of hydrogen by steam reforming method. | 6M | CO5 | L2 |
| (b) | How does a fuel cell differ from traditional method of energy generation? Highlight the advantages of fuel-cell. | 6M | CO5 | L2 |

**********

H.T.No. | | | | | | | | | | |

6 OCT 2021

R20

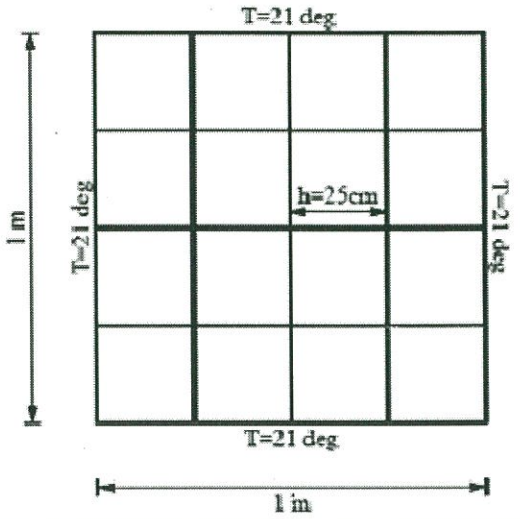
**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
**(AUTONOMOUS)**
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.
M.Tech. (II Semester) Regular Examinations

**20TE09-COMPUTATIONAL FLUID DYNAMICS**
(TE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit
All questions carry equal marks
Note : Gas tables are permitted.

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Compare the linear and quasi linear partial differential equations. | 6M | CO1 | L2 |
| (b) | Consider Laplace equation given by $\frac{\partial^2 \emptyset}{\partial x^2}+\frac{\partial^2 \emptyset}{\partial y^2}=0$. Show that this is an elliptic equation. | 6M | CO1 | L3 |
| | **(OR)** | | | |
| 2(a) | Show that all three conservation equations continuity, momentum, and energy can be put in a single generic form. | 6M | CO1 | L3 |
| (b) | Explain CFD as research and design tool. | 6M | CO1 | L2 |
| | | | | |
| 3. | Prove that wave equation, diffusion equation and Laplace equation are Hyperbolic, Parabolic and Elliptic in nature. | 12M | CO2 | L3 |
| | **(OR)** | | | |
| 4(a) | Write the Navier-Stokes equation and represent the parabolic, elliptic and hyperbolic part in the equation. | 6M | CO2 | L2 |
| (b) | Solve the partial differential equation $\frac{\partial u}{\partial t}+4u\frac{\partial u}{\partial x}=x, \quad u=0 \text{ on } t=0$ | 6M | CO2 | L3 |
| | | | | |
| 5(a) | How Dufort-Frankel method is influencing the explicit method for solving the finite difference formulation of parabolic equation. | 6M | CO3 | L2 |
| (b) | Discuss the CFD approach to solve parabolic form of equations with example. | 6M | CO3 | L2 |
| | **(OR)** | | | |
| 6(a) | Explain the point gauss seidel iteration method. | 6M | CO3 | L2 |
| (b) | Obtain the line gauss seidel iteration method. | 6M | CO3 | L3 |
| | | | | |
| 7(a) | Classify the various grid generation techniques. Mention the parabolic grid generation advantages and disadvantages. | 6M | CO4 | L1 |
| (b) | Compare the structured and unstructured grids. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | Explain the hyperbolic grid generation techniques. | 6M | CO4 | L2 |
| (b) | Write the advantages and disadvantages of elliptic grid generation techniques. | 6M | CO4 | L1 |

| | | | | |
|---|---|---|---|---|
| 9. | A 1-metre-square plate of thickness 5 mm (see the Figure) has its edges maintained at a fixed above-ambient temperature $T$ = 21°C. Use a finite-difference method with mesh spacing $h$ = 25 cm (as shown) to solve for the temperature distribution at the grid nodes if the parameters and $k$ have values of 40 W/ m²Kand 250 W/ mK respectively.<br>  <br> | 12M | CO5 | L3 |
| | **(OR)** | | | |
| 10(a) | Differentiate the FTCS and FTBCS explicit relations. | 6M | CO5 | L2 |
| (b) | Take a rod of length 0.1m with one node. The end temperatures are 100 $^0$C and 50 $^0$C with a heat generation of q=10 kW/m². What is the temperature at the node in Celsius scale? Take thermal conductivity as k=1.0 W/m K. compare this with the analytical result. What is the error percentage (in (K/K %) approximated to the decimal place? | 6M | CO5 | L3 |

**********