F 3782 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2005

Seventh Semester

Branches : Electronics and Communication Engineering, Applied Electronics and Instrumentation

MICROCONTROLLER BASED SYSTEM DESIGN (LA)

(New Scheme—2002 admissions—Regular)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

1. Name the subfamilies of TTL and explain briefly about each one.
2. What are gate arrays ?
3. What is meant by bouncing effect of a key switch ? How it can be eliminated ?
4. What for the pins V_{EE} and RS are used in a LCD ?
5. Draw the schematic of flash type ADC.
6. Explain the operation of opto-coupler.
7. Discuss about MAX 232 line driver.
8. List the features of RS 232 bus standard.
9. What for the watch dog timer is used ?
10. How the speed and direction rotation of stepper motor is controlled ?

(10 × 4 = 40 marks)

Part B

11. Draw the schematic of 22 V 10 PAL device and explain, also draw the schematic of 22 V 10 macrocell.

Or

12. Discuss about (a) PAL ; (b) FIFO ; and (c) Dual port RAM.
13. Draw the internal architecture of 89C 51 microcontroller in block diagram form and explain.

Or

14. Design a microcontroller based traffic light control system.
15. With the help of circuit diagram, explain how a successive approximation type ADC can be interfaced to a microcontroller.

Or

16. Design a temperature controller using a microcontroller.

Turn over

17. Explain about I^2C bus and PCI bus.

Or

18. Explain how data can be received and transmitted serially using a microcontroller of your choice.

19. Draw the 4 × 4 matrix keyboard interface circuit to a microcontroller and explain how the activated key can be identified.

Or

20. Explain with the help of schematic how a stepper motor can be interfaced to a microcontroller, and write a program to make the shaft of the motor to rotate continuously.

(5 × 12 = 60 marks)

8. Draw a 2 input CMOS based NAND gate. Convert into an AND gate.

9. What are the problems encountered in annealing GaAs ?

10. What is sub micro CMOS technology ? Why is it named so ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Describe Czochralski process of converting polycrystalline electronic grade silicon to single crystal silicon ingots.

Or

12. Draw the schematic diagram of an ion implantation system and explain the technique.

F 3793 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2005

Seventh Semester

Branches : Electronics and Communication Engineering, Applied Electronics and Instrumentation

VLSI TECHNOLOGY (LA)

(New Scheme—2002 admissions—Regular)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. How is polishing of silicon done ? What is the need for it ?
2. What are the merits of X-ray and electron beam lithography ?
3. What are the different ways a diode can be obtained in monolithic diodes ? Show diagrams.
4. What is a crossover ? Where is this easily accomplished in IC fabrication ? Why ?
5. Draw the band di... for the ideal MOS structure at (a) equilibrium and (b) negative voltage causing hole accumulation in *p*-type semiconductor.
6. Write down the scaling factors for a MOSFET for the following quantities according to a constant factor K :

   (a) Impurity concentration. (b) Current.

   (c) Voltage. (d) Power density.
7. Draw a 3 input NOR gate using CMOS and give truth table.
8. Draw a 2 input CMOS based NAND gate. Convert into an AND gate.
9. What are the problems encountered in annealing GaAs ?
10. What is sub micro CMOS technology ? Why is it named so ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Describe Czochralski process of converting polycrystalline electronic grade silicon to single crystal silicon ingots.

Or

12. Draw the schematic diagram of an ion implantation system and explain the technique.

Turn over

13. Explain the following isolation techniques :

(a) Junction isolation ; (b) Dielectric isolation.

Or

14. How are (a) MOS resistors and (b) Monolithic capacitors fabricated ? Explain with neat diagrams.

15. Describe the step-by-step process of twin well type of CMOS fabrication.

Or

16. How is large capacitance load driven ? Illustrate with example.

17. Describe the layout of a subsystem with the help of flowchart.

Or

18. How is a 4 bit shifter designed ? Explain the procedure.

19. What is submicro CMOS technology ? What are the differences this technology has from the conventional ones ?

Or

20. Write a detailed note on channeling effect in the gallium arsenide technology.

(5 × 12 = 60 marks)

F 3805 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2005

Seventh Semester

Branch : Applied Electronics and Instrumentation

INDUSTRIAL INSTRUMENTATION—II (A)

(New Scheme—2002 Admissions—Regular)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*
All questions carry equal marks.

Part A

1. Distinguish between Newtonian and Non-newtonian fluids.
2. Explain about density and specific gravity scales used in petroleum industries.
3. Explain hydrogen electrode used for pH measurement with a figure.
4. Explain conductivity measurement with the help of measuring circuit.
5. Write a note on Gas chromatography.
6. With the help of a diagram, explain Geiger Muller Counter.
7. Suggest a method to measure the speed of a shaft.
8. Explain potentiometric type accelerometer.
9. Explain the necessity of a fuel gas analysis in power plant.
10. Give advantages and disadvantages of diesel electrical power plants.

(10 × 4 = 40 marks)

Part B

11. Explain Rotating cylinder and Capillary tube viscometers with sketches.

Or

12. Explain any *two* methods of density measurement with sketches.
13. Explain in detail about the installation and maintenance of pH meters.

Or

14. Explain the construction and operation of conductivity cell.
15. Explain the infrared and mass spectrometer method of gas analysis.

Or

16. With a neat sketch, explain scintillation counter. What are the advantages of this counter ?

Turn over

17. With neat sketches, explain different types of electrical tachometers.

Or

18. With a schematic diagram, explain Seismic transducer for measuring acceleration.

19. Explain Diesel electrical power plants. Give its advantages and disadvantages.

Or

20. Explain various gas analysing equipments used in a power plant.

(5 × 12 = 60 marks)

F 3815 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2005

Seventh Semester

Branch : Applied Electronics and Instrumentation

PROCESS DYNAMICS AND CONTROL (A)

(New Scheme—2002 admissions—Regular)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. Explain self-regulation with example.
2. Differentiate interacting and non-interacting systems with examples.
3. What is proportional offset ? How it can be eliminated ?
4. Define and describe the two position control mode. What are its applications ?
5. Differentiate IAE and ISE with examples.
6. Explain quarter amplitude decay ratio.
7. What are valve positioners ? Explain.
8. Explain in detail the different types of electrical actuators with examples.
9. Explain feed forward control with an example.
10. Explain combustion control in steam boilers.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 12 *marks.*

11. Derive the equation for the time constant of a thermal system.

Or

12. Explain with diagrams continuous and batch processes. Differentiate between them. What are their applications ?

13. (a) Describe the floating control mode. Draw the output waveform for a particular error.

    (b) Implement the floating control mode electronically.

Or

Turn over

14. (a) Describe the 2 position control mode. Implement it using electronic controllers.

    (b) A 5 m. diameter cylindrical tank is emptied by a constant outflow of 1 $m.^3$/minute. A 2 position controller is used to open and close a fill valve with an open flow of 2·0 $m.^3$/minute. For level control, the neutral zone is 1 m. and set point is 12 m. Calculate (i) Cycling period ; (ii) Plot the level Vs. time.

15. Explain the evaluation criteria for the determination of optimum controller settings using time response method.

Or

16. Explain (a) Process reaction curve method ; (b) Damped oscillation method of process loop tuning.

17. (a) Explain flooding of control valve with example.

    (b) Explain different types of I/P convertors. What are its uses ?

Or

18. Write notes on :

    (a) Butterfly valves.

    (b) Globe valves.

    (c) Diaphragm valves.

19. Draw the piping and instrumentation diagram for the drum level control in steam boilers with a case study.

Or

20. Explain with examples (a) Multivariable control ; (b) Ratio control.

(5 × 12 = 60 marks)

14. (a) Describe the 2 position control mode. Implement it using electronic controllers.

    (b) A 5 m. diameter cylindrical tank is emptied by a constant outflow of 1 $m.^3$/minute. A 2 position controller is used to open and close a fill valve with an open flow of 2·0 $m.^3$/minute. For level control, the neutral zone is 1 m. and set point is 12 m. Calculate (i) Cycling period ; (ii) Plot the level Vs. time.

15. Explain the evaluation criteria for the determination of optimum controller settings using time response method.

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17. (a) Explain flooding of control valve with example.

    (b) Explain different types of I/P convertors. What are its uses ?

Or

18. Write notes on :

    (a) Butterfly valves.

    (b) Globe valves.

    (c) Diaphragm valves.

19. Draw the piping and instrumentation diagram for the drum level control in steam boilers with a case study.

Or

20. Explain with examples (a) Multivariable control ; (b) Ratio control.

(5 × 12 = 60 marks)

F 3824 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2005

Seventh Semester

Branch—Applied Electronics and Instrumentation, Electronics and Instrumentation Engineering

Paper—BIOMEDICAL INSTRUMENTATION (A,S)

(New Scheme—2002 Admissions—Regular)

Time : Three Hours Maximum : 100 Marks

Part A : Answer **all** *questions. Each question carry* 4 *marks.*
Part B : Answer **all** *questions. Each question carry* 12 *marks.*

Part A

1. Explain the anatomy of human heart.
2. Draw and explain the action potential waveform.
3. Explain the different types of needle electrodes. What are its applications ?
4. What are implantable transducers ? Explain with examples.
5. Explain the principle of operation of an electro static UV recorder.
6. Explain how conduction velocity and latency are determined.
7. Briefly explain the principle of operation of electronic BP monitors.
8. Explain the principle of operation of an EOG Machine. What are its applications ?
9. Explain the principle of operation of an Inhalator. What are its uses ?
10. What are ventillators ? Explain.

(10 × 4 = 40 marks)

Part B

11. (a) Explain in detail the electrical safety codes and standards for electromedical equipments.
    (b) Explain the physiological effects due to electric currents.

Or

12. (a) What is EEG ? Explain the EEG waveform for different conditions of brain.
    (b) What is bio-feedfack and evoked response of EEG ?
13. (a) What are biopotential transducers ? Explain each *one* with example.
    (b) Explain how strain gauges are used to measure pressure with example.

Or

14. (a) Explain the theory of electrode-skin interface.

    (b) Draw the equivalent circuit of electrolyte-skin interface and explain.

15. Explain with diagram the different types of amplifiers used for ECG and EEG with their design considerations.

Or

16. Explain with diagram the working principle of an ECG with the different lead systems. What are its clinical applications ?

17. Explain with diagrams the different types of gas analyzers.

Or

18. Explain with diagrams :

    (a) Auto analyzer.

    (b) Electro Cardioscope.

    (c) Spirometer.

19. What is dialysis ? Explain with diagram the different types of dialysis machines.

Or

20. Write notes on :–

    (a) Defibrillator.

    (b) Muscle Stimulators.

(5 × 12 = 60 marks)

G 1825 (2 pages) Reg. No .....

Name .....

B.Tech. DEGREE EXAMINATION, MAY 2005

Seventh Semester

Branch : Applied Electronics and Instrumentation Engineering

PROCESS CONTROL (A)

(Supplementary/Improvement)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. Explain servoregulation operation with example.
2. Explain with diagram a continuous process control.
3. Explain the two position control mode with its applications.
4. Explain with diagram a pneumatic PI controller.
5. Explain 1/4th decay ratio criterion.
6. Explain the continuous cycling method of tuning.
7. Compare and contrast quick-opening, Linear and equal percentage control valves in terms of the flow versus stem position.
8. What are the advantages of a hydraulic actuator ? Explain.
9. Explain ratio control with example.
10. Write notes on distillation columns.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each carries 12 *marks.*

11. What is meant by degree of freedom of a process ? Explain with at least two examples.
12. (a) What are the characteristics of thermal systems ? Explain. (8 marks)
    (b) Calculate the thermal capacitance of one gallon of water. (4 marks)
13. Compare and contrast the PI and PD control modes.

Or

14. Describe and implement the electronic PID controller.
15. Compare IAE, ISE and IATE.

Or

16. Explain how the frequency response method can be used to tune a process control loop.

Turn over

17. Write notes on :

    (a) Butterfly valve.

    (b) Globe valve.

    (c) Ball valves.

Or

18. (a) What are valve positioners ? Explain.

    (b) What is meant by cavitation ? Explain.

19. (a) Explain different methods of multivariable control with examples.

    (b) Write notes on :

        (i) Feed forward control.

        (ii) Ratio control.

Or

20. Draw the piping and instrumentation diagram for a steam boiler. Explain the symbols used.

(5 × 12 = 60 marks)

G 1837 (2 pages) Reg. No .....

Name .....

B.Tech. DEGREE EXAMINATION, MAY 2005

Seventh Semester

Branch : Applied Electronics and Instrumentation Engineering

INDUSTRIAL INSTRUMENTATION—II (A)

(Supplementary/Improvement)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. What are the causes of Vibration ?
2. What are the advantages of piezoelectric load cells ? Explain.
3. What are the uses of stroboscopic method of speed measurement ?
4. Explain any *one* method for the determination of speed mechanically.
5. Differentiate Viscosity and Consistency.
6. What are the applications of density measurement ?
7. Explain the principle of operation of a conductivity cell.
8. Explain how a pH meter is installed and maintained.
9. Compare and contrast proportional and Geiger Muller counters.
10. Explain briefly the principle of thermal conductivity type gas analyzers.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 12 *marks.*

11. Explain any *three* types of force measurement in detail.

Or

12. (a) Explain how vibration analysis done by holography.

    (b) Explain in detail the strain gauge type torque transducer. What are its advantages ?

13. Explain the various methods used for calibration.

Or

14. Explain with neat diagrams, any *three* methods to measure acceleration.

Turn over

15. Discuss any *three* methods of measurement of viscosity. What are its uses ?

Or

16. (a) Explain the operation of a hygrometer with a neat diagram.

(b) What is psychrometric chart ? Explain. What are its uses ?

17. Explain the different types of electrodes used for pH measurement.

Or

18. Write notes on :

(a) Conductivity meter.

(b) Electrical conductivity of solution.

19. Explain the principle of operation of a gas chromatograph with a neat sketch.

Or

20. Write notes on :

(a) Mass spectrometer.

(b) Proportional counters.

(5 × 12 = 60 marks)

G 1854 (2 pages) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2005

Seventh Semester

Branch – Applied Electronics and Instrumentation Engineering

TELEMETRY AND REMOTE CONTROL (A)

(Supplementary/Improvement)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

1. (a) With a diagram, explain a simple pneumatic motor.

(b) Compare a.c and d.c synchro systems.

(c) What is meant by abliasing error during sampling ? Why it happens ?

(d) Suggest a block diagram for FSK modulation.

(e) Explain how a graded index fiber is better than step index fiber. What are its features ?

(f) List the important features of a good optical detector.

(g) What is meant by orthogonal code vectors ?

(h) List the various sources of noise in RF telemetry system.

(i) Distinguish between active and passive satellites.

(j) Compare active medium altitude and stationary satellite systems.

(10 × 4 = 40 marks)

Part B

Each question carries **12** *marks.*

2. (a) With a block diagram, explain the working of a wireless telemetry system.

Or

(b) Explain the various telemetry standards.

3. (a) Explain a synchronous demodulation technique to demodulate FSK signals.

Or

(b) Explain any one type of digital coding technique which can correct at least one bit error.

Turn over

4. (a) What is meant by 'dispersion' in an optical fiber ? Explain the various types of dispersion.

Or

(b) Explain any one type of optical detector in detail.

5. (a) Explain the designing of a RF link.

Or

(b) Explain the important specifications of a digital telemetry system.

6. (a) Explain a typical satellite telemetry system with example.

Or

(b) With an example, explain how digital techniques can be employed in process control.

(5 × 12 = 60 marks)

G 1870 (2 pages) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2005

Seventh Semester

Branch – Applied Electronics and Instrumentation Engineering

MICROCONTROLLER BASED SYSTEM DESIGN (Elective I) (A)

(Supplementary/Improvement)

Time : Three Hour Maximum : 100 Marks

Part A

Answer **all** *questions.*

1. Briefly explain the built in ports of 8051
2. Explain the following pins of 8051 (a) TXD (b) RST.
3. Explain the following instructions of 8051.
   (a) CJNE Rn, #n, radd (b) JBC b, radd.
4. Explain the interrupt enable register of 8051.
5. How do we carry out a RAM test for 8051 ?
6. How do we setup a look up table for 8051 ?
7. Explain the functions of the registers SBUF and SCON.
8. Explain mode 2 of the serial data transfer of 8051.
9. Explain the memory map of 8096.
10. Compare 8096 with 8051.

(10 × 4 = 40 marks)

Part B

11. Explain the register structure of 8051 with the details of control registers used for timer and serial I/O.

Or

12. Explain (a) the stack operation of 8051. (b) Internal memory organization of 8051.
13. Write an ALP to count the number of ones (1's) in a data byte stored in external RM location 150 h.

Or

14. Explain the various addressing modes of 8051.
15. Write an ALP for setting 100 ms hardware delay using 8051.

Turn over

Or

16. Write an ALP for sending a character using 8051 with proper wait time.

17. Write a program in assembly language for generating a PWM wave for DC motor control using 8051.

Or

18. Draw a schematic diagram and explain how temperature and level can be monitored by an 8051 based system.

19. Explain the interrupt system of 8096

Or

20. Compare 8/16/32 bit micro controllers and write a note on how you would choose a micro controller for a particular project.

(5 × 12 = 60 marks)

G 1871 (2 pages) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2005

Seventh Semester

Applied Electronics and Instrumentation Engineering

VLSI DESIGN (Elective – I) (A)

(Supplementary/Improvement)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each carries 4 *marks.*

1. Compare the merits and demerits of CMOS and bipolar technologies.
2. Write an expression for the threshold voltage of a MOS transistor. Explain the symbols used.
3. What is meant by a native super buffer ?
4. Explain how the fall time can be estimated for the CMOS inverter.
5. Write a note on CMOS domino logic. What are its merits ?
6. Explain the effects of scaling of supply voltage in CMOS circuits.
7. What are the two ways in which FSM can be implemented ?
8. Draw a block diagram illustrating the use of PLA in FSM.
9. Derive an expression for the propagation delay through '*n*' numbers of pass transistors in series.
10. Define 'testability'.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*

Each question carries 12 *marks.*

11. (a) Describe the realization of a two-input NOR gate using CMOS logic. Draw the corresponding stick diagram.

Or

(b) Write notes on λ-based design rules for CMOS.

Turn over

12. (a) What are the problems when a CMOS inverter is driving large capacitive loads ? Show how this can be remedied.

Or

(b) Explain the factors involved in deciding the choice of layers in IC design.

13. (a) Explain the functional limitations to scaling.

Or

(b) Explain a 4-bit dynamic shift register. Draw the CMOS stick diagram for each cell of this.

14. (a) Explain the principle of carry look ahead adder.

Or

(b) Design a FSM which checks for the sequence '010' in the input data and output '1' when such a sequence is detected. Draw the floor plan/arrangement for the design.

15. (a) Explain the working of a typical pseudo-static CMOS memory cell. Draw the corresponding stick diagram.

Or

(b) Explain the various CAD tools used in VLSI.

(5 × 12 = 60 marks)

F 3898 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2005

Seventh Semester

Branch : Information Technology

VLSI ENGINEERING—I

(Supplementary)

[Old Scheme—Prior to 2002 admissions]

Time : Three Hours Maximum : 100 Marks

Answer **all** *the questions.*
Each question in Part A carries 4 *marks.*
Each question in Part B carries 12 *marks.*

Part A

1. Name and define any four parameters in solid-state diffusion.
2. What are the arial relations, angular relations and Bravais lattice types for cubic crystal system ?
3. What is electron migration ? Give mathematical relation between rate of metal transport and target of cross-section.
4. Explain the requirements in etching-selectivity, anisotropy and uniformity.
5. Discuss ion beam milling.
6. Differentiate FEOL and BEOL processes.
7. What is noise margin ? What is its relevance ?
8. Draw the small signal equivalent model of a MOS transistor and explain the components.
9. List the advantages and disadvantages of pass-transistor network in CMOS.
10. Draw CMOS logic for function $Z = \overline{A \cdot B + C(A + B)}$.

(10 × 4 = 40 marks)

Part B

11. Explain the Deal Grove model of oxidation.

Or

12. Write short notes on :

    (i) Intrinsic silica glass. (4 marks)

    (ii) Extrinsic silica glass. (4 marks)

    (iii) Oxidation of silicon. (4 marks)

Turn over

13. Discuss the different classifications of etching.

Or

14. With suitable schematics, explain an ion implantation system.

15. With relevant sketches, explain the BiCMOS process sequence.

Or

16. Explain three basic types of cold wall reactors.

17. Sketch the structure of an *n*-channel enhancement type transistor and explain.

Or

18. Draw a CMOS inverter. Draw the DC transfer characteristics and mark the operating regions. Discuss the voltage relation and operating conditions of pull up and pull down device, in each region.

19. Draw three input CMOS NAND and NOR gates and explain the working. Can nMOS device form the pull up ? Justify.

Or

20. Draw the basic CMOS dynamic gate and explain the working. List the problems with this structure. Suggest a modification to correct the problem.

(5 × 12 = 60 marks)