**G 2134** (Pages : 2) Reg. No.....

Name.....

# B.TECH. DEGREE EXAMINATION, APRIL 2010

## Fifth Semester

Branch—Electronics and Communication Engineering

POWER ELECTRONICS (LA)

(Supplementary—Prior to 2007 Admissions)

Time : Three Hours Maximum : 100 Marks

### Part A

*Answer* **all** *questions.*

1. Discuss the turn on and turn off characteristics of SCRs.
2. Explain the $di/dt$ and $du/dt$ protection of power semiconductor devices.
3. What is a free wheeling diode ? Discuss its effect on controlled rectifier output waveform.
4. Discuss the pwm chip TL 494.
5. What is the principle of an integral cycle a.c. controller ?
6. Draw any one configuration of a 3-phase a.c. voltage controller.
7. Discuss the classification of choppers.
8. Explain the principle a step up chopper.
9. Compare voltage source and current source inverters.
10. What are the various harmonics reduction techniques in inverters ?

(10 × 4 = 40 marks)

### Part B

11. List the important power switching devices used in modern power processors and explain their salient features along with circuit symbols and static characteristics.

*Or*

12. (a) What are the different protections used in power semiconductor devices ? What is a snubber ?

    (b) Explain proper method of operating several thyristors in series.

13. (a) What is the effect of source inductance in controlled rectifiers ?

    (b) A single-phase full converter with RLE load is operating from 30 V, 50 Hz supply. The load inductance is very large so that load current is continuous and nipple free. If R = 6Ω, E = 40V, find the average load current for a delay angle of $\pi/3$. Also find the average thyristor current.

*Or*

**Turn over**

14. (a) Explain the operation of a 3-phase fully controlled bridge converter with circuit diagram.

(b) What are the various power factor improvement techniques for phase controlled rectifiers ?

15. With circuit diagram and necessary waveforms explain the operation of a single-phase controlled a.c. voltage controller with RL load. Obtain the expression for output voltage and current.

*Or*

16. A single-phase a.c. voltage controller controls the power into a load consisting of R = 3Ω and WL = 4Ω. If the supply voltage is 230 V, 50 Hz, calculate :

(i) control range of firing angle ;

(ii) maximum r.m.s. load current ;

(iii) maximum power input to the load ;

(iv) maximum power factor ;

(v) maximum value of average and r.m.s. thyristor current.

17. Draw the circuit diagrams and explain the working of a voltage commutated chopper circuit.

*Or*

18. Explain the operation of a four Quadrant chopper with circuit diagram and waveforms.

19. With necessary waveforms and circuit diagram, explain the working of a single-phase bridge inverter. What are the performance parameters of inverters ?

*Or*

20. (a) Explain a PWM inverter operation. What are the various types of PWM techniques used in inverters for control of voltage and waveform.

(b) List the application of inverters.

(5 × 12 = 60 marks)

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# B.TECH. DEGREE EXAMINATION, APRIL 2010

## Fifth Semester

Branch : Electronics and Communication/Electronics and Instrumentation

MICROPROCESSORS AND MICROCONTROLLERS (LS)

(Supplementary/Prior to 2007 admissions)

Time : Three Hours Maximum : 100 Marks

*Answer* **all** *questions.*

## Part A

1. Explain the purpose of AC flag in 8085.
2. How is the $AD_0 - AD_7$ bus in 8085 is demultiplexed ?
3. Write a note on program protection mode in 89 C51.
4. Discuss the types of memory available in Atmal AT 89 C51.
5. Distinguish between direct and indirect addressing in 89 C51. Give example.
6. Write a set of instructions which swap the contents of the two memory locations 60H and 61H if the carry flag is 1.
7. Explain what happens when the following instructions are executed :—

   (i) MUL AB ; (ii) DIV AB.
8. What is the purpose of XCH instruction ?
9. Differentiate between ACALL and LCALL instructions.
10. What is the difference between Mode 2 and Mode 3 serial data modes in 89 C51 ?

(10 × 4 = 40 marks)

## Part B

11. With a timing diagram, explain the fetch and execution of the instruction MOV A, B in 8085. (12 marks)

*Or*

12. (a) Explain the flags available in 8085. (5 marks)

    (b) Explain the control pins available in 8085. (7 marks)
13. With a block diagram, explain the internal architecture of 89 C51. (12 marks)

*Or*

14. Explain the port configuration PORT 0 to PORT 3 in 89 C51. (12 marks)

**Turn over**

15. (a) Program memory and data memory are same in 89C51. Comment on this statement. (5 marks)

(b) 10 bytes are stored in RAM location 60 H onwards. Write a program to find the largest byte among them. Store the result in location 70 H. (7 marks)

*Or*

16. (a) Explain the register banks in 89C51. (5 marks)

(b) 9 bytes are stored in location 60 H onwards. Write a program to count the even bytes among them. Store the result in location 70 H. (7 marks)

17. Explain in detail the interrupt handling mechanism in 89C51. (12 marks)

*Or*

18. With a neat block diagram, explain how 89C51 can be interfaced with 16 K EPROM chip. (12 marks)

19. Explain the various timer modes of 89C51. (12 marks)

*Or*

20. Write short notes on :

(i) ONCE mode.

(ii) IE and IP SFRs.

(iii) Timer counter interrupts.

(3 × 4 = 12 marks)

[5 × 12 = 60 marks]

G 2143 (Pages : 2) Reg. No.....

Name.....

# B.TECH. DEGREE EXAMINATION, APRIL 2010

## Fifth Semester

Branch—Electronics and Communication Engineering

APPLIED ELECTROMAGNETIC THEORY (L)

(Supplementary—Prior to 2007 Admissions)

Time : Three Hours Maximum : 100 Marks

*Answer* **all** *questions.*

### Part A

*Each question carries* 4 *marks.*

1. Explain linear and volume charge densities.
2. State and explain Stoke's theorem.
3. Find the force produced by a current element in a magnetic field.
4. State and explain Helmholtz theorem.
5. Differentiate between conduction current and displacement current.
6. Explain Poisson's equation and Laplace's equation.
7. A wave guide is a high pass filter. Explain.
8. What is meant by dominant mode ?
9. What is the relationship between standing wave ratio and reflection coefficient ?
10. Why Impedance matching is required for transmission lines ?

(10 × 4 = 40 marks)

### Part B

*Each question carries* 12 *marks.*

11. Explain the transformation of a vector from rectangular co-ordinate system to cylindrical and vice versa.

*Or*

12. Explain the electrostatic boundary conditions at the boundary between two dielectrics.
13. Derive the expression for magnetic flux density due to a current loop. What is magnetic dipole ?

*Or*

14. Derive the expression for energy stored and energy density in a magnetic field.

**Turn over**

15. Obtain Maxwell's equations in integral form and point form starting from fundamental laws.

*Or*

16. What is wave polarization ? Explain different types of wave polarization.

17. What is attenuation factor ? Discuss the attenuation of waves in wave guides.

*Or*

18. Discuss the differences in the propagation and general behaviour between TE and TM modes in rectangular wave guides.

19. Obtain the expression for $r$ circles and $x$ circles. List their properties.

*Or*

20. Derive the transmission line equations and obtain the solution what are primary and secondary constants of a line.

(5 × 12 = 60 marks)

G 2152 (Pages : 2) Reg. No.....

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# B.TECH. DEGREE EXAMINATION, APRIL 2010

## Fifth Semester

Branch—Electronics and Communication/Applied Electronics and Instrumentation

COMPUTER ORGANIZATION AND ARCHITECTURE (L A)

(Supplementary—Prior to 2007 Admissions)

Time : Three Hours Maximum : 100 Marks

*Answer* **all** *questions.*

## Part A

*Each question carries* 4 *marks.*

1. What is the need for machine language ?
2. What are the machine control instructions ?
3. What are Microinstructions ?
4. Give a situation where the address has to be modified in microprogram sequencing technique.
5. What are the advantages of having memory modules ?
6. What is LRV ? Explain.
7. What is a port ?
8. Describe a parallel interface standard.
9. What is an array processor ?
10. What are the advantages of pipe line processors ?

(10 × 4 = 40 marks)

## Part B

*Each question carries* 12 *marks.*

11. Describe the different addressing modes with suitable examples.

*Or*

12. Design a small arithmetic logic unit with minimum number of operations.
13. Describe the different steps involved in the design of a control unit.

*Or*

14. Differentiate hardwired and microprogrammed control units.

**Turn over**

15. With a detailed internal organisation explain the working of a bipolar and a MOS RAM memory.

*Or*

16. What is the need for a secondary memory ? Explain any *two* types in detail.

17. Explain DMA operation in detail.

*Or*

18. How is the priority of interrupt determined by the processor in the various interrupt handling techniques.

19. What are the methods of classifying parallel processors ?

*Or*

20. Briefly describe the different methods of interconnection of networks.

(5 × 12 = 60 marks)

G 2162 (Pages : 2) Reg. No.....

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# B.TECH. DEGREE EXAMINATION, APRIL 2010

## Fifth Semester

Branch : ECE/ELI/AE AND I Engineering

LINEAR INTEGRATED CIRCUITS (LAS)

(Supplementary—Prior to 2007 Admissions)

Time : Three Hours Maximum : 100 Marks

*Answer* **all** *questions.*

## Part A

*Each question carries* 4 *marks.*

1. What is a differential amplifier ? What are its acharacteristics ?
2. Explain the requirements of power supply used in op-amp.
3. Draw and explain the circuit of a voltage follower.
4. What are the applications of V to I converters ?
5. Draw and explain a zero-crossing detector. What are its applications ?
6. What are the advantages of op-amp multivibrator circuits ?
7. What are the advantages of Active filters ?
8. Describe a switched capacitor integrator.
9. What are the characteristics of IC voltage regualtors ?
10. Define capture range and lock range. Explain their significances.

(10 × 4 = 40 marks)

## Part B

*Each question carries* 12 *marks.*

11. (a) Explain the parameters of an op-amp.

*Or*

(b) What is current mirror ? What are the different methods of achieving current mirror ?

12. (a) Explain the different feedback configurations used in op-amp. Compare their characteristics.

*Or*

(b) Draw the circuit of a 3-op-amp differential amplifier. Explain its working and characteristics.

**Turn over**

13. (a) Explan with circuit diagram and characteristics curves the working of a schemitt trigger. What are its applications ?

*Or*

(b) Draw and explain the circuit of a saw-tooth generator using op-amp

14. (a) Draw and explain the circuit of a second order. Butterworth LPF. Derive its transfer function.

*Or*

(b) Draw and explain the functional block diagram of 555 trimer.

15. (a) Draw the functional block diagram of PLL. Explain the functions of each block.

*Or*

(b) Draw and exlain the block diagram of LM 380 power amplifier. What are the characteristics of this IC ?

(5 × 12 = 60 marks)

**G 2128** (Pages : 3) Reg. No.....

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# B.TECH. DEGREE EXAMINATION, APRIL 2010

## Fifth Semester

Branches : Civil/Mechanical/Electrical and Electronics/Electronics and Communication/Polymer/Applied Electronics and Instrumentation/ Electronics and Instrumentation/Automobile

ENGINEERING MATHEMATICS—IV (CMELPASU)

(Supplementary—Prior to 2007 Admissions)

Time : Three Hours Maximum : 100 Marks

*Answer* **one** *question from each module.*
*All questions carry equal marks.*

### Module I

I. (a) State and prove Cauchy's integral formula.

(b) Evaluate $\int_C \left[\frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)^2 (z+2)}\right] dz$ where C is the circle $|z| = 3$.

*Or*

II. (a) Find the Laurent's series expansion of $f(z) = \left(z^2 - 1\right) \Big/ \left(z^2 + 5z + 6\right)$ in the regions :

(i) $|z| < 2$ ;

(ii) $2 < |z| < 3$ ; and

(iii) $|z| > 3$.

(b) Evaluate $\int_0^\infty dx \Big/ \left(x^2 + a^2\right)\left(x^2 + b^2\right)$.

### Module II

III. (a) Using Newton's method find the root of $xe^x - \cos x = 0$ correct to four decimal places.

(b) Solve correct to four places of decimals by Jacobi's method :

$x + y + 54z = 110$, $27x + 6y - z = 85$, $6x + 15y + 2z = 72$.

*Or*

**Turn over**

IV. (a) Using Regula Falsi medo solve correct to four decimal places $\cos x - 3x + 1 = 0$.

(b) Using Gauss-Seidel method solve correct to four places of decimals :

$8x - y + z = 18$, $2x + 5y - 2z = 3$, $x + y - 3z = -6$.

**Module III**

V. (a) Using Taylor series method compute $y(0.1)$ and $y(0.2)$ correct to three decimal places where

$\frac{dy}{dx} = x + y^2$, $y(0) = 1$.

(b) Use Runge Kutta method to solve $10y^1 = x^2 + y^2$, $y(0) = 1$ for the interval $0 < x \leq 0.2$ with $h = 0.1$.

*Or*

VI. (a) Given $\frac{dy}{dx} = (y - x)/(y + x)$ with $y = 1$ for $x = 0$. Using Euler's method find $y$ approximately for $x = 0.1$ in five steps.

(b) Compute $y(1)$ and $y(1.25)$ correct to four places of decimals, using Milne's predictor corrector method where $dy/dx = x^2 - y^3$, $y(0) = 1$, $y(0.25) = 0.821$, $y(0.5) = 0.7412$ and $y(0.75) = 0.741$.

**Module IV**

VII. (a) Evaluate the following :—

(i) $z\{\sin(3x + 5)\}$.

(ii) $z\{e^t \sin 2t\}$.

(iii) $z\{2(3^n) - 3(-1)^n\}$.

(b) Find $z^{-1}\left\{\left(3z^2 - 18z + 26\right)/(z - 2)(z - 3)(z - 4)\right\}$.

*Or*

VIII. (a) Use convolution theorem to evaluate $z^{-1}\left\{\left(z/z^{-1}\right)^3\right\}$.

(b) Using Z transform solve :

$u_{n+2} + 4u_{n+1} + 3u_n = 3^n$ with $u_0 = 0$ and $u_1 = 1$.



**Module V**

IX. (a) Solve the following linear programming problem by Simplex method :—

Minimize $Z = x_1 - 3x_2 + 2x_3$

subject to $3x_1 - x_2 + 3x_3 \leq 7$

$-2x_1 + 4x_2 \leq 12$

$-4x_1 + 3x_2 + 8x_3 \leq 10$,

$x_1, x_2, x_3 \geq 0$.

(b) Use two phase method to solve :

Maximize $Z = 2x_1 + x_2 + 3x_3$ such that

$x_1 + x_2 + 2x_3 \leq 5$

$2x_1 + 3x_2 + 4x_3 = 12$

$x_1, x_2, x_3 \geq 0$.

*Or*

X. (a) Apply the principle of duality to solve :

Minimize $Z = 4x_1 + 2x_2$ such that :

$x_1 + 2x_2 \geq 2$

$3x_1 + x_2 \geq 3$

$4x_1 + 3x_2 \geq 6$

$x_1, x_2 \geq 0$.

(b) Solve the following transportation problem :—

| | $D_1$ | $D_2$ | $D_3$ | Supply |
|---|---|---|---|---|
| $O_1$ | 2 | 7 | 4 | 5 |
| $O_2$ | 3 | 3 | 1 | 8 |
| $O_3$ | 5 | 4 | 7 | 7 |
| $O_4$ | 1 | 6 | 2 | 14 |
| Demand | 7 | 9 | 18 | 34 |