F 9198 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Fifth Semester

Branch : Electronics and Communication Engineering/Applied Electronics and Instrumentation

POWER ELECTRONICS (L, A)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Draw a typical gate-drive circuit for an IGBT. What are the critical requirements of an IGBT gate drive circuit ?
2. Draw the static V-I characteristics of a thyristor and mark the salient features and operating regions.
3. Plot the variation of average output voltage against the firing angle α of a single-phase fully controlled converter feeding a pure resistive load.
4. What is the effect of a free-wheeling diode connected in parallel with the load, in the operation and performance of a single-phase fully controlled converter feeding R-L load ?
5. Draw the waveform of load voltage of a single-phase a.c. voltage controller operating with a firing angle $\alpha = 60°$. The load is to be assumed a purely resistive load and the source voltage is $v(t) = V_m \sin(\omega t)$.
6. Compare the features of integral-cycle control and phase-control as applied to a.c. voltage controllers.
7. A step-down chopper is operating with a duty ratio of 0.35. The source is 100V d.c., and the load is a highly inductive load. Draw the waveform of the input current and find its average value.
8. What are the features of a four-quadrant chopper ? List two applications of a four-quadrant chopper.
9. Write a short note on the voltage control in inverters.
10. Compare between current source and voltage source inverters.

(10 × 4 = 40 marks)

Part B

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

11. (a) Explain the turn-on process in a SCR with an equivalent circuit and related equations.

(8 marks)

Turn over

(b) Draw the static V-I characteristics of MOSFETs. Indicate the regions where it operates as a switch. (4 marks)

Or

12. What are the issues in operating SCRs in series and parallel ? How are these issues addressed both in steady-state and transient conditions ? (12 marks)

13. (a) List the features of SMPS control IC SG 3525. (4 marks)

(b) Derive the output voltage expression for a three-phase controlled rectifier feeding R-L load. (8 marks)

Or

14. (a) A single-phase fully controlled converter is fed from a 230 V, 50 Hz, a.c.source. If the line inductance is 200 μH, find the voltage drop due to commutation overlap at a load current magnitude of 5 A. Draw the variation of the output voltage with respect to load current. (8 marks)

(b) List the features of the IC TL 494. How is the oscillator frequency set in this IC ? (4 marks)

15. A 2 kW resistive heating element is fed from a 230 V, 50 Hz a.c. bus through an integral-cycle a.c. voltage controller. One switching period is equal to 15 periods of the a.c. bus voltage waveform. Calculate the number of ON periods that would be needed to set the heating power to 60 % of the rated power. (12 marks)

Or

16. Explain the operation of a three-phase configuration of a.c. voltage controller with circuit diagram and waveforms. (12 marks)

17. (a) A step-down chopper is operating with a constant ON time, variable switching frequency. If for a switching frequency of 1 kHz and an ON time of 0.4 ms., the output voltage is 100 V. What will be the output voltage when the switching frequency is 1.25 kHz ? (6 marks)

(b) Explain briefly the operation of a step-up chopper. (6 marks)

Or

18. Explain the operation of a current-commutated chopper with the aid of a neat circuit diagram and operating waveforms. (8 marks)

19. Explain the operation of a pulse width modulated single-phase inverter. Explain any *two* methods of pulse width modulation applied to single-phase inverter. (8 marks)

Or

20. (a) Explain the operation of a single-phase current source inverter in square wave mode. (6 marks)

(b) Write a short note on harmonic control in inveters. (6 marks)

[5 × 12 = 60 marks]

F 9207 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Fifth Semester

Branch : Electronics and Communication Engineering

APPLIED ELECTROMAGNETIC THEORY (L)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Four charges of one coloumb each is placed in the corners of a square of side 10 cm. Find the electric field at the center of square.
2. Distinguish between Stokes theorem and divergence theorem.
3. Use Gauss theorem to find the electric field between two concentric spheres.
4. Distinguish between Electric and Magnetic potentials.
5. State and explain Ampere's law.
6. What is Poynting vector Theorem ? Explain.
7. Find magnetic field inside and outside of a toroid.
8. Write Maxwell's equations in differential form. Identify equations applicable to time varying fields.
9. Explain whether TM_{01} mode can propagate through rectangular waveguides.
10. Write expression for input impedance of a transmission line. Explain.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Two point charges +Q and – Q are seperated by distance *d*. Find an expression for electric field at any point in space due to this dipole, assuming spherical co-ordinate system.

Or

12. Explain the significance of curl, divergence and gradient of a vector flow.
13. State Biot-Savart's law. Using it find the magnetic field intensity due to a current carrying loop.

Or

14. Derive expression for energy stored in a magnetic field.

Turn over

15. Derive Wave equation for a conducting medium.

Or

16. Write Maxwell's equations in differential form. Deduce the equations and explain the significance.

17. Derive expressions for electric and magnetic field components for TE modes in rectangular wave guides.

Or

18. Explain and prove why TEM waves cannot propagate through rectangular waveguides. Also explain why TM_{10} mode cannot propagate through them.

19. Derive the expression for input impedance of a Transmission line.

Or

20. Explain how a quarter wave line is used for impedance matching. What are disadvantages of such impedance matching ?

(5 × 12 = 60 marks)

F 9216 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Fifth Semester

Branch : Electronics and Communication/Applied Electronics and Instrumentation

COMPUTER ORGANIZATION AND ARCHITECTURE (LA)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Distinguish between Hardware and Software.
2. What is addressing mode ? Explain its types with examples.
3. What is hard wired control ?
4. What is control signal ? Explain.
5. Short note on 'Cache memory'.
6. What is meant by memory interleaving ?
7. What is DMA ? Explain.
8. Distinguish between software interrupts and vector interrupt.
9. What is meant by pipeline architecture ? Give its advantages.
10. What are vector processions ? Explain with example.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (i) Explain Booth's algorithm with example. (6 marks)

    (ii) Short note on 'Instruction Set'. (6 marks)

Or

12. Explain Division algorithm with examples (12 marks)
13. Explain the concept of hard wired control in detail. (12 marks)

Or

14. Explain the need of perfecting micro instruction. (12 marks)

Turn over

15. Explain the working of a static memory cell. (12 marks)

Or

16. Short notes on :

(a) Virtual memory. (6 marks)

(b) Disk drive. (6 marks)

17. Short notes on :

(a) Plotter. (4 marks)

(b) Pritter. (4 marks)

(c) Daisy Chain. (4 marks)

Or

18. What is I/O Interface ? Explain. (12 marks)

19. Short notes on :

(i) Multi-stage network. (6 marks)

(ii) Message passing Architecture. (6 marks)

Or

20. What is Cache Coherence ? Explain. (12 marks)

[5 × 12 = 60 marks]

F 9226 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Fifth Semester

Branch : ECE/ELI/Applied Electronics and Instrumentation Engineering

LINEAR INTEGRATED CIRCUITS (LAS)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Define CMRR. How it is expressed ?
2. What is the maximum frequency of a sinewave of 1 V amplitude that can be amplified using op-amp of gain 10 and slew rate 0.5 V/μS.
3. Compare input impedances of inverting and non-inverting op-amps.
4. Draw a op-amp circuit to find square root of a given input.
5. In a zero crossing comparator using op-amp inverting terminal is connected + 2V. A sinewave of amplitude 5V is given to other input, find duty ratio of output.
6. Draw a sample and hold circuit using op-amp.
7. Draw the circuit of a op-amp integrator. Write expression for output.
8. Distinguish between Capture range and Lock range in a PLL.
9. Explain how LPF and HPF can be used to realize a band reject filter.
10. Give applications of IC 566.

(10 × 4 = 40 marks)

Part B

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

11. Draw a block diagrams for different stages in a op-amp. Explain the working of each block in detail.

Or

12. Draw the transfer curve of op-amp. Deduce the expressions for curves.
13. Distinguish between types of feedbacks present in inverting and non-inverting op-amps.

Or

14. Draw the circuit of a voltage to current converter using op-amp. Explain its working.

Turn over

15. Draw the circuit of RC phase-shift oscillator using op-amp and explain.

Or

16. Explain the working of sample and hold circuit using op-amp and explain.

17. Draw the circuit of a monostable multivibrator using IC 555. Explain the working with the help of waveforms.

Or

18. Explain how a notch filter can be obtained using low-pass and high-pass filters.

19. Explain how FM is demodulated using PLL.

Or

20. Explain the working of a regulator IC 723. Discuss about fold back protection used in the IC.

(5 × 12 = 60 marks)

F 9233 **(Pages : 2)** **Reg. No.....**

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Fifth Semester

Branch : Electronics and Communication/Electrical and Instrumentation Engineering

MICROPROCESSORS AND MICROCONTROLLERS (LS)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. How demultiplexing of $AD_0 - AD_7$ bus is done in 8085 microprocessor system ?
2. Describe the function of Stack pointer and program counter in 8085.
3. What are the addressing modes available in 89C51. Give examples ?
4. List various types of registers used in 89C51.
5. Draw and explain the memory map of data RAM used in 89C51.
6. Describe the function of XCH instruction in 89C51.
7. What is the role of the SCON register in serial data transfer ?
8. In what way 89C51 ports are different from 8255 ports ? Explain.
9. What is meant by Auto Reload feature and where it is used ?
10. How will you decide the Baud rate for mode 1 in 89C51 serial port ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the Pin/Signal functions of 8085 microprocessor. (12 marks)

Or

12. (a) Explain the memory mapped I/O and I/O mapped I/O schemes in detail. (6 marks)

    (b) Draw the timing diagram for the instruction MVI A, 32_H. (6 marks)

13. What are the functional blocks available in 89C51? Explain with a block diagram. (12 marks)

Or

Turn over

14. Write short notes on :

    (a) Register bank used in 89C51 (6 marks)

    (b) SFR registers and their usage. (6 marks)

15. Explain all the program control instructions of 89C51 with suitable examples. (12 marks)

Or

16. List out the Bit manipulation instructions of 89C51 and explain with suitable examples. (12 marks)

17. Describe the interrupt structure of 89C51 in detail. (12 marks)

Or

18. Explain how 89C51 can be interfaced to external data ROM with suitable diagram. (12 marks)

19. Describe the operation of 89C51 timers in detail. (12 marks)

Or

20. Explain the serial logic of 89C51 with relevant figures in detail. (12 marks)

[5 × 12 = 60 marks]

F 9192 (Pages : 3) Reg. No.....ECE.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Fifth Semester

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

ENGINEERING MATHEMATICS—IV (CMELPASUF)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

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

Module I

1. (a) Evaluate $\int_C z^2 dz$, where C is the curve passing through the points $1+i$ and $2+4i$ and specified as (i) the arc $y = x^2$; (ii) the straight line joining the points $1+i$ and $2+4i$. (10 marks)

(b) Find the Laurent's expansion for $\frac{7z-2}{(z+1)z(z-2)}$ in the region given by (i) $0 < |z+1| < 1$; (ii) $1 < |z+1| < 3$; (iii) $|z+1| > 3$. (10 marks)

Or

2. (a) Use Cauchy's integral formula to find $\oint_C \frac{1}{1-z^2} dz$, where C is (i) $|z| = ½$; (ii) $|z| = 2$; (iii) $|z-1| = 1$. (10 marks)

(b) Evaluate $\int_0^{2\pi} \frac{d\theta}{(a+b\cos\theta)^2}$, $a > b > 0$ by contour integration. (10 marks)

Module II

3. (a) Using the method of bisection, find a root of the equation $x^3 - x^2 + x - 7 = 0$ correct to 3 decimal places. (10 marks)

Turn over

(b) Use Jacobi method to solve :

$$\begin{aligned} 2x - y + 11z &= 20 \\ x + 9y - z &= 10 \\ 10x - 2y + z &= 12 \end{aligned}$$

correct to 4 decimal places.

(10 marks)

Or

4. (a) Use Gauss Seidel to solve

$$\begin{aligned} 2x + 5y - 2z - 3 &= 0 \\ x + y - 3z + 6 &= 0 \\ 8x - y + z - 18 &= 0 \end{aligned}$$

correct to 4 decimal places.

(10 marks)

(b) Derive a Newton-Raphson iteration formula for finding the cube root of a +ve number C. Hence find (i) C = 12 ; (ii) C = 25.

(10 marks)

Module III

5. (a) Given : $y' = x^2 - y$, $y(0) = 1$, $y(.1) = .90516$, $y(.2) = .82127$, $y(.3) = .74918$. Obtain the value of y (.4) using Milne's method.

(10 marks)

(b) Use Taylor's series to find the values of y for $x = .1, .2, .3$, given $\frac{dy}{dx} = 1 - y$, $y(0) = 0$. Tabulate the numerical and exact solutions.

(10 marks)

Or

6. (a) Solve using Runge-Kutta method :

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

Find the value of y when $x = 1.1$.

(10 marks)

(b) Use Euler's method to obtain y (.2), y (.4) and y (.6) correct to 3 decimal places if y satisfies $y' = y - x^2$, $y(0) = 1$.

(10 marks)

Module IV

7. (a) Solve $y_{k+2} + 2y_{k+1} + y_k = k$ where $y_0 = y_1 = 0$. (10 marks)

(b) Find $Z^{-1}\left(\frac{z^2+1}{z^2-2z+2}\right)$. (10 marks)

Or

8. (a) Find (i) $z\,(-2)^n$; (ii) $z\,(na^n)$; (iii) $z\,(1/(n+2)\,(n+1))$. (10 marks)

(b) State and prove the convolution theorem of z-transform. (10 marks)

Module V

9. (a) Apply graphical method to solve :

Maximize $Z = x_1 - 2x_2$ subject to

$-x_1 + x_2 \le 1$, $6x_1 + 4x_2 \ge 24$, $0 \le x_1 \le 5$, $2 \le x_2 \le 4$ and $x_1, x_2 \ge 0$.

(10 marks)

(b) Solve the Transportation problem :

	A	B	C	D	E	Available
P	4	1	2	6	9	100
Q	6	4	3	5	7	120
R	5	2	6	4	8	120
Demand	40	50	70	90	90	

(10 marks)

Or

10. (a) Use duality to solve the L.P.P. :

Minimize $Z = 2x_1 + 2x_2$ subject to

$2x_1 + 4x_2 \ge 1$, $-x_1 - 2x_2 \le -1$, $2x_1 + x_2 \ge 1$ and $x_1, x_2 \ge 0$.

(10 marks)

(b) Use Simplex method to :

Minimize $Z = x_2 - 3x_3 + 2x_5$

subject to :

$$\begin{aligned} 3x_2 - x_3 + 2x_5 &\le 7 \\ -2x_2 + 4x_3 &\le 12 \\ -4x_2 + 3x_3 + 8x_5 &\le 10 \text{ and} \\ x_2, x_3, x_5 &\ge 0. \end{aligned}$$

(10 marks)

[5 × 20 = 100 marks]