G 7113　　　　　　(Pages : 3)　　　　Reg. No............ *E EE*

Name.................................

B.TECH. DEGREE EXAMINATION, APRIL 2011

Fifth Semester

Branch—Civil/Mechanical/Electrical/Electronics/Electronics and Communication/
Polymers/Applied Electronics and Instrumentation/Electronics and Instrumentation/
Automobile Engineering

ENGINEERING MATHEMATICS—IV (CMELPASU)

(Supplementary)

Time : Three Hours　　　　　　　　　　　　　　　　Maximum : 100 Marks

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

Module I

1. (a) Evaluate $\int_C \left\{ (z+1) \big/ \left(z^2 + 2z + 4\right) \right\} dz$ where C is the circle $|z + 1 + i| = 2$.

   (b) Expand $f(z) = 1 \big/ (z+1)(z+2)$ as a Taylor's series about the point $z = 2$.

   Or

2. (a) Find the Laurent's series for $f(z) = 1 \big/ (z-1)(z-2)$ in the regions :

   (i) $1 < |z| < 2$,

   (ii) $|z| > 2$ and

   (iii) $0 < |z - 1| < 1$.

   (b) Evaluate $\int_0^\pi \dfrac{\cos 2\theta}{5 + 4 \cos\theta} d\theta$.

Module II

3. (a) Find the root of $xe^x - 2 = 0$ correct to four places of decimals using Regula Falsi method.

   (b) Using Jacobi's method solve correct to four decimal places :

   $10x + y + z = 12,\ 2x + 10y + z = 13,\ 2x + 2y + 10z = 14$.

   Or

Turn over

4. (a) Find the value of $\sqrt{10}$ correct to four decimal places using Newton-Raphson method.

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

   $$2x - y + 11z = 20, 10x - 2y + z = 12, x + 9y - z = 10.$$

Module III

5. (a) Using Euler's modified method compute the value of y when $x = 0.1$ given that :

   $$y^1 = x^2 + y, y(0) = 1, h = 0.05.$$

   (b) Using Milnes predictor corrector method find $y(0.4)$ and $y(0.5)$ given $\dfrac{dy}{dx} = 1 + xy^2 + y(0) = 1$, $y(0.1) = 1.105$, $y(0.2) = 1.223$ and $y(0.3) = 1.355$.

   Or

6. (a) Compute $y(0.5)$ and $y(1)$ using Taylor series method where $\dfrac{dy}{dx} = x^2 + y^2$, $y(0) = 1$.

   (b) Given $\dfrac{dy}{dx} = x + 2y$ where $y = 1$ when $x = 0$ using Runge-Kutta method compute $y(0.2)$ and $y(0.4)$ correct to four decimal places.

Module IV

7. (a) Find the z transforms of the following :–

   (i) $\cosh n\theta$;

   (ii) $\cos\left\{\dfrac{n\pi}{2} + \dfrac{\pi}{4}\right\}$;

   (iii) $(n + 1)$.

   (b) Use convolution theorem to evaluate $z^{-1}\left\{z^2/(z-1)(z-3)\right\}$.

   Or

8. (a) Evaluate $z^{-1}\left\{(3z^2 + 2)/(5z - 1)(5z + 2)\right\}$.

   (b) Using Z transforms solve $y_{n+2} + 4y_{n+1} + 3y_n = 2^n$ with $y_0 = 0$ and $y_1 = 1$.

Module V

9. (a) Using Simplex method solve :

Maximize $Z = 6x_1 + 4x_2$

subject to

$$-2x_1 + x_2 \leq 2$$
$$x_1 - x_2 \leq 2$$
$$3x_1 + 2x_2 \leq 9$$
$$x_1, x_2 \geq 0$$

(b) Using Big M method solve :

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

$$3x_1 + x_2 \geq 27$$
$$x_1 + x_2 \geq 21$$
$$x_1 + 2x_2 \geq 30$$
$$x_1, x_2 \geq 0$$

Or

10. (a) Use two phase method to solve :

Maximize $Z = 3x_1 - x_2$ such that

$$2x_1 + x_2 \geq 2$$
$$x_1 + 3x_2 \leq 2$$
$$x_2 \leq 4$$
$$x_1, x_2 \geq 0$$

(b) Solve the following transportation problem :—

	D_1	D_2	D_3	D_4	D_5	Supply
O_1	3	4	6	8	9	20
O_2	2	10	1	5	8	30
O_3	7	11	20	40	3	15
O_4	2	1	9	14	16	13
Demand	40	6	8	18	6	78

(5 × 20 = 100 marks)

G 7118

Reg. No...

Name..

B.TECH. DEGREE EXAMINATION, APRIL 2011

Fifth Semester

Branch : Electrical and Electronics Engineering

DIGITAL CIRCUITS (E)

(Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 4 marks.

1. Explain ASCII and EBCDIC codes with their uses.

2. Realize the following function using NOR – NOR gate network :—

$$Y = \bar{A} B + B (C + D) + E (\bar{B} + \bar{D})$$

3. Explain fan-in and fan-out of TTL NAND gates.

4. Implement the function using a 4-to-1 MUX (multiplexer) $F (A, B, C) = \sum(1, 2, 5, 6)$.

5. Differentiate between Combinational Circuits and Sequential Circuits.

6. Draw the circuit of a clocked SR flip-flop and explain. What are the advantages of clocking ?

7. Explain the methods to improve counter speed.

8. What is meant by lockout in counters ? How can it be eleminated ?

9. Explain Universal Shift Register with diagram.

10. What is a shift register ? Why are they considered to be basic memory devices ? List different types of shift registers ?

(10 × 4 = 40 marks)

Part B

11. Simplify the function using Karnaugh Map and implement using NAND gates only :

$$F (A, B, C, D) = \sum_{m}(1, 3, 5, 7, 8, 9, 11, 15) + \sum_{d}(0, 4, 12)$$

(12 marks)

Or

12. Realize the half subtractor and full subtractor usign NOR gates only.

(12 marks)

Turn over

13. Draw the logic diagram of a BCD to 7 segment decoder and explain.

(12 marks)

Or

14. Draw the circuit of CMOS NAND and NOR gates and explain.

(12 marks)

15. Draw the circuit of a JK Master-Slave flip-flop and explain with waveforms. What is meant by racing ? How can it be eleminated in MSJK ?

(12 marks)

Or

16. (a) What are the disadvantages of a ripple counter ?

(4 marks)

(b) Draw the circuit of 4-bit UP-DOWN counter and explain.

(8 marks)

17. (a) Describe with circuits the IC7490-Decade counter.

(6 marks)

(b) Draw the circuit of a 4-bit synchronous down counter and explain.

(6 marks)

Or

18. Design a synchronous counter that has the following seuqnece : 1, 3, 5, 7, 1 . . . . Use T flip-flops.

(12 marks)

19. Design a 4-bit self starting ring counter and explain.

(12 marks)

Or

20. Describe with diagram and waveforms a 4-bit ring counter using D-flip-flops. What are its applications ?

(12 marks)

[5 × 12 = 60 marks]

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Name..........................

B.TECH. DEGREE EXAMINATION, APRIL 2011

Fifth Semester

Branch : Electrical and Electronics Engineering

INDUSTRIAL MANAGEMENT AND ECONOMICS (E)

(Supplementary)

Time : Three Hours   Maximum : 100 Marks

Answer all questions.

*Answer Part A and Part B in **separate** answer books.*

All questions carry equal marks.

Part A (Industrial Management)

1. (a) What is scientific management ? How is it relevant in the present day management of organisations ?

    (b) Explain the co-ordinating and controlling functions of management.

Or

2. (a) Discuss line and staff organisations. What are its advantages and disadvantages ?

    (b) Write short notes on : (a) Delegation ; (b) Span of control.

3. (a) What is the need for a good recruitment and selection process for any organisation ? How an organisation is benefitted due to this ?

    (b) Why there is a need for training ? List out few training methods.

Or

4. (a) What are the causes of industrial disputes ? How is it settled ?

    (b) List out the difference between Joint stock and Public sector companies.

5. (a) How do advertising help in promotion of a product ?

    (b) Write short notes on Market Research.

Or

6. (a) Explain the factors influencing selection of channels of distribution for a product.

    (b) Explain with an example how critical path method can be employed in project planning.

Turn over

Part B (Engineering Economics)

7. (a) Explain the term elasticity of demand. What are the factors affecting elasticity of demand?

    (b) How pricing of a commodity is determined based on the given market conditions?

Or

8. (a) Briefly explain the various factors of production.

    (b) What is national income accounting? Explain its concepts.

9. (a) Define Inflation and explain its characteristic features.

    (b) What are the causes and consequences of black money?

Or

10. (a) What is banking? Briefly explain the various functions of banks.

    (b) Write short notes on : (i) SIDBI ; (ii) IRBI.

11. (a) Write the policies and functions of any *two* Insurance Companies.

    (b) What is speculation? What are its advantages and disadvantages?

Or

12. (a) What are the contributions of public sector companies to Indian economy.

    (b) Distinguish between stock market and capital market.

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Name...................................

B.TECH. DEGREE EXAMINATION APRIL 2011

Fifth Semester

Branch : Electrical and Electronics Engineering

LINEAR INTEGRATED CIRCUITS (E)

(Supplementary)

Time : Three Hours   Maximum : 100 Marks

Part A

Answer all *questions.*

Each question carries 4 marks.

1. What is a differential amplifier ? What are its characteristics ?

2. Draw and explain an Op-Amp Voltage-follower circuit ? What are its applications ?

3. Draw and explain the circuit of a basic comparator. What are its characteristics ?

4. Draw and explain a Sample and hold Circuit using Op-Amp.

5. What are the advantages of active filters ?

6. Compare the characteristics of two types of DACs.

7. Explain the need of a LPF in a PLL.

8. Draw and explain a frequency multiplier using PLL.

9. Explain the astable operation of 555 timer.

10. Draw and explain a series Op-Amp regulator circuit.

$(10 \times 4 = 40 \text{ marks})$

Part B

Each question carries 12 marks.

11. (a) Draw a circuit using Op-Amp to produce the output $V_0 = (V_1 + V_2 + V_3 + V_4) - (V_5 + V_6 + V_7)$

where $V_1, V_2 .....V_7$ are positive Voltages.

Or

(b) Explain the parameters of an Op-amp.

Turn over

12. (a) Draw the circuit of an astable multivibrator using Op-Amp. Explain its working. Derive an expression for its frequency.

Or

(b) Draw and explain the circuit of a function generator using Op-Amp.

13. (a) Draw the circuit of a first order butterworth BPF. Explain its principle of operation.

Or

(b) Draw and explain the circuit of a ladder type DAC.

14. (a) Draw the block diagram of PLL. Explain its principle of operation.

Or

(b) Discuss the applications of PLL in Communication Systems.

15. (a) Draw and explain the circuit of a transistorized series voltage regulator. How does it differ from an Op-Amp regulator ?

Or

(b) Draw and explain the functional block diagram of a general purpose Switching regulator. What are its characteristics ?

(5 × 12 = 60 marks)

G 7153 (Pages : 2) Reg. No.................................

Name...................................

B.TECH. DEGREE EXAMINATION, APRIL 2011

Fifth Semester

Branch : Electrical and Electronics Engineering

POWER ELECTRONICS (E)

(Supplementary)

Time : Three Hours

Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 marks.

1. What are the power diodes ? Explain with examples.

2. Explain the two transistor analogy of SCR with a neat diagram.

3. Explain the heat sink requirements for SCR.

4. What is pulse transformer ? Explain its need.

5. State and explain free wheeling effect in detail.

6. Define and explain active and reactive power.

7. What is meant by commutation of SCRs ? Explain.

8. Explain the basic principles of PWM with neat sketches.

9. Explain the basic principles of a chopper with a neat sketch.

10. Explain in detail about Digital firing scheme.

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. (a) Give an account on : (i) Power diodes and (ii) power transisters. (6 marks)

   (b) Differentiate DIAC from TRIAC. (6 marks)

Or

12. Describe in detail the static and dynamic characteristics of SCR with neat sketches.

(12 marks)

13. Explain Device protection and heat sink selection for SCR with neat sketches. (12 marks)

Or

Turn over

14. Explain in detail the following :—

    (a)   RC, UJT triggering circuits.   **(6 marks)**

    (b)   Diac triggering circuit.   **(6 marks)**

15. Draw a fully controlled bridge rectifier and explain its principle in detail. Derive an expression for V_0.

Or

16. Draw a neat diagram for 3φ full wave controlled rectifier and explain its principle of operation.

17. Draw a neat schematic diagram of 3φ bridge Inverter and explain its principle in detail.

Or

18. Give an account on :

    (a)   MC Murray Inverter.   **(6 marks)**

    (b)   Commutation of SCRs.   **(6 marks)**

19. Explain in detail the basic principle of cyclo converter with a neat sketch.

Or

20. Write short notes on :

    (a)   Type DLF chopper.   **(4 marks)**

    (b)   Firing circuits.   **(4 marks)**

    (c)   Linear and cosine comparison.   **(4 marks)**

                                                       [5 × 12 = 60 marks]

G 7127   (Pages : 2)   Reg. No...............................

Name..............................

B.TECH. DEGREE EXAMINATION, APRIL 2011

Fifth Semester

Branch : Electrical and Electronics Engineering

COMMUNICATION ENGINEERING (E)

(Supplementary)

Time : Three Hours   Maximum : 100 Marks

Answer all questions.

Part A

Each question carries 4 marks.

1. Compare the characteristics of AM and FM.

2. Define modulation index in the cases of AM and FM.

3. Differentiate between high level and low level transmission systems.

4. What are the limitations of TRF receivers ?

5. What is equalizing pulse ? How is it generated ? Explain its functions.

6. What is meant by compatibility ?

7. What are the factors affecting the band width of a radar receiver ?

8. What does an MTI radar actually do ?

9. Differentiate between passive and active satellites.

10. Define spot beaming and explain how it is achieved.

$(10 \times 4 = 40 \text{ marks})$

Part B

Each question carries 12 marks.

11. (a) Derive an expression for an amplitude modulated signal. Discuss on the spectrum of the modulated signal and power on each frequency component.

Or

    (b) Write a brief account on the spectrum of FM Signal.

12. (a) Explain with diagrams the working of an FM transmitter.

Or

    (b) Discuss the factors to be considered for selecting an IF for Communication receivers.

Turn over

13. (a) Draw and label a Composite Video Signal. Explain each significant components.

Or

(b) Explain with diagrams the basics of colour transmission and reception.

14. (a) Explain with diagrams the principle of operation of MTI radar.

Or

(b) Write a note on Radio navigational aids.

15. (a) Explain with diagrams the principle of Satellite Communication System.

Or

(b) Explain the basic principles of FDMA and TDMA.

(5 × 12 = 60 marks)