

Code No: 134CF

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

SWITCHING THEORY AND LOGIC DESIGN

(Common to EEE, ECE, MCT, ETM)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 marks)

- 1.a) Perform the following conversions $(476.64)_{10} = ()_2 = ()_8$. [2]
- b) Perform the following operation using 2's complement method $1111.10 - 0101.11$. [3]
- c) Define Multiplexer. Explain in brief about 2:1 Mux. [2]
- d) Explain the procedure to construct the 3-variable K-map with an example. [3]
- e) Derive the characteristic equations of D and T flipflop. [2]
- f) Give the differences between latches and flipflops. [3]
- g) Define state diagram. [2]
- h) List the features of sequential circuits. [3]
- i) What are finite state machines? [2]
- j) List the limitations of finite state machines. [3]

PART - B

(50 Marks)

2. Design and realize the 3 bit binary to unit distance code using NOR gates. [10]
- OR**
3. Simplify and realize the following Boolean expression using logic gates.
a) $Y = AB + A'C + BC$
b) $Y = (A + B' + C')(A + B' + C)$ [5+5]
4. Design a digital system to compare two binary numbers of 1 bit by using logic gates. [10]
- OR**
5. Realize 3:8 maxterm generator using 2:4 maxterm generators. Using the same, Design a system to provide the difference of two numbers. Use external two input gates only. [10]
6. Explain master slave JK flipflop with neat timing diagram. [10]
- OR**
7. Explain the principle of Universal shift Register(USR). Using the same, design 4-bit, mod-8 twisted ring counter. [10]

8. Design a digital system using data flipflops to monitor the status of the bookrack of maximum occupancy 10. The number of books available in the bookrack on a daily basis for the following conditions over a week.

- a) On Monday, there were 10 books.
b) On Tuesday, 2 books were removed and donated to near by library.
c) On Wednesday, one book is added to the bookrack.
d) Next day, 3 books were removed from the rack and given it to neighbour.
e) On Friday, one book was taken out for reading.
f) On Saturday, neighbour returned only two books.

All the remaining books were taken out on Sunday to clean the rack.

[10]

OR

- 9.a) Discuss about the approaches of designing synchronous sequential finite state machines.
b) Design a digital controller for the state table shown below using sequential component as single input data flip flop.

[5+5]

Present state	Next state, Output(z)	
	Input(x)=0	Input(x)=1
A	C,0	B,1
B	D,0	D,0
C	C,1	A,0
D	A,1	A,0

10. Draw the state diagram of a Mealy machine that produces a 1 output if there have been four or more consecutive 1 inputs or two or more consecutive 0 inputs.

[10]

OR

- 11.a) With a neat block diagram, explain the moore model of a clocked synchronous sequential circuit.
b) Illustrate partition techniques in sequential circuits.

[5+5]

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Code No: 124DN

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

PULSE AND DIGITAL CIRCUITS

(Common to ECE, ETM)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) What is a ringing circuit? What are its applications? [2]
- b) How high pass RC network works as differentiator. [3]
- c) Draw the circuit diagram of positive clipper. [2]
- d) State clamping circuit theorem. [3]
- e) What is the significance of transistor breakdown voltages in transistor switch? [2]
- f) How a silicon controlled Rectifier works as switch? [3]
- g) What are the values of gain for ideal miller and Boot strap circuits. [2]
- h) Mention the methods to improve linearity in time base generators. [3]
- i) What are the sweep circuits and what are their applications? [2]
- j) What are universal gates? Realize XOR gate using universal gates. [3]

PART-B

(50 Marks)

- 2.a) Explain how a low pass RC circuit act as an integrator with suitable diagrams and show their response for a square wave.
- b) A symmetrical square wave of $\pm 5V$ at a frequency of 5 kHz is applied to a high- pass RC circuit with a cut off frequency of 20KHz. Calculate the steady state output voltage and draw the steady state Input/output voltage wave forms. [5+5]

OR

- 3.a) Discuss the response of a high pass RC circuit to step, ramp, exponential and sinusoidal input signals with necessary expressions and wave forms.
- b) Explain the working of an attenuator with circuit diagram and describe how it is used in a CRO probe. [5+5]

4. Write about clipping and clamping of wave forms. Classify different types of clipper circuits give their circuits and explain their operation with help of transfer characteristics. [10]

OR

- 5.a) Explain the working of transistor based voltage comparators with neat circuit diagram and describe the functions of voltage comparators.
- b) Design a diode clamper to restore a d. c voltage level of +3 V to an input signal of peak to peak value of 10V. Assume drop across the diode as 0.6V. [5+5]

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6.a) Discuss the practical considerations in design of a transistor switch with help of neat diagram and explain the saturation parameters of a transistor.

b) What is meant by piece wise-linear approximation? Draw the V-I characteristics of a junction diode on the basis of the above approximation. [5+5]

OR

7.a) Explain the basic operating principles of sampling gates and draw the circuit diagrams of unidirectional and bi directional sampling gates.

b) Discuss the effect of temperature variations on saturation parameters and switching times of transistor switch. [5+5]

8.a) Explain the operation of a mono-stable multivibrator with triggering and wave forms and also derive an expression for its pulse width.

b) Design a Schmitt trigger circuit using n-p-n silicon transistor with following specifications $V_{cc}=12V$, $UTP=4V$, $LTP=2V$, $h_{fe}=60$, $I_{ce}=3mA$, using relevant assumptions and empirical relationships. [5+5]

OR

9.a) Briefly list out various methods of generating time base wave forms and explain in detail about transistor Miller time base generator with help of neat diagram.

b) Explain the terms sweep error, transmission error and displacement error in general time base generator and obtain expressions for them. [5+5]

10.a) Explain the working of monostable relaxation circuit as a frequency divider with neat circuit diagram and necessary wave forms.

b) Explain the principle of operation of synchronization of sweep circuits with symmetrical signal with suitable wave forms. [5+5]

OR

11.a) Explain the working of basic 3 input (diode transistor logic) DTL NAND gate with help of neat diagram.

b) Design a relaxation oscillator using 2N3980 UJT with 20V supply for an output frequency of 5KHz and calculate its output amplitude. [5+5]

---ooOoo---

Code No: 124DD

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

MATHEMATICS - II
(Common to ME, MCT, MIE, MSNT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

- 1.a) State Stokes theorem. [2]
- b) Find the work done by a force $y\bar{i} + x\bar{j}$ which displaces a particle from origin to a point $(0, -1)$. [3]
- c) Write down the half range sine series for the function $(x) = e^{-x}$ in $(0, \pi)$. [2]
- d) Find the finite Fourier cosine transform of $f(x) = 2x$, $0 < x < 4$. [3]
- e) Evaluate $\Delta(e^{ax} \log bx)$. [2]
- f) Find $\Delta^2 y(4)$ given that $y(2) = 5$, $y(3) = 8$ and $y(4) = 12$. [3]
- g) State the theorem for the convergence of a root by the iteration method. [2]
- h) Establish the iteration formula to find the square root of a number by Newton Raphson method. [3]
- i) Write the Simpson's $\frac{1}{3}$ rd rule formula to evaluate $\int_a^b y dx$. [2]
- j) Write finite difference formula for y'' . [3]

PART-B

(50 Marks)

- 2.a) If $\bar{f} = (x^2 + y^2 + z^2)^{-n}$, find $\text{div grad } \bar{f}$ and determine n if $\text{div grad } \bar{f} = 0$.
 - b) Verify Green's theorem for $\int_C (xy + y^2) dx + x^2 dy$ where C is the curve made up of the line $y = x$ and the parabola $y = x^2$. [5+5]
- OR**
- 3.a) Show that $\bar{f} = (6xy + z^3)\bar{i} + (3x^2 - z)\bar{j} + (3xz^2 - y)\bar{k}$ is irrotational. Find ϕ such that $\bar{f} = \nabla\phi$.
 - b) By using divergence theorem, evaluate $\int_S \bar{f} \cdot \bar{n} dS$, where $\bar{f} = 4x\bar{i} - 2y^2\bar{j} + z^2\bar{k}$ and S is the surface enclosing the region for which $x^2 + y^2 \leq 4$, $0 \leq z \leq 3$. [5+5]
- 4.a) Find the Fourier series for the function $f(x) = e^x$, from $x = 0$ to $x = 2\pi$.
 - b) Find the Fourier transform of $f(x) = \begin{cases} 0, & |x| < a \\ 1, & |x| \geq a. \end{cases}$ [5+5]

OR

- 5.a) Obtain the Fourier series for the function $f(x) = x - x^2$ in the interval $[-\pi, \pi]$.
Hence show that $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n^2} = \frac{\pi^2}{12}$.

- b) Find the Fourier cosine transform of e^{ax} . [5+5]

- 6.a) i) Prove $\Delta \nabla = \Delta - \nabla$ ii) Show that $\mu\delta = \frac{1}{2}(\Delta + \nabla)$.

- b) Find the Lagrange's interpolation polynomial for the following data and find the value of $y(t)$ when $t = 2$. [5+5]

t	1.3	1.7	1.9	2.7
$y(t)$	1.44	1.65	2.56	3.76

OR

- 7.a) Find $y(25)$, given that $y_{20} = 24, y_{24} = 32, y_{28} = 35, y_{32} = 40$, using Gauss forward difference formula.
b) Fit a second degree curve to the following data by the method of least squares: [5+5]

x	1	2	4	6	8	9
y	2.11	2.78	3.12	4.00	4.83	5.01

- 8.a) Use bisection method to find a real root of the equation

$$f(x) = x^3 - 2 \log_{10} x - 3 = 0.$$

- b) Using Crout's method, solve the system of equations: [5+5]
 $4x_1 + x_2 + x_3 = 4; x_1 + 4x_2 - 2x_3 = 4; 3x_1 + 2x_2 - 3x_3 = 6.$

OR

- 9.a) Use Newton-Raphson method to find a real root of the equation
 $f(x) = x^2 - 2 \cos x - 1 = 0.$

- b) Solve the system of equations using Jacobi's method:

$$4x_1 + x_2 + x_3 = 2; x_1 + 5x_2 + 2x_3 = -6; x_1 + 2x_2 + 3x_3 = -4,$$

with the initial approximation $x^0 = [0.5, -0.5, -0.5]^T$. [5+5]

10. Find the largest eigen value and the corresponding eigen vector of the matrix

$$A = \begin{bmatrix} -15 & 4 & 3 \\ 10 & -12 & 6 \\ 20 & -4 & 2 \end{bmatrix} \text{ using the power method.}$$

[10]

OR

11. Solve the differential equation $\frac{dy}{dx} = 1 + xy^2$, subject to $y(0) = 1$ by Taylor series method and hence find $y(0.2)$ and $y(0.4)$. [10]

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Code No: 124AC

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

NETWORK THEORY

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Define a three phase electric system and give the common configurations of it. [2]
- b) Draw the circuit diagram for measuring reactive power by using a single wattmeter. [3]
- c) Define transient response or natural response. [2]
- d) How do you relate and understand the response as over damped, under damped and critically damped? [3]
- e) Explain the physical interpretation of complex frequency. [2]
- f) How do you define Driving point impedance and admittance? [3]
- g) State the application of h-parameters in electronic circuits. [2]
- h) Derive z-parameters in terms of ABCD parameters. [3]
- i) Draw the frequency response characteristic of constant K low pass filter. [2]
- j) State the design parameters of Band pass filter. [3]

PART-B

(50 Marks)

- 2.a) Derive the relationship between line and phase voltages and currents in a Delta connection.
 - b) A 20 HP induction motor is supplied from a 400 V, 3 phase, 50 Hz power system. The efficiency being 90%, the power factor of operation is 0.8. Obtain i) the active power consumed ii) the apparent power iii) the reactive power and iv) the line current. [5+5]
- OR
3. A delta connected load has following impedances $Z_{RY} = j10\Omega$, $Z_{YB} = 10\Omega$, $Z_{BR} = -j10\Omega$. If the load be connected across a three phase 415V supply (balanced), obtain the line currents. Draw the vector diagram. [10]
 - 4.a) Derive the transient response for a series RC circuit with Sinusoidal excitation.
 - b) Find the current in a series R-L circuit having $R = 2\Omega$ and $L = 10\text{ H}$ while a dc voltage of 100 V is applied. What is the value of this current after 5 seconds of Switching On? [5+5]
- OR
5. Derive the expression for circuit current of a series RLC circuit excited by DC as input. [10]

- 6.a) Derive the conditions for symmetry and reciprocity in terms of Y-Parameters.
 b) Find the y-parameters of the network shown in figure 1.

[5+5]

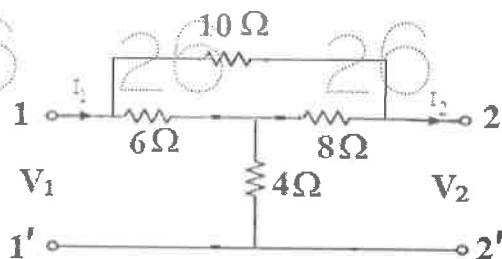


Figure: 1
OR

- 7.a) Derive the condition for Reciprocity and symmetry in a two port ABCD parameter representation.
 b) Find the z-parameters of the network shown in figure 2.

[4+6]

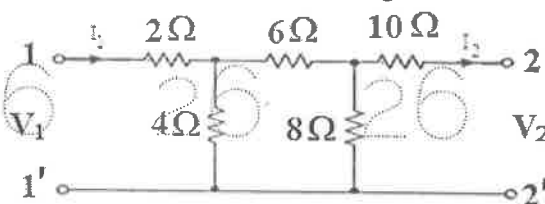


Figure: 2

- 8.a) Explain the conditions to be fulfilled for interconnection of two port networks.
 b) Find voltage and current transformation ratio shown in the figure 3.

[4+6]

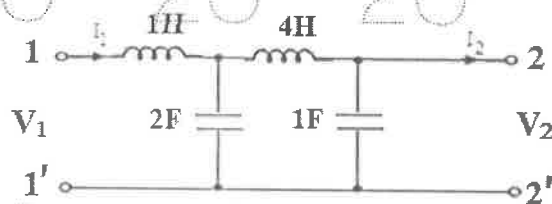


Figure: 3
OR

- 9.a) Explain the concept of poles and zeros in a network function. Locate the poles and zeros of a transfer function $G(s) = \frac{(s+2)}{s^2(s+3)(s+4)}$.

- b) State and explain the properties of transfer functions.

[5+5]

10.a) Compare between Laplace and Fourier transform.

b) Find the exponential Fourier series for the following wave form shown in figure 4. [5+5]

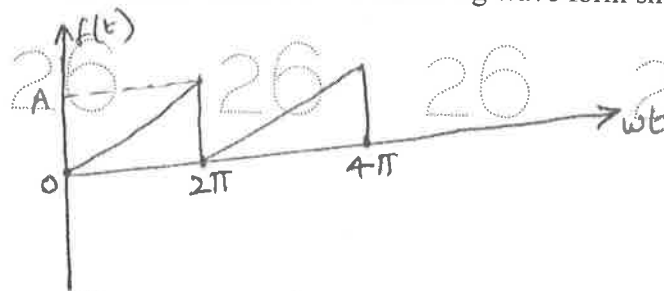


Figure: 4

OR

11.a) Obtain the Fourier series for the waveform shown in figure 5.

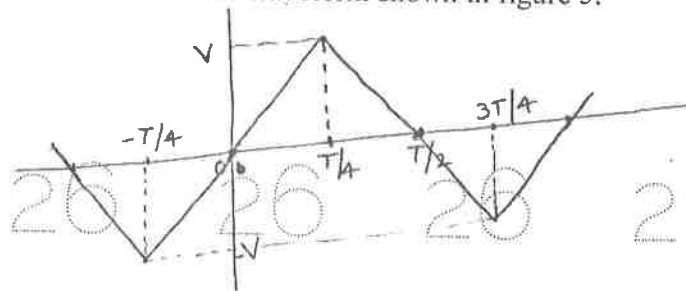


Figure: 5

b) Draw the T and π -network representation of Band elimination filter.

[6+4]

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Code No: 124CQ

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

DATABASE MANAGEMENT SYSTEMS

(Common to CSE, IT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

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PART - A

(25 Marks)

- 1.a) What is meant by data abstraction?
- b) Define the terms entity and attributes.
- c) Explain the selection and projection operations.
- d) Write brief notes on NULL values.
- e) Explain first normal form?
- f) Write short notes on inclusion dependencies.
- g) What is meant by atomicity?
- h) What is meant by recoverability?
- i) What are the clustered indexes?
- j) What is meant by linear hashing?

[2]
[3]
[2]
[3]
[2]
[3]
[2]
[3]
[2]
[3]

PART - B

(50 Marks)

2. Discuss about querying relational data.
- OR
3. Describe the history of database systems.
4. Explain the AND, OR and NOT logical connectives with examples.
- OR
5. Discuss about complex integrity constraints in SQL.
6. Explain about dependency preserving decomposition.
- OR
7. Explain third normal form and fifth normal form.
8. Discuss about time stamp based protocols.
- OR
9. Discuss about remote backup systems.
10. Explain about Dynamic index structure.
- OR
11. Discuss about static hashing and extendable hashing.

[10]
[10]
[10]
[10]
[10]
[10]
[10]
[10]
[10]
[10]
[10]

Code No: 114DN

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

PULSE AND DIGITAL CIRCUITS
(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

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PART- A

(25 Marks)

- 1.a) What is a ringing circuit? What are its applications? [2]
- b) How high pass RC network works as differentiator. [3]
- c) Draw the circuit diagram of positive clipper. [2]
- d) State clamping circuit theorem. [3]
- e) What is the significance of transistor breakdown voltages in transistor switch? [2]
- f) How a silicon controlled Rectifier works as switch? [3]
- g) What are the values of gain for ideal miller and Boot strap circuits. [2]
- h) Mention the methods to improve linearity in time base generators. [3]
- i) What are the sweep circuits and what are their applications? [2]
- j) What are universal gates? Realize XOR gate using universal gates. [3]

PART-B

(50 Marks)

- 2.a) Explain how a low pass RC circuit act as an integrator with suitable diagrams and show their response for a square wave.
- b) A symmetrical square wave of $\pm 5V$ at a frequency of 5 kHz is applied to a high- pass RC circuit with a cut off frequency of 20KHz. Calculate the steady state output voltage and draw the steady state Input/output voltage wave forms. [5+5]

OR

- 3.a) Discuss the response of a high pass RC circuit to step, ramp, exponential and sinusoidal input signals with necessary expressions and wave forms.
- b) Explain the working of an attenuator with circuit diagram and describe how it is used in a CRO probe. [5+5]

4. Write about clipping and clamping of wave forms. Classify different types of clipper circuits give their circuits and explain their operation with help of transfer characteristics. [10]

OR

- 5.a) Explain the working of transistor based voltage comparators with neat circuit diagram and describe the functions of voltage comparators.
- b) Design a diode clamper to restore a d. c voltage level of +3 V to an input signal of peak to peak value of 10V. Assume drop across the diode as 0.6V. [5+5]

6.a) Discuss the practical considerations in design of a transistor switch with help of neat diagram and explain the saturation parameters of a transistor.

b) What is meant by piece wise-linear approximation? Draw the V-I characteristics of a junction diode on the basis of the above approximation. [5+5]

OR

7.a) Explain the basic operating principles of sampling gates and draw the circuit diagrams of unidirectional and bi directional sampling gates.

b) Discuss the effect of temperature variations on saturation parameters and switching times of transistor switch. [5+5]

8.a) Explain the operation of a mono-stable multivibrator with triggering and wave forms and also derive an expression for its pulse width.

b) Design a Schmitt trigger circuit using n-p-n silicon transistor with following specifications $V_{cc}=12V$, $U_{TP}=4V$, $L_{TP}=2V$, $h_{fe}=60$, $I_{ce}=3mA$, using relevant assumptions and empirical relationships. [5+5]

OR

9.a) Briefly list out various methods of generating time base wave forms and explain in detail about transistor Miller time base generator with help of neat diagram.

b) Explain the terms sweep error, transmission error and displacement error in general time base generator and obtain expressions for them. [5+5]

10.a) Explain the working of monostable relaxation circuit as a frequency divider with neat circuit diagram and necessary wave forms.

b) Explain the principle of operation of synchronization of sweep circuits with symmetrical signal with suitable wave forms. [5+5]

OR

11.a) Explain the working of basic 3 input (diode transistor logic) DTL NAND gate with help of neat diagram.

b) Design a relaxation oscillator using 2N3980 UJT with 20V supply for an output frequency of $5KHz$ and calculate its output amplitude. [5+5]

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R13

Code No: 114CQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

DATABASE MANAGEMENT SYSTEMS

(Common to CSE, IT)

Time: 3 Hours

Max. Marks: 75

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PART - A

(25 Marks)

- 1.a) What is meant by data abstraction? [2]
- b) Define the terms entity and attributes. [3]
- c) Explain the selection and projection operations. [2]
- d) Write brief notes on NULL values. [3]
- e) Explain first normal form? [2]
- f) Write short notes on inclusion dependencies. [3]
- g) What is meant by atomicity? [2]
- h) What is meant by recoverability? [3]
- i) What are the clustered indexes? [2]
- j) What is meant by linear hashing? [3]

PART - B

(50 Marks)

2. Discuss about querying relational data. [10]
- OR**
3. Describe the history of database systems. [10]
4. Explain the AND, OR and NOT logical connectives with examples. [10]
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5. Discuss about complex integrity constraints in SQL. [10]
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7. Explain third normal form and fifth normal form. [10]
8. Discuss about time stamp based protocols. [10]
- OR**
9. Discuss about remote backup systems. [10]
10. Explain about Dynamic index structure. [10]
- OR**
11. Discuss about static hashing and extendable hashing. [10]

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Code No: 114DD

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

MATHEMATICS – II
(Common to ME, MCT, MIE)

Time: 3 Hours

Max. Marks: 75

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PART-A

(25 Marks)

- 1.a) State Stokes theorem. [2]
- b) Find the work done by a force $y\bar{i} + x\bar{j}$ which displaces a particle from origin to a point $(0, -1)$. [3]
- c) Write down the half range sine series for the function $f(x) = e^{-x}$ in $(0, \pi)$. [2]
- d) Find the finite Fourier cosine transform of $f(x) = 2x$; $0 < x < 4$. [3]
- e) Evaluate $\Delta(e^{ax} \log bx)$. [2]
- f) Find $\Delta^2 y(4)$ given that $y(2) = 5$, $y(3) = 8$ and $y(4) = 12$. [3]
- g) State the theorem for the convergence of a root by the iteration method. [2]
- h) Establish the iteration formula to find the square root of a number by Newton Raphson method. [3]
- i) Write the Simpson's $\frac{1}{3}$ rd rule formula to evaluate $\int_a^b y dx$. [2]
- j) Write finite difference formula for y'' . [3]

PART-B

(50 Marks)

- 2.a) If $f = (x^2 + y^2 + z^2)^{-n}$, find $\text{div grad } f$ and determine n if $\text{div grad } f = 0$.
 - b) Verify Green's theorem for $\int_C (xy + y^2) dx + x^2 dy$ where C is the curve made up of the line $y = x$ and the parabola $y = x^2$. [5+5]
- OR**
- 3.a) Show that $\vec{f} = (6xy + z^3)\bar{i} + (3x^2 - z)\bar{j} + (3xz^2 - y)\bar{k}$ is irrotational. Find ϕ such that $\vec{f} = \nabla\phi$.
 - b) By using divergence theorem, evaluate $\int_S \vec{f} \cdot \vec{n} dS$, where $\vec{f} = 4x\bar{i} - 2y^2\bar{j} + z^2\bar{k}$ and S is the surface enclosing the region for which $x^2 + y^2 \leq 4$, $0 \leq z \leq 3$. [5+5]
- 4.a) Find the Fourier series for the function $f(x) = e^x$, from $x = 0$ to $x = 2\pi$.
 - b) Find the Fourier transform of $f(x) = \begin{cases} 0, & |x| < a \\ 1, & |x| \geq a. \end{cases}$ [5+5]

OR

- 5.a) Obtain the Fourier series for the function $f(x) = x - x^2$ in the interval $[-\pi, \pi]$.

Hence show that $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n^2} = \frac{\pi^2}{12}$.

- b) Find the Fourier cosine transform of e^{ax} . [5+5]

- 6.a) i) Prove $\Delta \nabla = \Delta - \nabla$ ii) Show that $\mu \delta = \frac{1}{2}(\Delta + \nabla)$.

- b) Find the Lagrange's interpolation polynomial for the following data and find the value of $y(t)$ when $t = 2$. [5+5]

t	1.3	1.7	1.9	2.7
$y(t)$	1.44	1.65	2.56	3.76

OR

- 7.a) Find $y(25)$, given that $y_{20} = 24, y_{24} = 32, y_{28} = 35, y_{32} = 40$, using Gauss forward difference formula.

- b) Fit a second degree curve to the following data by the method of least squares: [5+5]

x	1	2	4	6	8	9
y	2.11	2.78	3.12	4.00	4.83	5.01

- 8.a) Use bisection method to find a real root of the equation

$$f(x) = x^3 - 2 \log_{10} x - 3 = 0.$$

- b) Using Crout's method, solve the system of equations: [5+5]

$$4x_1 + x_2 + x_3 = 4; \quad x_1 + 4x_2 - 2x_3 = 4; \quad 3x_1 + 2x_2 - 3x_3 = 6.$$

OR

- 9.a) Use Newton-Raphson method to find a real root of the equation

$$f(x) = x^2 - 2 \cos x - 1 = 0.$$

- b) Solve the system of equations using Jacobi's method:

$$4x_1 + x_2 + x_3 = 2; \quad x_1 + 5x_2 + 2x_3 = -6; \quad x_1 + 2x_2 + 3x_3 = -4,$$

with the initial approximation $x^0 = [0.5, -0.5, -0.5]^T$. [5+5]

10. Find the largest eigen value and the corresponding eigen vector of the matrix

$$A = \begin{bmatrix} -15 & 4 & 3 \\ 10 & -12 & 6 \\ 20 & -4 & 2 \end{bmatrix} \text{ using the power method.}$$

[10]

OR

11. Solve the differential equation $\frac{dy}{dx} = 1 + xy^2$, subject to $y(0) = 1$ by Taylor series method and hence find $y(0.2)$ and $y(0.4)$. [10]

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Code No: 54009

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

ELECTRONIC CIRCUITS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Draw a circuit diagram for a CB transistor amplifier and derive expressions for voltage and current gain and input and output impedance.
- b) Classify the Amplifiers based on different parameters? [8+7]
- 2.a) Explain the effect of emitter bypass and coupling capacitors on the frequency response of the CE amplifier.
- b) Discuss the low-frequency and High-frequency response of FET Amplifier. [7+8]
- 3.a) An amplifier has an open loop voltage gain of 1000 and delivers 10W output with 10% second harmonic distortion when the input is 10mV. Find the distortions if 60dB of negative feedback is applied.
- b) Determine the input impedance and output Impedance of all types feedback amplifiers. [5+10]
- 4.a) Derive an expression for frequency of oscillation of a RC phase shift oscillator using a FET.
- b) In the Hartley oscillator $L_2=0.04\text{mH}$ and $C=0.004\mu\text{F}$. If the frequency of oscillator is 150kHz, find L_1 ? Neglect mutual inductance. [10+5]
- 5.a) For a class B amplifier providing a 22V peak signal to an 8Ω load, and power supply of 25V. Determine input and output power and also circuit efficiency.
- b) Explain how a diode works as a switch and define all switching times. [7+8]
- 6.a) A square wave whose peak to peak value is 1V extends $\pm 0.5\text{V}$ with respect to ground. The half period is 0.1sec, this voltage is impressed upon an RC differentiating circuit whose time constant is 0.2sec. What are the steady state maximum and minimum values of the output voltage?
- b) Draw the Integrator circuit and explain its working and also derive expressions for required conditions. [8+7]
- 7.a) A 100V peak square wave with an average value of 0V and period of 20ms is to be negatively clamped at 25V. Draw the circuit diagram necessary for this purpose. Also, draw the input and output waveforms.
- b) Explain the effect of R_f and R_r of a practical semiconductor diode on the transfer characteristic of the series diode and parallel diode clipping circuits. [8+7]
- 8.a) Compare and contrast different Multivibrators.
- b) Design a collector coupled Astable multivibrator to generate a square wave of 2.5 kHz. [5+10]

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Code No: 54017

R09

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

MACHINE DRAWING

(Common to ME, AME)

Time: 3 hours

Max. Marks: 75

Answer any THREE questions from Part-A
Part-B is Compulsory

PART-A

(30 Marks)

1. Draw the top view and sectional front view of a double plated, double riveted zig zag rivet joint. Consider thickness of plates as 15 mm. [10]
2. Sketch the conventional representation of atleast four different thread forms. [10]
3. Sketch the various methods of fitting a feather key in position. [10]
4. Draw:
 - a) half sectional view from the front, top half in section and
 - b) half sectional view from the side, left half in section, of a split-muff coupling, indicating proportions to connect two shafts, each of diameter 50 mm. [10]

PART-B

(45 Marks)

5. The details of eccentric given in the following. Draw the following assembled views.
 - a) half sectional front view (bottom half in section)
 - b) Top view
 - c) Side view.All dimensions are in mm. [45]

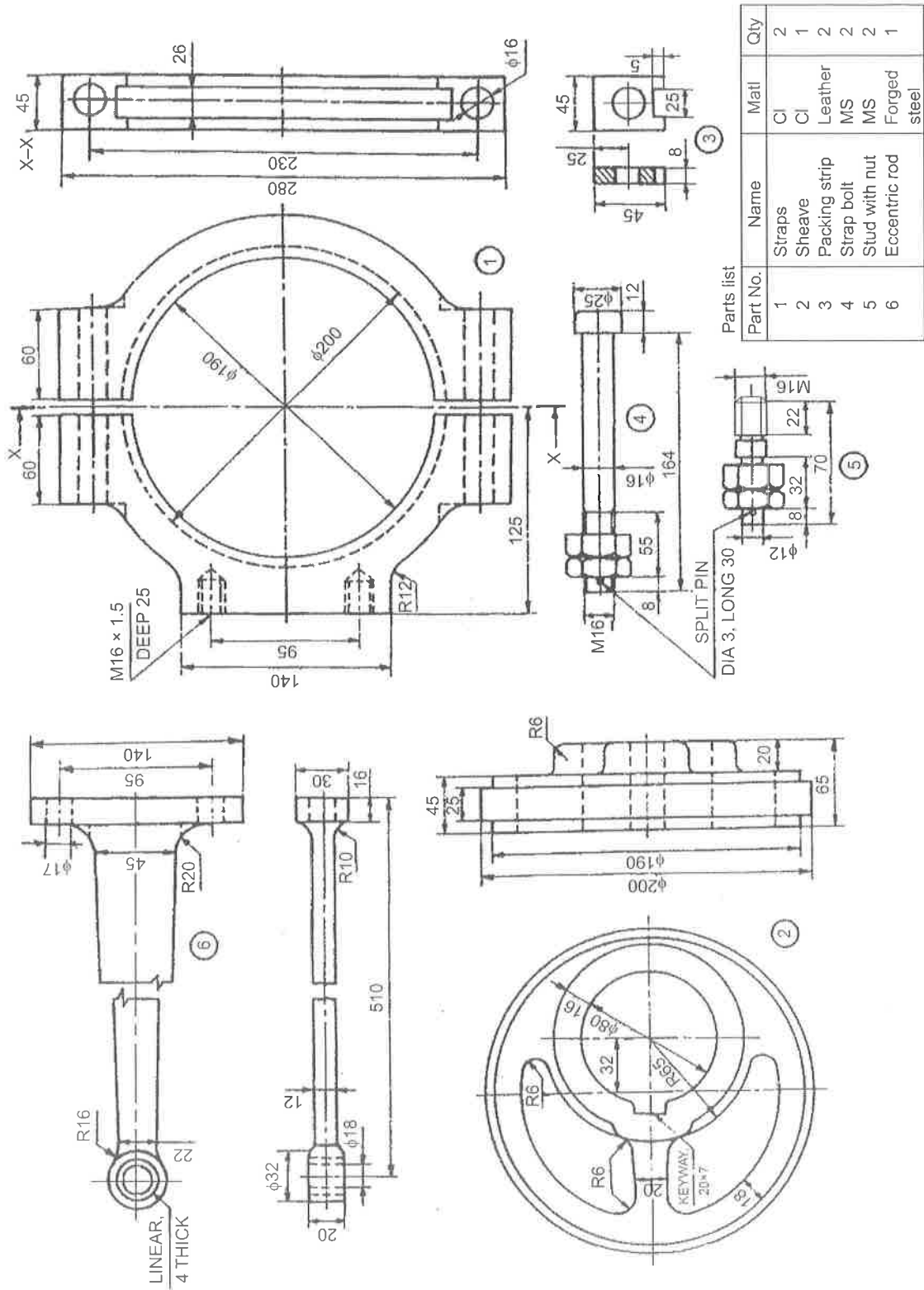
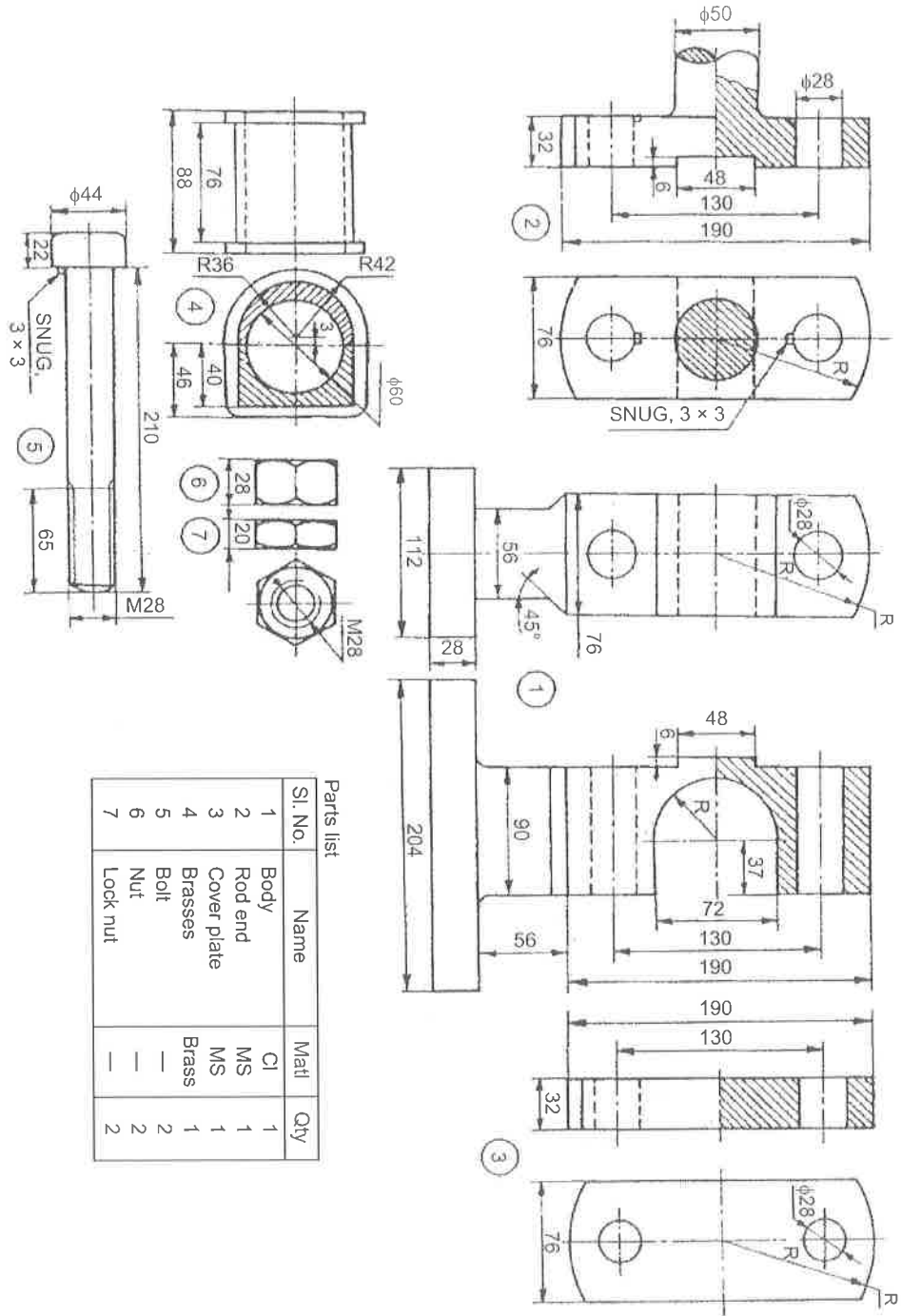


Fig. 18.8b Details of an eccentric



Parts list

Sl. No.	Name	Matl	Qty
1	Body	CI	1
2	Rod end	MS	1
3	Cover plate	MS	1
4	Brasses	Brass	1
5	Bolt	—	2
6	Nut	—	2
7	Lock nut	—	2

Fig. 18.3 Crosshead