

**MIDWESTERN UNIVERSITY
FACULTY OF ENGINEERING**

Examination Control Division

Chaitra 2074

Exam	Final Exam		
Level	BE	Full Marks	50
Program	Computer	Pass Marks	25
Year/Part	II/I	Time	3 Hrs.

Database Management System (CO506)

- *Attempt all questions*
- *Candidates are required to answer the questions in their own words as far as possible.*
- *Assume suitable values, with stipulation, if necessary.*
- *Figures in margin indicate full marks.*

- 1 a) Define database management system. Describe the drawback of file system
b) What do you mean by attributes? Describe different types of attributes.
- 2 a) Describe the different types of basic operators used in relational algebra.
b) Describe the format of SQL statement with simple example.
- 3 a) Describe first three normal forms.
b) Define Security. Discuss different level of Security.
- 4 a) Define Query Processing. Describe the basic steps of Query Processing.
b) Describe B-Tree Index files.
- 5 a) What do you mean by transaction? Describe required properties of transaction.
b) What do you mean by crash recovery? Describe log based recovery method.

**MIDWESTERN UNIVERSITY
FACULTY OF ENGINEERING
Examination Control Division**

2073 Chaitra

Exam	Regular		
Level	BE	Full Marks	50
Program	Computer	Pass Marks	25
Year/Part	II/I	Time	3 Hrs.

Subject: Database Management System (CO506)

- *Attempt all questions*
- *Candidates are required to answer the questions in their own words as far as possible.*

- Assume suitable values, with stipulation, if necessary.
- Figures in margin indicate **full marks**.

- 1.a) State and explain the properties of database management system.
- b) What do you mean by relationship and relationship set? Describe the different level of data abstraction briefly?
- 2.a) Define keys. Explain different types of keys briefly with example.
- b) What is the significance of ER model? Draw an ER diagram of a student doing the project in a faculty.
- 3.a) Write down the SQL of following question:
 i) To find all loan number for loans made at the Kohalpur branch with loan amounts greater than Rs 12000.
 ii) Find the loan number of those loans with loan amounts between Rs 90,000 and Rs 100,000 .
 iii) Find the name, loan number and loan amount of all customers having a loan at the Surkhet branch.
 iv) Find the names of all branches where the average account balance is more than Rs 1,200.
- b) State Armstrong's Axiom. Explain different type of functional dependency briefly.
- 4.a) Explain the term transaction briefly. Describe the different transaction state with diagram.
- b) Describe the different types of Normal form.
- 5.a) Briefly describe different physical storage media used for DBMS.
- b) Write short notes on i) RAID ii) Database architecture

DATABASE SCHEMA

branch (branch_name, branch_city, assets)
customer (customer_name, customer_street, customer_city)
loan (loan_number, branch_name, amount)
borrower (customer_name, loan_number)
account (account_number, branch_name, balance)
depositor (customer_name, account_number)

**MIDWESTERN UNIVERSITY
 FACULTY OF ENGINEERING**

Examination Control Division

2073 Chaitra

Exam	Regular		
Level	BE	Full Marks	50
Program	Computer	Pass Marks	25
Year/Part	II/I	Time	3 Hrs.

Subject: Discrete Structures (CO505)

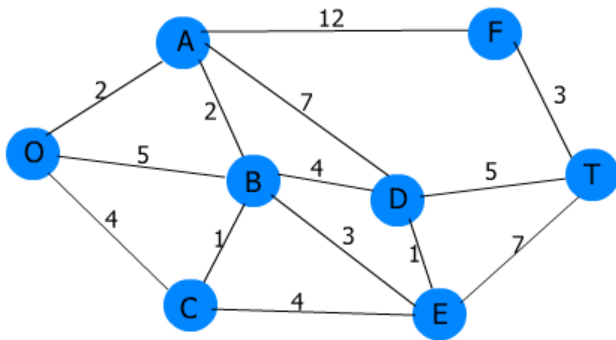
- Candidates are required to answer the questions in their own words as far as possible.
- Assume suitable values, with stipulation, if necessary.

- Figures in margin indicate full marks.

- 1 (a) Symbolize the following arguments and check for the validity.
Some females are not mothers. Some politicians are not females. Hence, some politicians are not mothers.
- (b) What is logical equivalence? Show that $p \leftrightarrow q$ and $(p \rightarrow q) \wedge (q \rightarrow p)$ are logically equivalent.
- 2 (a) Explain DFA with block diagram. How is it different from N DFA.
- (b) Construct a transition graph corresponding to the transition table given and check for the acceptance of the string: 01110 and 011101

State / Σ	Input	
	0	1
$\rightarrow q_0$	q_0	q_1
q_1	q_2	q_1
	q_0	q_1

- 3 (a) Explain recurrence relation. Solve the recurrence relation $a_n - 5a_{n-1} + 6a_{n-2} = 0$ where $a_0 = 2$ and $a_1 = 5$.
- (b) State the principle of mathematical induction. Show by mathematical induction, that for all $n \geq 1$.
 $1 + 2 + 3 + \dots + n = n(n + 1)/2$
- 4 (a) Explain briefly Hamiltonian graph and bipartite graph.
- (b) What is Euler graph? Give examples
- (c) What are applications of graph theory?
- 5 (a) State Dijkstra's Algorithm and use it to find the shortest route from the origin O to the destination T.



- (b) Write short note on the following terms: Parallel Edges, Binary Tree and Spanning Tree

BEST OF LUCK

**MIDWESTERN UNIVERSITY
FACULTY OF ENGINEERING**

Examination Control Division

Exam	Retake		
Level	BE	Full Marks	50
Program	Computer	Pass Marks	25
Year/Part	II/I	Time	3 Hrs.

- Candidates are required to answer the questions in their own words as far as possible.

- Assume suitable values, with stipulation, if necessary.

- Figures in margin indicate full marks.

1 (a) Symbolize the following arguments and check for the validity: If Clinton does not live in France, and then he does not speak French. Clinton does not drive a Datsun. If Clinton lives in France, then he rides a motorcycle. Either Clinton speaks French, or he drives a Datsun. Hence, Clinton rides a motorcycle.

(b) State De Morgan's Law and Prove it by using truth table.

2 (a) Explain Finite Automata with block diagram. How is it different from NFA.

(b) Construct a transition graph corresponding to the transition table given and check for the acceptance of the string: 101101 and 11111

State / Σ	Input	
	0	1
\rightarrow	q ₂	q ₁
q ₁	q ₃	q ₀
q ₂	q ₀	q ₃
q ₃	q ₁	q ₂

3 (a) Explain non homogeneous recurrence relation. Solve the recurrence relation $a_n - 7a_{n-1} + 10a_{n-2} = 0$ where $a_0 = 0$ and $a_1 = 3$.

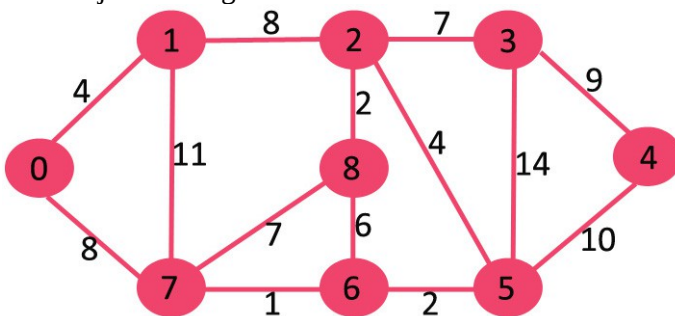
(b) State the principle of mathematical induction. Show by mathematical induction, that $1 + 3 + 5 + \dots + (2n-1) = n^2$ for $n=1,2,\dots$

4 (a) Explain briefly Planar graph and Directed graph.

(b) Differentiate cycle and circuit in graph with example.

(c) Explain travelling salesman problem with example.

5 (a) State Dijkstra's Algorithm and use it to find the shortest route from the vertex 0 to the destination vertex 4.



(b) Write short note on the following terms: Tree, Full Binary Tree and Spanning Tree

Examination Control Division

2073 Chaitra

(Electronics Device and Circuits) (EX503)

Program	Computer	Pass Marks	25
Year/Part	II/I	Time	3 Hrs.

- ✓ *Attempt all questions.*
 - ✓ *Candidates are required to answer the questions in their own words as far as possible.*
 - ✓ *Assume suitable values, with stipulation, if necessary.*
 - ✓ *Figures in margin indicate full marks.*
- 1. a)** Explain the terminal characteristics of junction diode in different regions with its necessary Characteristics curve.
b) Describe exponential modeling of diode forward characteristics.
 - 2. a)** Explain the working principle of Common-collector amplifier circuit, and calculate its voltage gain.
b) Explain general large signal model of BJT. Design common-emitter amplifier circuit using voltage divider type biasing, take $V_{cc}=24v$, $I_c=2mA$, $B=150$, $V_{be}=0.7v$, use appropriate guidelines.
 - 3. a)** Define MOSFET ? Explain its structure and physical operation.
b) How MOSFET acts as an amplifier explain. A JFET has $V_p=-4.5v$, $I_{Dss}=10mA$, and $I_{Ds}=2.5mA$, determine its trans-conductance.
 - 4. a)** Write down the physical operation of n-channel JFET. Analyze it in ohmic and pinch off region, also calculate its transconductance.
b) What is class B output stage amplifier explain with circuit diagram, also calculate its general and Maximum Efficiency.
 - 5. a)** Write down the basic principle of oscillation and Barkhausen criteria also Calculate the current gain of RC phase shift oscillator.
b) Calculate the oscillation frequency of Wien bridge oscillator .Explain the operation of integrated circuit Timer
 - 6. a)** Explain why regulated power supply is needed ? Draw the block diagram series voltage regulator .
b) Explain transistor series voltage regulator and its operation with necessary circuit diagram.

**MIDWESTERN UNIVERSITY
FACULTY OF ENGINEERING**

Examination Control Division

Exam	Regular		
Level	BE	Full Marks	50
Program	Computer	Pass Marks	25
Year/Part	II/I	Time	3

2073 Chaitra

Subject: (Electrical Machine) (EL502)

- Candidates are required to answer the questions in their own words as far as possible.
- Assume suitable values, with stipulation, if necessary.
- Figures in margin indicate **full marks**.

- 1 (a) A circular iron core has a cross – sectional area of 5sq.cm. and mean length of 25 cm including an air gap of 4mm. The core is wound with 500 turns of winding. Calculate the inductance of the coil, if a current of 10 ampere Passed through the coil. Calculate magnetic flux in the core .Given the relative permeability of the core is 2000. 5
- (b) Explain the no – load and loaded operation of an ideal transformer. Prove that the net magnetic flux in the core remains constant at any load. 5
- 2 (a) A 230V / 2300V single phase transformer is excited by 230V ac voltage. The equivalent resistance and reactance Referred to primary side are 0.1Ω and 0.6 Ω respectively. Given that Ro = 600 Ω and Xo = 300 Ω . The load Impedance is (400+ j600) Ω calculate:
- (i) Primary current and input power factor.
- (ii) Secondary terminal voltage.
- (b) Explain the working principle of DC generator with neat diagram. 5
- 3 (a) A 240 DC shunt motor has armature winding resistance of 0.6 Ω and field winding resistance of 120 Ω. It draw a Current of 26A at full load and the corresponding speed is 600 rpm. If a resistance of 1 Ω is connected in series with the armature winding and the load torque is increased by 15%, calculate the new speed. 5
- (b) With the help of phasor diagram, explain the effect of excitation in a three – phase Synchronous motor. 5
- 4 (a) Explain the working principle of synchronous generator. Also derive emf equation. 5
- (b) A 8 – pole, 50HZ, 3 phase induction motor develops a starting torque of 50N. The rotor winding has an impedance of (0.8 + j4) Ω per phase. At what speed the motor will develop maximum torque and calculate the magnitude of maximum torque. 5
- 5 (a) What do you understand by double field revolving theory? Explain it with the help of a neat diagram. 5
- (b) Write short note on: [2×2.5= 5]
- (1) Universal motor.
- (2) eddy current loss and hysteresis loss in magnetic circuit.

MIDWESTERN UNIVERSITY
FACULTY OF ENGINEERING

Examination Control Division

2074 Kartik

Exam	Retake		
	Level	BE	Full Marks
Program	Computer	Pass Marks	25
Year/Part	II/I	Time	3 Hrs.

Subject: Electrical Machine (EL502)

- Candidates are required to answer the questions in their own words as far as possible.
- Assume suitable values, with stipulation, if necessary.
- Figures in margin indicate full marks.

- 1 (a) A magnetic circuit consists of a circular iron core having mean length of 10cm and cross-sectional area of 100mm^2 . The air gap is 2mm and the core has 600 turns of winding calculate the magnitude of current to be passed through the winding to produced air gap flux of 1 telsa. Given $\mu_0 = 4000$.
- (b) What are different types of losses in transformer? Drive the expression of efficiency of transformer.
- 2 (a) A 200KVA, 2000 / 440V, 50HZ single phase transformer gave following results.
No load test : 400V, 1500 watt, 8Amp on L.V side with H.V
Short circuit test: 30V, 2000 watts and 300 Amp on H.V side with L.V side short circuited.
Calculate the equivalent circuit parameters referred to primary side and draw the equivalent circuit.
- (b) Describe different methods of controlling the speed of a shunt DC motor.
- 3 (a) A short shunt compound generator supplies a load current of 100A at 250V. The generator has the following winding resistance: shunt field 130Ω , armature 0.1Ω and the series field 0.1Ω . Find the emf generated and the armature current, if the brush drop is 1V per brush.
- (b) Explain with necessary vector diagram how rotating magnetic field is produced in a three phase induction motor. Also explain how this rotating magnetic field helps the motor to rotate.
- 4 (a) A three phase, star – connected synchronous generator rated at 10 KVA, 230V has a synchronous reactance of 1.2Ω per phase and an armature resistance of 0.5Ω per phase. Calculate emf generated and voltage regulation in each case.
(i) 0.8 P.F lagging.
(ii) 0.8 P.F leading.
- (b) Drive the power – angle equation of synchronous machine having cylindrical rotor.
- 5 (a) Why single phase induction motors are not self starting? Explain any two starting method of single phase induction motor.
- (b) Write shot note on : [$2 \times 2.5 = 5$]
(i) Single phase series motor.
(ii) Pitch factor and distribution factor.

**MIDWESTERN
UNIVERSITY
FACULTY
OF
ENGINEERING
Examination
Control Division**

Exam	Regular		
Level	BE	Full Marks	50
Program	Computer	Pass Marks	25
Year/Part	II/I	Time	3 Hrs.

2073 Chaitra

Subject: (Engineering Mathematics) III (SH505)

- Candidates are required to answer the questions in their own words as far as possible.
- Assume suitable values, with stipulation, if necessary.

- Figures in margin indicate full marks.

1	a i	Define symmetric determinant. Prove that= .
	ii	Diagonalise: .
	b	State Cayley-Hamilton theorem and Verify Cayley-Hamilton theorem for the matrix A and find its inverse of: .
2	a i	Evaluate the integral by using Laplace Transform.
	ii	Evaluate where and s is the finite plane $x+y+z=1$ between the coordinate plane
	b	Define Fourier series. Obtain a Fourier series to represent the function $f(x)=$ for and deduce that
3	a i	Define Laplace Transform. Find the Laplace Transform of: .
	ii	Find the inverse Laplace Transform of: .
	b	Solve by the method of transform the equation.
4	a i	Find the characteristic equation of the matrix: .
	ii	Define Eigen value and Eigen vectors. Find the Eigen value and Eigen vectors of the matrices
	b	Verify Stoke's theorem for over the plane surface $x+y+z=1$ lying in the first octant.
5	a i	Find the point in which the matrix transforms the point into.
	b i	Solve the following linear programming problem by simplex method. Maximize Subject to: and.
	ii	Maximize subject to constraints:, graphically.

MIDWESTERN UNIVERSITY
FACULTY OF ENGINEERING
Examination Control Division

2074 Kartik

Exam	Retake		
Level	BE	Full Marks	50
Program	Computer	Pass Marks	25
Year/Part	II/I	Time	3 Hrs.

Subject: Engineering Mathematics - III (SH505)

- Candidates are required to answer the questions in their own words as far as possible.
- Assume suitable values, with stipulation, if necessary.
- Figures in margin indicate full marks.

- 1 (a) Define inverse of matrix. Prove that: . [3]
 i
- Define rank of the matrix. Find the rank of the matrix: . [2]
 ii
- (b) State Cayley-Hamilton theorem. Find the Eigen value as well as vector of: . [5]
- 2 (a) i Obtain the matrix transformation which transforms the point (1, 1) into the point (-2, 0) and the point (0, 1) into (-1, 1). [2]
 ii Solve by method of transform the equation [3]
- (b) Define Fourier series. Obtain a Fourier series for $f(x) = x^3$ in the interval . [5]
- 3 (a) i Define Laplace Transform. Find the Laplace Transform of: . [2]
 ii Define inverse Laplace Transform. Find the inverse Laplace Transform of: . [3]
- (b) State Green's Theorem and find where along the curve bounded by [5]
- 4 (a) i Find the half range cosine series for the function $f(x) = x^2$ in the range. [2]
 ii Find the inverse Laplace transform of by Convolution Theorem. [3]
- (b) Verify Stoke's theorem for the vector field. integrated round the rectangle, in the plane $z = 0$ and bounded by the lines $x = 0, y = 0; y = a$ and $y = b$. [5]
- 5 (a) Solve the following linear programming problem by simplex method. [4]
 Maximize
 Subject to:
 and .
- (b) i Evaluate where v is the region bounded by unite cube and [2]
 Maximize subject to constraints:, graphically. [4]
 ii

MIDWESTERN UNIVERSITY
 FACULTY OF ENGINEERING
 Examination Control Division

2074 Kartik

Exam	Retake		
Level	BE	Full Marks	50
Program	Computer	Pass Marks	25
Year/Part	II/I	Time	3 Hrs.

Subject: Engineering Mathematics - III (SH505)

- Candidates are required to answer the questions in their own words as far as possible.
- Assume suitable values, with stipulation, if necessary.
- Figures in margin indicate full marks.

- 1 (a) Define inverse of matrix. Prove that: [3]
- i
- Define rank of the matrix. Find the rank of the matrix: . [2]
- ii
- (b) State Cayley-Hamilton theorem. Find the Eigen value as well as vector of: . [5]
- 2 (a)
- i Obtain the matrix transformation which transforms the point (1, 1) into the point (-2, 0) and the point (0, 1) into (-1, 1). [2]
- ii Solve by method of transform the equation [3]
- (b) Define Fourier series. Obtain a Fourier series for $f(x) = x^3$ in the interval . [5]
- 3 (a)
- i Define Laplace Transform. Find the Laplace Transform of: . [2]
- ii Define inverse Laplace Transform. Find the inverse Laplace Transform of: . [3]
- (b) State Green's Theorem and find where along the curve bounded by [5]
- 4 (a)
- i Find the half range cosine series for the function $f(x) = x^2$ in the range. [2]
- ii Find the inverse Laplace transform of by Convolution Theorem. [3]
- (b) Verify Stoke's theorem for the vector field. integrated round the rectangle, in the plane $z = 0$ and bounded by the lines $x = 0, y = 0; y = a$ and $y = b$. [5]
- 5 (a) Solve the following linear programming problem by simplex method. [4]
- Maximize
- Subject to:
- and .
- (b)
- i Evaluate where v is the region bounded by unite cube and [2]
- Maximize subject to constraints:, graphically. [4]
- ii

Examination	Regular/Back		
Level	Bachelor	Full Marks	50
Program	BCT	Pass Marks	25
Year/Part	II / I	Time	3 hrs

MID-WESTERN UNIVERSITY
FACULTY OF ENGINEERING

Examination Control Division

2073Chaitra

Subject: Numerical Methods

Code: SH506

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt all questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. How do we obtain a real root of a non- linear equation using Secant Method? Explain graphically and hence deduce the iteration formula. [5]

2. Find the root of the equation $e^x - 3x = 0$ using bisection method correct up to 3 decimal places. [5]

3. From the following data, find the cubic polynomial between $x=3$ and $x=4$ using the natural cubic spline interpolation technique. [5]

x	2	3	4	5	6
y	5	6	4	3	2

4. Evaluate by dividing it into 10 strip using Simpson's 1/3 and 3/8 rule. [5]

5. Use Romberg integration method to evaluate the integral correct up to 3 places with $n=2$. [5]

6. Find the largest Eigen value of the matrix $A =$ using power method. [5]

7. Solve the following differential equation within $0 \leq x \leq 0.4$ using RK 4th order method. [5]

8. Fit the following data to an exponential curve of the form $y = ab^x$ [5]

X	2	4	6	8	10
---	---	---	---	---	----

y	2	6	25	115	300
---	---	---	----	-----	-----

9. Solve the Poisson equation $\nabla^2 f = 2x^2 - y^2$ over the square domain $0 \leq x \leq 3, 0 \leq y \leq 3$ with $f=0$ on the boundary take $h=1$. [5]

10. Write an algorithm, flowchart and program to implement Heun's method. [5]

1. Define different types of errors in numerical method.

2

2. By using Secant method find a real root of $f(x) = x^3 + x^2 - x - 1 = 0$ correct up to 3 decimal places.

5

3. Find the missing value using Lagrange interpolation from the following data

5

X	0	1	1.3	3	4
f(x)	0	4.28	?	2.18	4.13

4. Evaluate by dividing it into 10 strips using Trapezoidal 1/3 and 3/8 rule.

5

5. Estimate approximate derivative of $f(x) = x^2$ at $x=1$, for $h=0.2, 0.1, 0.05$ and 0.01 using the first order forward difference formula.

6. Solve the following system of equations using Gauss elimination method

5

$$5x_1 + x_2 + x_3 + x_4 = 4$$

$$x_1 + 7x_2 + x_3 + x_4 = 6$$

$$x_1 + x_2 + 6x_3 + x_4 = -5$$

$$x_1 + x_2 + x_3 + x_4 = 0$$

7. Using finite difference method Solve $y'' = e^{-(x^2)}$, with $y(0)=0$ and $y(1)=0$ and estimate $y(x)$ where $x=0.25, 0.5$ and 0.75 . 5

8. A steel plate of size of 15cmX15cm.If two of the sides are held at 100°C and other two sides are held at 0°C.What is the steady state temperature at interior point assuming grid of size 5cmX5cm? 5

9. From the given table fit a power function model of the form $y=ax^b$
5

X	1	2	3	4	5
Y	0.	2	4.	8	12.5

10. Write an algorithm, flowchart and program to implement Euler’s Method.
2+2+4

**MIDWESTERN UNIVERSITY
FACULTY OF ENGINEERING
Examination Control Division**

Exam	Regular		
Level	BE	Full Marks	50
Program	Computer	Pass Marks	25
Year/Part	II/I	Time	3 Hrs.

2073 Chaitra

Subject: Web Programming and Technic (CO507)

- Attempt all questions
- Candidates are required to answer the questions in their own words as far as possible.
- Assume suitable values, with stipulation, if necessary & Figures in margin indicate full marks.

1. What is web server? Explain about client side and server side scripting. [2+3]
2. What is client / server architecture? Explain its type. [2+3]
3. List the advantage of using form in website? Write the HTML code to create the following table [2+3]

Operating Systems			
Linux		Windows	
Fedora	Ubuntu	Windows 8	Windows 10

4. What are the different type of CSS ?. Explain the purpose of using CSS Box Model and mention its Parts. [2+3]
5. List the benefits of the Java Script. Explain the array creation in Java Script with example. [2+3]
6. Write the common uses of PHP. Explain the PHP session Variables with example. [2+3]
7. What is Web Content Management System ?. How to mitigate the security threats of WCMS. [3+2]
8. Explain the XML with example . Write the advantages and disadvantage of XML. [3+2]

9. Describe SOAP and its building Blocks in details. [5]

10. Write Short notes on (**Any Two**): [5]

- Blogs
- Social Network
- Wikis

Best of Luck