

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination: Semester 1

Academic Year: 2005

Date: August 4, 2005

Time: 9:00-12:00

Subject: 226-607 Advanced Engineering Mathematics

Room: R300

for Manufacturing Engineers

Instructions

- This is an opened-book examination.
- Total score is 40.
- Answer all questions in the answer book.

ทฤษฎีในการสอบ โทษขั้นต่ำ คือ พักการเรียน 1 ภาคการศึกษา และปรับตกในรายวิชาที่ทฤษฎี

Name

Student ID

Question #	Full Score	Assigned Score
1	10	
2	10	
3	10	
4	10	
Total	40	

Dr. Thanate Ratanawilai



Problem 1 (10 marks) Solve the following systems of equations to find x , y , z , and k .

$$\begin{aligned}x - 3y + 2z &= 1 \\2x - 2y &= k \\3x - 5y + z &= 0 \\-2x + 8y + 4z &= 49\end{aligned}$$

Problem 2 (10 marks) Is the following matrix symmetric, skew-symmetric, or orthogonal? Find eigenvalues and eigenvectors.

$$A = \begin{bmatrix} 4 & i \\ -i & 2 \end{bmatrix}$$

Problem 3 (10 marks) For the following matrix, determine

$$B = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 2 & -1 & 3 \end{bmatrix}$$

- (a) Its ranks
- (b) its adjoint and
- (c) its inverse, if it exists

Problem 4 (10 marks) Find a diagonalization of the following matrix.

$$C = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 3 & 2 \\ 0 & 0 & 2 \end{bmatrix}$$

