



The Open University of Sri Lanka  
Faculty of Engineering Technology  
Industrial Studies Program of study  
Final Examination- 2005/2006  
**AEZ3238 Mathematics for Agriculture**

Date : 19-03-2006  
Time : 0930-1230  
Duration : Three (03) hours

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**SEPARATE SHEETS WILL BE PROVIDED TO ANSWER BOTH SECTIONS**

Instructions

1. This question paper consists of two sections.

**SECTION A**

Contains TEN (10) questions. You are required to answer all questions. You may spend about **one hour** to answer this section.

**SECTION B**

Contains SEVEN (07) questions. You are required to answer ANY FOUR (04) questions. You may spend about **two hours** to answer the questions in this section.

2. Read the questions carefully before answering.
3. Please remember to write your registration number and your index number correctly on each answer script.
4. In case of doubt, please consult the supervisor or an invigilator conducting the examination.

**SECTION A: Answer all questions.**

1. If  $x = 2$  is a solution of  $x^3 - 6x^2 + 11x - 6 = 0$ , then find other solution of it.
2. The perimeter and the area of a rectangular land are 24 m and  $35 \text{ m}^2$  respectively. Find the length and the width of the land.
3. If the angle between two forces P and Q is  $\alpha$ , then show that the resultant is  $\sqrt{P^2 + Q^2 + 2PQ \cos \alpha}$ . Find the angle between two forces 10N and 12N if their resultant is  $2\sqrt{91} \text{ N}$ .
4. Define the terms **couple** and the **moment of a couple**.  
Show that a couple has the same moment about any point in the plane which contains the two forces.
5. A uniform beam AB is 10m long and its mass 9 kg. It rests on two supports C and D which are 6m apart and the reactions on them are 30N and 60N respectively. Assuming  $g = 10 \text{ ms}^{-2}$  find the length of AC and BD.
6. The displacement,  $x$ , of a particle with time  $t$  which moves along a straight line is given by  $x = t^2 - 4t + 3$ . At what time will the particle reach the velocity zero? Find the acceleration.
7. A particle is projected with velocity  $30 \text{ ms}^{-1}$  at an angle  $30^\circ$  to the horizontal. Find, (assuming  $g=10\text{ms}^{-2}$ )
  - (i) the maximum height to which it reaches and
  - (ii) the time it takes to reach that height.
8. Define the following terms:
  - (i) Kinetic energy and
  - (ii) Potential energy of a moving particle.

9. A 40 ton rail car moving at 3 mph gets coupled to 60 ton car moving with 1 mph. Find the velocity of the two cars together.
  
10. The sum and sum of squares of height of 10 plants of cultivation are 89 and 805 respectively. Find the mean and the variance of the cultivation.