Uva Wellassa University
Faculty of Animal Science & Export Agriculture
BSc. in Export Agriculture
BSc. in Palm & Latex Technology and Value Addition
BSc. in Tea Technology and Value Addition

End Semester Examination - January/February 2016
Year 1 Semester II

Principles of Agricultural Engineering (EAG 142- 2)

Instructions

Answer all questions.

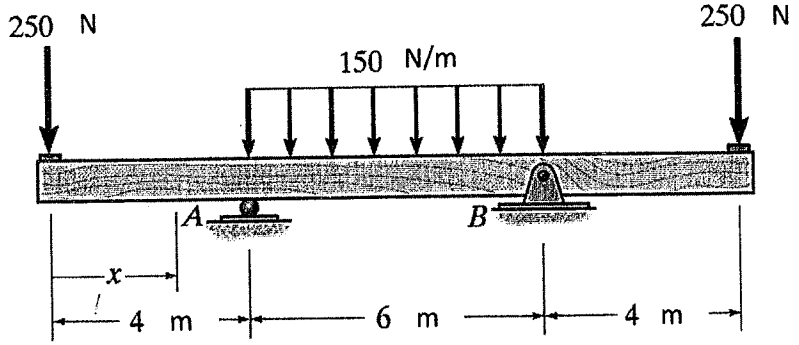
No. of questions	:	Two (02)
No. of pages	:	Four (04)
Time	:	One (01) Hour
Total marks allocated	:	40 %

Index No:

PART III - ESSAY

Question 01

1.1 The external forces act on a beam is shown in the figure below. Answer the following questions.



a) Find out the reaction forces act on each support. (10 Marks)

b) Find out the Normal Force, Shear Force and Bending Moment at the middle point of the beam. (25 Marks)

c) Draw the bending moment and shear force diagram along the distance of the beam. (20 Marks)

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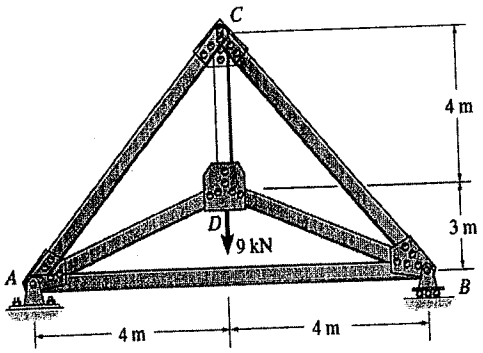
d) At which point or points bending momentum become zero? Find the distance of the point or points from left side end of the beam. (10 marks)

e) Draw the bending pattern of the beam (sagging or hogging). (5 Marks)

1.2 The following diagram shows the forces acting on a simple truss. Answer the question based on the data given in the diagram.



a) Find the forces acting on each member of the truss.

b) Indicate whether each member under tension or compression.

c) Draw the free body diagram.

(10 x 3 marks)

Question 02

2.1

a) Write the Newton's first law of thermodynamics?

b) Explain this law by using one example.

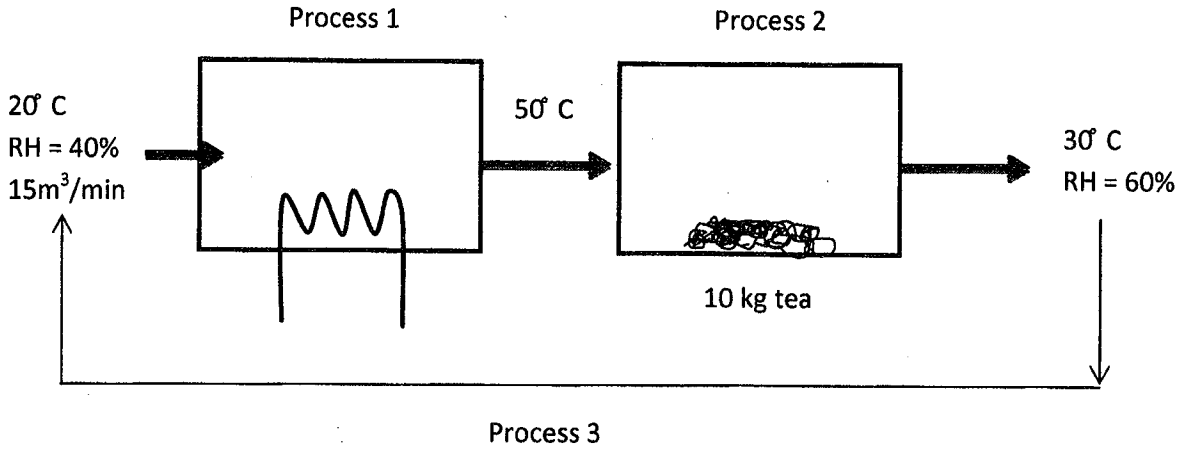
c) Describe the following terms and give one example.

   a. Intensive property and Extensive property

   b. Quasi-equilibrium process and Non Quasi-equilibrium process

(10 x 4 marks)

2.2 The following psychometric processes were taken from a tea factory and all the processes given below are related to dry tea leaf production (Use the given Psychometric chart).



Process 1: Initial temperature of the air-vapor mixture is 20 °C and RH = 40% and it is heated to 50 °C.

Process 2: The mixture is sent through a chamber to dry 10 kg of tea leaves and the temperature of the outlet mixture is 30 °C and RH is 60%.

Process 3: The outlet mixture is again converted to the initial temperature (20 °C) and RH (40%).

a) During process 1, how much of energy is given by the heating coil to the air-vapor mixture?

b) What is the relative humidity and moisture content (MC) of the air-vapor mixture comes out of the process 1?

c) What is the rate of moisture removal from the tea leaves during the process 2?

d) How long do we need to send air-vapor mixture to dry 10 kg tea leaves completely?

e) During the process 3, how much of moisture is removed from the air-vapor mixture?

f) Draw the entire process on the given psychometric chart and mark all the points and process. (10 x 6 marks)

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Carrier

PSYCHROMETRIC CHART

NORMAL TEMPERATURES

SI METRIC UNITS

Barometric Pressure 92.600 kPa

750m Above Sea Level