UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

1ˢᵗ SEMESTER 2016 -2017

PROGRAMME: BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION YEAR 2

BACHELOR OF SCIENCE IN HORTICULTURE YEAR 2

BACHECLOR OF SCIENCE IN AGRONOMY YEAR 2

COURSE CODE: CPR203

TITLE OF PAPER: CROP PHYSIOLOGY

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER QUESTION 1 AND 2 AND ANY OTHER TWO

QUESTIONS.

DO NOT OPEN THIS PAPER UNTIL PERMISSION HAS BEEN GRANTED BY THE CHIEF INVIGILATOR

QUESTION 1 - COMPULSORY

Give your answer on the answer sheet by writing: 12 = a, or 12 = 5 moles. (all questions have 2 marks, except question 11 which has 5 marks)

Assume that a plant cell with a water potential of -1.0 MPa is placed in a beaker containing a sucrose solution that has a water potential of -4.0 MPa. Further, assume the temperature of the solution is 24 C. Thus:

1.	The plant cell will become:	A. larger	B. smaller	C. not change
2.	The weight of the plant cell will:	A. increase	B. decrease	C. not change
3.	The concentration of the sucrose solution in the beaker will:	A. increase	B. decrease	C. not change
4.	The turgidity of the plant cell will:	A. increase	B. decrease	C. not change
5.	The osmotic potential of the sucrose solution will become:	A. more negative	B. less negative	
6.	There will be a net movement of water from the:	A. cell to the solution	B. solution to the cell	
7.	After a few hours the cell is removed. A drop of sucrose (-4.0 MPa) placed in the solution will:	A. float	B. sink	C. hover & disperse
8.	The refractive index of the sucrose solution will:	A. increase	B. decrease	C. not change
9.	The cell will likely plasmolyze:	A. false	B. true	
10.	The initial concentration of the sucrose solution (in molality) is:			
11.	Assume that at equilibrium, the water potential of the cell becomes -3.5 MPa. Thus, the concentration of the sucrose solution (in molality) in the beaker at equilibrium is:			

[25 MARKS]

QUESTION 2 - COMPULSORY

a) Discuss the overall mechanism of cellular respiration (6 marks)

b) Differentiate between aerobic and anaerobic respiration(6 marks).

c) Write the overall equation of cellular respiration(6 marks).

d) Give the importance of studying cellular respiration (7 marks).

[25 MARKS]

QUESTION 3

a)   From the figure below indicate whether the plant will either remain vegetative or flower, and draw a general model consistent with the responses you have indicated (10 marks).

On your answer sheet draw a table as below on which you may give your answer. Do not write your answer on the question paper.
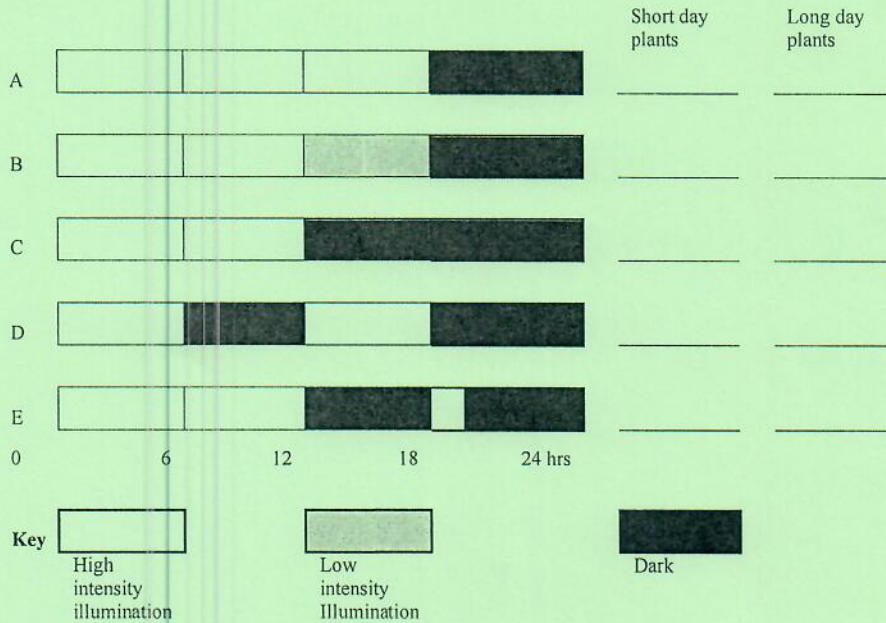
c)   Describe the vernalisation process. Discuss the physiological processes that take place when a crop is vernalised (15 marks).

[25 MARKS]

QUESTION 4

a)   Outline three general areas in which growth regulators may exert their effects and give an example of how each may affect plant growth and development (15 Marks).

b)   Describe how temperature and pH may affect the anticipated results in each area given in (a) above (10 Marks)

[25 MARKS]

QUESTION 5

Seeds collected by a desert hermit were subjected to various treatments and then evaluated in a standard germination test. The results were as follows:

Treatment prior to germination test	% germination	
	5 days	10 days after planting
a) None (control)	5%	8%
b) Soaked in warm water for an hour	5%	90%
c) GA added to seeds	5%	9%
d) GA added after soaking	95%	95%
e) GA + ABA added after soaking	5%	7%
f) Auxin added to seeds	95%	96%

Chromatographic analysis of water from treatment b) indicated GA and ABA, but no auxin. Extracts from soaked seeds contained no GA, ABA, or auxin, but extracts from germinating seed contained GA and auxin, but no ABA.

Propose a model for these observations and indicate how your model explains the results.

[25 Marks]