Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
100 Level 1st Semester Examination –July /August 2016
SCT 101-1 Essential Mathematics

Uva Wellassa University

Instructions to candidates
Duration: 01 hour
Number of questions: 2 Essay Questions
Mark allocation: 100 mark
Use standard symbols without defination.
Scientific calculators are allowed.
Answer all questions

1.

a. Draw the graph of the following piecewise function. (10 mark)

$$f(x) = \begin{cases} 2x - 1; \text{if } x \geq 1 \\ 3 \quad\quad ; \text{if } x \geq 2 \end{cases}$$

b. 60 different vitamin pills contain at least one of the vitamins A, B or C. 12 of the pills contain only vitamin A, 7 pills contain only B and 11 pills contain only C. Equal number of pills contains the vitamin A and B, A and C and B and C. Number of pills contain the vitamin A, B and C is 3.

i. How many pills contain vitamin A? (10 mark)
ii. How many pills contain only vitamin B and C? (10 mark)

c. Let $f(x) = x^2 + 2x - 1$, find $f(4)$ (10 mark)

d. A student must answer 3 out of 5 essay questions on a test. How many different ways can the student select the questions? (10 mark)

2.

a.

i. Prove the trigonometric identity, $\text{cosec}\, x\,(\cos x + \sin x) = \cot x + 1$ (10 mark)

ii. Find $\tan 225^0$ (10 mark)

iii. A person stands 150m away from a flagpole and measures an angle of elevation of 60^0 from his horizontal line of sight to the top of the flagpole. Assume that the person's eyes are a vertical distance of 6m from the ground. What is the height of the flagpole? (10 mark)

b. Solve the following inequality and represent the solution obtained, on a real line ($\mathbb{R}$).

(10 mark)

$$1 \leq x + 2 < 3.5$$

c. Find the partial fractions of $\frac{2}{(x-1)(x+1)}$ (10 mark)