Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
100 Level 1st Semester Examination –Sept. /Oct. 2015
SCT 101-1 Essential Mathematics

Uva Wellassa University

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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 function. (10 mark)

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

b. Each student in a class of 40 plays at least one indoor game Chess, Carom and Scrabble. 18 students play Chess, 20 students play Scrabble and 27 students play Carom. 7 students play Chess and Scrabble, 12 students play Scrabble and Carom and 4 students play Chess, Carom and Scrabble.

i. Find the number of students who play Chess and Carom. (10 mark)
ii. Find the number of students who play Chess and Carom but not Scrabble. (10 mark)

c. Simplify the following expression; $\left(\frac{x^3y^{-2}}{z^4y^4}\right)^{\frac{1}{6}}$. (10 mark)

d. Solve the following expression for x; $4^{2x-1} = 16$. (10 mark)

2.

a. Prove the following Trigonometric identities.

i. $\sec^2 x + \operatorname{cosec}^2 x = \sec^2 x \operatorname{cosec}^2 x$ (10 mark)

ii. $\tan^2 x + \tan x \sec x + 1 = \frac{1+\sin x}{\cos^2 x}$ (10 mark)

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b. Solve the following inequality and represent the solution obtained, on a number line. (20 mark)

$$3 \leq 4x - 5 < 15$$

c. Using Binomial theorem, expand $(3x - 1)^6$. (10 mark)