Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
100 Level 1st Semester Examination – June/July 2017
SCT 101-2 Essential Mathematics

Instructions to candidates
Duration: One(01) hour
Number of questions: Two(02) Essay Questions
Mark allocation: 100 mark (50 mark ×2)
Use standard symbols without defination.
Scientific calculators are allowed.
Answer all questions

1.

a. Let $A=\begin{pmatrix}3 & 0 & 6\\ 5 & -5 & 7\\ 1 & 3 & -2\end{pmatrix}$ and $B=\begin{pmatrix}2 & 2 & 3\\ 10 & 0 & 5\\ 6 & -1 & -5\end{pmatrix}$, find:

i. $A+B$ (02 mark)
ii. $2A$ (02 mark)
iii. product of matrix A and matrix B (04 mark)
iv. transpose of matrix A (03 mark)

b. Find the determinant of matrix $C=\begin{pmatrix}1 & 3\\ -2 & 4\end{pmatrix}$. (04 mark)

c. Let $Z_1=1+3i$ and $Z_2=3+2i$, find:

i. Z_1+Z_2 (03 mark)
ii. $-3Z_1$ (03 mark)
iii. $Z_1\times Z_2$ (04 mark)

2.

a. Describe each of the following sets using *Venn diagram*.

i. $A=\{2,4,6,8,10\}$ (03 mark)
ii. $B=\{\text{prime numbers less than } 15\}$ (03 mark)

b. List all the subsets of the set $A=\{1,2,3\}$. (02 mark)

c. If X, Y, and Z are three non-empty sets. Represent the following using the Venn diagrams by shading the relevant regions.

i. $(X \cup Y) \cap (X \cup Z)$ (02 mark)

ii. $(X \cap Y) \cap Z'$ (02 mark)

d. In a group of 70 cars tested by a garage in Badulla, 15 had faulty tires, 20 had faulty brakes and 18 exceed the allowable emission limits. Also, 5 cars had faulty tires and brakes, 6 failed on tires and emission, 10 failed on brakes and emissions, and 4 cars were unsatisfactory in all three respects.

i. Draw an appropriate Venn diagram. (08 mark)

ii. How many cars had no faults in these three checks? (05 mark)