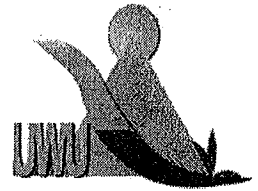


Uva Wellassa University, Sri Lanka  
End Semester Examination – March 2010  
SCT 104-2 Essential Mathematics

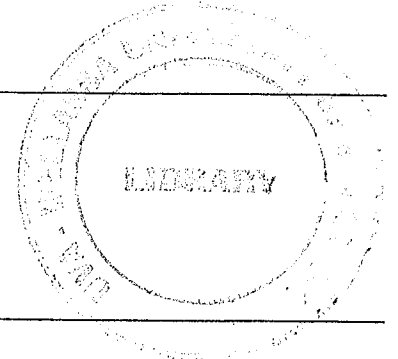


Time: Two (02) hours

Total five (05) questions.

Answer four (04) questions only.

Each question carries equal marks.



01. (i) Find the solutions of  $x_1$  and  $x_2$  for the equation of  $ax^2 + bx + c = 0$ . where  $a \neq 0$

(ii) Using part (i) show that ;

a.)  $x_1 + x_2 = -\frac{b}{a}$

b.)  $x_1 \cdot x_2 = \frac{c}{a}$

(iii) Solve the equation  $x^2 - 5x + 50 = x - 8$

(iv) If  $Z_1 = \frac{1}{2} + i$  and  $Z_2 = -1 + \frac{1}{3}i$ , then find  $\frac{Z_1}{Z_2}$

02. (i) Find the partial fractions of  $\frac{4(x^2 - x + 1)}{(x-1)(x^2 - 1)}$

(ii) If  $A = \begin{pmatrix} -1 & 1 \\ 2 & -2 \end{pmatrix}$  and  $B = \begin{pmatrix} 3 & -2 \\ -1 & 2 \end{pmatrix}$  show that  $(A \cdot B)' = B' \cdot A'$

03. (a) (i) Find  $\log_7 \left( \frac{1}{49} \right)$

(ii) Find possible value(s) that satisfies the equation  $\log_a 36 = 2$

(iii) Show that  $\log_a b \cdot \log_b c = \log_a c$

(b) (i) Solve  $|6 - 5x| \geq 16$

(ii) Solve and Graph  $3(x^2 + 1) \leq 2 + 2x - 3x^2$

04. (i) Find  ${}^8C_3$  (Show your calculations.)

(ii) How many words can be made using the letters of the word "WELLASSA".

(iii) Expand  $\left(x^2 + \frac{1}{x^2}\right)^4$

(iv) Find the fourth term of  $\left(2 - \frac{1}{x^2}\right)^7$

05. (a) (i) Convert 135 degrees into radians.

(ii) Convert  $\frac{13\pi}{12}$  radians into degrees.

(iii) Convert  $24.243^\circ$  into DMS (Degree Minute Second) form.

(iv) Convert  $56^\circ 57' 58''$  into DD (Decimal Degree) form.

(b) (i) Prove the identity  $\frac{1 + \tan A}{1 + \cot A} = \tan A$

(ii) Using your knowledge of Sum and Difference formulas and Double Angle formulas derive the expression for  $\sin 3x$ .

(Keep the answer with one parameter)