

Home work – task 6

Group – Tuesday 14.20

1. Calculate ΔE^* , ΔH^* , ΔC^* , ΔL^* , Δa^* a Δb^* for next values.

$L_{st}^* = 52,24$	$L_b^* = 48,00$	$\Delta E^* = ?$
$a_{st}^* = -1,49$	$a_b^* = -0,01$	$\Delta C^* = ?$ a $\Delta L^* = ?$
$b_{st}^* = 12,28$	$b_b^* = 15,25$	$\Delta H^* = ?$, $\Delta a^* = ?$, $\Delta b^* = ?$

$\Delta E^* = 5,3841$; $\Delta a^* = 1,48$; $\Delta b^* = 2,97$; $\Delta C^* = 2,8799$; $\Delta L^* = -4,24$; $\Delta H^* = -1,6484$;

2. Calculate the coordinates x , y , z , L^* , a^* , b^* , C^* a h_{ab} .

$X = 18,0206$	$X_0 = 94,81$	$x_0 = 0,31381$	$x = ?$	$L^* = ?$	$C^* = ?$
$Y = 20,3955$	$Y_0 = 100$	$y_0 = 0,33098$	$y = ?$	$a^* = ?$	$h_{ab} = ?$
$Z = 43,7041$	$Z_0 = 107,32$		$z = ?$	$b^* = ?$	

$L^* = 52,2815$; $a^* = -6,8362$; $b^* = -30,5173$; $C^* = 31,2736$; $h_{ab} = 4,4920$;
 $x = 0,2194$; $y = 0,2484$; $z = 0,5322$;

3. Calculate $L^*u^*v^*$ using values X , Y , Z . From these input values also calculate x , y , z .

$X = 51,50$	$X_0 = 94,81$	$L^* = ?$	$x = ?$
$Y = 61,88$	$Y_0 = 100$	$u^* = ?$	$y = ?$
$Z = 60,13$	$Z_0 = 107,32$	$v^* = ?$	$z = ?$

$u' = 0,1776$; $v' = 0,4801$; $u_0 = 0,1979$; $v_0 = 0,4695$; $L^* = 82,8496$; $u^* = -21,8438$;
 $v^* = 11,3373$; $x = 0,2968$; $y = 0,3566$; $z = 0,3466$;

4. Calculate whiteness index W_{CIE} and tint T_{CIE} (tint) for values.

$X = 83,7345$	$x_0 = 0,31381$	$x = ?$
$Y = 85,8178$	$y_0 = 0,33098$	$y = ?$
$Z = 121,4528$		$W_{CIE} = ?$
		$T_{CIE} = ?$

$x = 0,2877$; $y = 0,2949$; $W_{CIE} = 168,0054$; $T_{CIE} = 0,0099$;

5. Calculate coordinates $L^*a^*b^*$ of CIELAB color space and calculate color difference ΔE^* .

$X_b = 56,00$	$X_{st} = 55,63$	$X_0 = 94,81$	$L_{st}^* = ?$	$L_b^* = ?$	$\Delta E^* = ?$
$Y_b = 51,28$	$Y_{st} = 50,18$	$Y_0 = 100$	$a_{st}^* = ?$	$a_b^* = ?$	
$Z_b = 35,40$	$Z_{st} = 33,56$	$Z_0 = 107,32$	$b_{st}^* = ?$	$b_b^* = ?$	

$$\Delta a^* = -1,9563; \Delta b^* = -1,2840; \Delta L^* = 0,6687; \Delta E^* = 2,4337;$$

6. Calculate the difference between the Kubelka–Munk function for the standard and batch.

$$\begin{aligned} R_{st}(\%) &= 74 & K / S_{st} &=? \\ R_b(\%) &= 60 & K / S_b &=? \\ & & \Delta K / S &=? \end{aligned}$$

$$\Delta K / S = 0,0877;$$

7. Calculate the maximum wavelength λ_{max} (nm) of the maximum spectral density of the emission from an absolute blackbody at 4500 °C from Wien's displacement law. The value of Wien's displacement constant is $b=2,8977 \times 10^{-3}$ mK.

$$\lambda_{max} = 607 \text{ nm}$$

8. Calculate the excitation (coordination) purity p_E for hue with the coordinates given in the table together with the white point of CIE D65 (W) and the corresponding purest color of this hue (F₁).

Sample	$x = 0,1800$	$y = 0,6150$
Pure color F ₁	$x_{F_1} = 0,0850$	$y_{F_1} = 0,8170$
White point W	$x_0 = 0,3138$	$y_0 = 0,3310$

$$p_{Ex} = 0,5848, p_{Ey} = 0,5844$$

9. Calculate coordinates x,y,z.

$$X = 14,2263 \quad x = ?$$

$$Y = 13,0758 \quad y = ?$$

$$Z = 30,5056 \quad z = ?$$

$$x = 0,2461; y = 0,2262; z = 0,5277;$$

10. Calculate coordinates L^* , a^* , b^* , C^* a h_{ab} .

$$X = 4,9752 \quad X_0 = 94,81 \quad x_0 = 0,31381 \quad L^* = ? \quad C^* = ?$$

$$Y = 8,1332 \quad Y_0 = 100 \quad y_0 = 0,33098 \quad a^* = ? \quad h_{ab} = ?$$

$$Z = 6,6947 \quad Z_0 = 107,32 \quad b^* = ?$$

$$L^* = 34,2587; a^* = -29,44; b^* = 7,3333; C^* = 30,3396; h_{ab} = 2,8975;$$

11. Calculate coordinates C^* a h_{ab} .

$$L^* = 61,5634$$

$$a^* = 79,9714$$

$$b^* = 51,1078$$

$$C^* = ?$$

$$h_{ab} = ?$$

$$C^* = 94,9075; h_{ab} = 0,5687;$$



