ASSIGNMENT
03

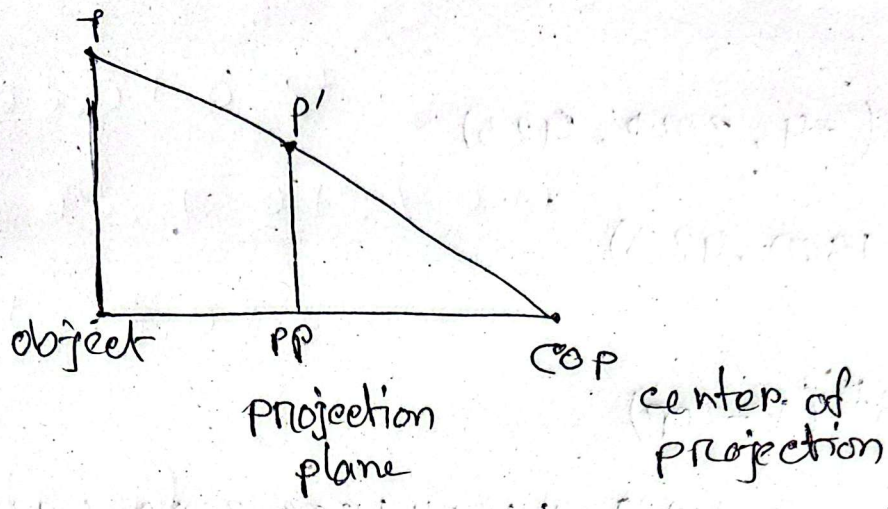
NAME : Abdullah Al Mahmud

ID : 22201502

SEC : 18

1.

(a)



COP the origin

distance d ~~z~~ = d

a 3d point P = (x, y, z, 1) projected on P' = (x', y', z', 1).

$$x' = \frac{d}{z}x, \quad y' = \frac{d}{z}y, \quad z' = \frac{d}{z}z = d$$

$$M = \begin{vmatrix} d & 0 & 0 & 0 \\ 0 & d & 0 & 0 \\ 0 & 0 & d & 0 \\ 0 & 0 & 1 & 0 \end{vmatrix}$$

$$\begin{bmatrix} d & 0 & 0 & 0 \\ 0 & d & 0 & 0 \\ 0 & 0 & d & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix} \begin{vmatrix} x \\ y \\ z \\ 1 \end{vmatrix} = \begin{vmatrix} dx \\ dy \\ dz \\ z \end{vmatrix}$$

after dividing by z, ~~PP~~ projection point is,

$$P' = \left(\frac{dx}{z}, \frac{dy}{z}, d, 1 \right)$$

(b)

$COP = (-4, 2000, 423)$

$P = (4, 1500, 423)$

$L(t) = COP + t(P - COP)$

$= (-4, 200, 423) + t(4+4, 1500-2000, -423-423)$

$= (-4, 2000, 423) + t(8, -500, -846)$

$z = 0,$

$\Rightarrow 423 + t(-846) = 0$

$\Rightarrow t = \frac{423}{846} = 1/2$

$x = -4 + 1/2 \times 8 = -4 + 4 = 0$

$y = 2000 + 1/2(-500) = 2000 - 250 = 1750$

$P' = (0, 1750, 0)$ Ans

2.

(a) CMY = (0.3, 0.7, 0.2)

RGB = (1 − 0.3, 1 − 0.7, 1 − 0.2)

= .7, .3, 0.8

V = max (RGB)

= 0.8

L = max − min = 0.8 − 0.3 = 0.5

S = $\frac{L}{max} = \frac{0.5}{0.8}$ = 5/8

Here, blue is max

H = $\left(\frac{R-G}{L}\right) \times 60^\circ + 240^\circ = \left(\frac{.7-.3}{.5}\right) \times 60^\circ + 240^\circ$

= 288°

HSV = (288°, 5/8, 0.8) Ans

(b)

$H = 135°$, $S = 0.9$, $V = 80\%$.

$S = 0.9$

$V = 0.8$

$C = V \cdot S = 0.8 \times 0.9 = .72$

$H/60 = 135°/60 = 2.25$

$X = C \times (1 - |2.25 \bmod 2 - 1|$

$= 0.72 \times (1 - |.25 - 1|)$

$= 0.72 \times .25 = .18$

$R', G', B' = (0, C, X) = (0, .72, .18)$

$R = 0 + .008 = 0.08$

$G = .72 + 0.08 = 0.8$

$B = 0.18 + .08 = .26$

$(RGB) = (.08, 0.8, .26)$ Ans