

**3.24** Convert the coordinates of the following points from spherical to cylindrical coordinates:

(a)  $P_1 = (5, 0, 0)$ ,

(b)  $P_2 = (5, 0, \pi)$ ,

(c)  $P_3 = (3, \pi/2, 0)$ .

**Solution:**

(a)

$$\begin{aligned} P_1 = (r, \phi, z) &= (R \sin \theta, \phi, R \cos \theta) = (5 \sin 0, 0, 5 \cos 0) \\ &= (0, 0, 5). \end{aligned}$$

(b)  $P_2 = (r, \phi, z) = (5 \sin 0, \pi, 5 \cos 0) = (0, \pi, 5)$ .

(c)  $P_3 = (r, \phi, z) = (3 \sin \frac{\pi}{2}, 0, 3 \cos \frac{\pi}{2}) = (3, 0, 0)$ .

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