5.6.

Lets define $A := \{(X, Y, Z) : x^2 + y^2 + z^2 \leq 1\}$ the set of points in S^2.

We also define $R = \sqrt{X^2 + Y^2 + Z^2}$ the distance of the point $(X, Y, Z) \in A$ from the origin.

First of all, we have to understand the meaning of $R < r$ for $r \in (0, 1]$.

$R < r \equiv x^2 + Y^2 + z^2 < r^2$ ⤳ event of having the ball of radius r.

Now, since the distribution is uniform ⟹ every point is equiprobable in S^2.

Hence, with the same logic of the uniform in 1 dimension, the CDF represents the length of the r-ball respect to the total length of S^2. We are in 3 dimensions, so the length of the r-ball is: $\frac{4}{3}\pi r^3$.

$$F_R(r) = P(R < r) = \frac{\text{Volume of r-ball}}{\text{Volume of } S^2} = \frac{\frac{4}{3}\pi r^3}{\frac{4}{3}\pi} = r^3$$

So, the PDF will be $f_R(r) = 3r^2$.