Q4. Suppose that the time for developing of a tumour in rats exposed to a carcinogen follows a Weibull distribution with α=2 and λ=0.002. (time is in units?)

1. What is the average time to tumour development?
2. Find the hazard rate of tumour development at 10 days, 20 days and 30 days. Find the median time to the tumour development.

(unit of hazard rate?)

The time in days to development of a tumor for rats exposed to a carcinogen follows a Weibull distribution with α=2 and λ=0.001. (a)What is the probability a rat will be tumor free at 30 days? 45 days? 60 days? Answer: Let X denote the time in days to development of a tumor for rats exposed to a carcinogen, and X has Weibull distribution with α=2 and λ=0.001. So the p.d.f. of X is f(x) = 21000∙ 𝑥 ∙ exp{−11000∙ 𝑥2}. P{X>t} = ∫21000∙ 𝑥 ∙ exp{−11000∙ 𝑥2}∞?dx= −exp{−11000∙ 𝑥2}|?∞= exp{−11000∙ ?2}∴p{X>30} = exp{ −1 1000 ∙ 30 2 } = 0.407 ; p{X>45} = exp{ −1 1000 ∙ 45 2 } = 0.132 p{X>60} = exp{ −1 1000 ∙ 60 2 } = 0.027