Dr. Sasha

It is the information about the task N26

1) Th-234 has a half-life of 24.1 days. Your answer is:

$$T_{1/2} = 24.106 \pm 0.007 \text{ s.}$$

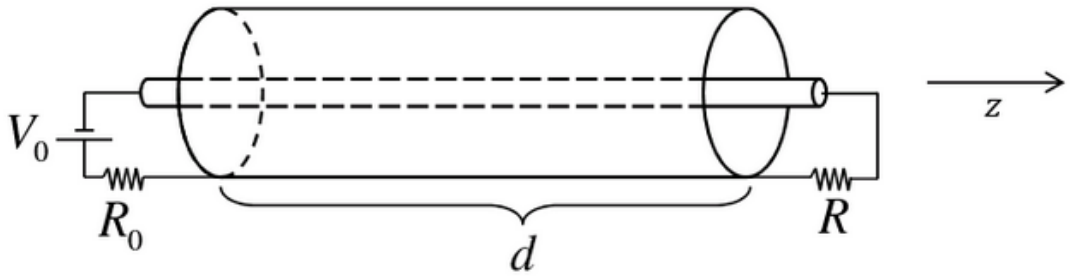
2),3) and 5) I agree with your answers.

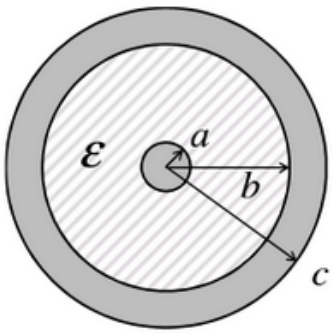
4) It is a good that you know the telegraph equation. The variable x is a coordinate along the coaxial cable. If you solve the system

$$\frac{\partial^2 V}{\partial t^2} = u^2 \frac{\partial^2 V}{\partial x^2},$$
$$\frac{\partial^2 I}{\partial t^2} = u^2 \frac{\partial^2 I}{\partial x^2},$$

how would you find the magnetic and electric fields $\vec{B}(r,t)$, $\vec{E}(r,t)$ (where $b \le r \le a$ is the distance from the center of the cable)?

4) A coaxial cable consists of a wire with radius a (the core of the cable), which is wrapped with insulating material with dielectric constant ε, until radius b (called the insulator).





Around the cable there is a layer of conducting material (radius c from the center of the cable and is called the wrapper). The wire's length is d such that $d >>$ a, b, c. At one side of the cable, a voltage source V_0 with inner resistance R_0 is connected to both the wire and the wrapper, and at the other side, a resistor R is connected instead of a voltage source. Find the magnetic and electric fields $\vec{B}(r,t)$, $\vec{E}(r,t)$ (where $b \le r \le a$ is the distance from the center of the cable from z axis in the picture) generated after turn on of the voltage source.