Solution for Q.4:

Part (a):

This optical illusion seen in the video is "purportedly" made possible by synching the camera shutter speed with the rotation of the helicopter's blades, giving the latter the appearance of "staticity."
The filmmaker of the video synched his shutter speed with the rotation of the helicopter blades to make it appear as it does.
This is a matter of frame rate, not shutter speed. The frame rate has to be synched such that with each frame exposure the blades are in the exact same position.

The effect is due to shutter speed as well as due to frame rate . i.e it is the factor of both. *Since each frame has to ensure the blade is in the same position as the last it therefore needs to be in sync with the rpm of the rotar blades. Shutter speed then needs to be fast enough to freeze the blade without too much motion blur within each frame.*

Part (b):

*Here the rotor has five blades, now it is given that the rps of the rotor is R2. That means, per rotation, a blade is in a specific spot on five counts. That gives us an effective rps of 5*R2 .*

*Therefore shooting at (5*R2) fps will ensure the rotor blades are shot in the same position every frame. Each frame then has to be shot at a fast enough shutter speed to freeze the blade for minimal motion blur.*

*Hence R1 = 5*R2*

Part (c):

In part (a), we assumed that the chopper has 5 rotor blades.This assumption is valid because we can see 5 rotor blades if R1 = 5*R2 as we have done in the part(b).

If we had seen 6 blades in the video then let's take the chopper has x blades.then

x = R1/R2 and x must be integer so x can be 1,2 or 3 or even 6.

Hence if we had seen 6 blades in the video and if R1 = 6*R2,then the chopper will have 6 blades.

In general,the chopper can have 1,2,3 or 6 blades if we see 6 rotor blades in the video.