1. Complete the conversation using the words in the box.

An interior designer is talking to a structural engineer.

Appropriate, effective, inappropriate, ineffective, insufficient, sufficient

Designer: One idea I've had, as a design feature on the concrete columns, is to have a really rough finish on the surface, with the steel reinforcement partly exposed in places, so it's visible. I don't know if it would be OK to do that – whether it would be (1) , technically. I'm only talking about the columns inside the building. It would obviously be (2) to do that with the ones outside, otherwise the steel would rust.

Engineer: Yeah. It would also be a problem inside, actually, with fire regulations. You have to have (3) thickness of concrete covering the steel, to protect it against fire.

Designer: Oh, right. I didn't realise steel could catch fire. Engineer: Well, it doesn't actually catch fire. But when it gets hot, it just goes like rubber – structurally, it becomes totally (4) . So if there's (5) cover, then ...

Designer: The building falls down.

Engineer: That's right. I mean, you can get a special type of fire-resistant paint, called intumescent paint. But you need to put on quite a thick coat to make it (6) . So you wouldn't see the steel through it. And it's not really designed for that purpose.

Designer: OK, not to worry. It was just an idea.

2. Complete the conversation using the words in the box.

An engineer at a power station is talking to a manager.

cost-effective, efficient, inefficient, reliable, uneconomical, unreliable

Engineer: Given the age of these gas turbines, you'd think they would be breaking down all the time – starting to get (7) . But that's not the case at all. They're performing perfectly well. The problem is, in terms of energy consumption, compared with modern equivalents they're just very (8) . So financially speaking, it's just not (9) to keep running such (10) equipment.

Manager: So we need to look at replacing them with a more economical solution before they reach the end of their planned lifespan? That's basically what you're saying?

Engineer: I think we have to, yes. If we wait until they break down, we'll still be using them in 50 years' time. In a sense, you could say they're too (11) .

Manager: OK. And in terms of energy consumption, how (12) would a new installation be, comparatively?

3. Use the words below to complete the textbook extract about the effects of forces.

Accelerate, area, compress, deform, elongation, gravity, magnitude, mass, strain, stress, unit, velocity

The (1) of force is the newton (N). One newton is equal to the force required to cause a (2) of 1 kilogram (kg) to (3) at 1 metre per second per second (m/sI). For example, if an object with a mass of 1 kg is floating in space, and is pushed by a constant force of 1 N, the (4) (speed) of the mass, measured in metres per second (m/s), will increase by 1 m/s every second (= 1 m/sI). On earth, (5) exerts a downward acceleration of approximately 10 m/sI. Therefore, on earth, a 1 kg mass is subjected to a downward force of approximately 10 N, a 2 kg mass to 20 N, and so on. The effect a force has on an object, such as a column in a building, depends on the (6) of the force (how great the force is). It also depends on the size of the object – so for a column, how thick it is, or more precisely, what its cross-sectional (7) is. If the same force is applied to two columns with different-sized cross-sections, the thinner column will have a harder time, as the force will be more concentrated. The degree to which force is concentrated (the measurement of force divided by area) is called (8) , and is measured in Pascals (P), the unit of pressure. When subjected to stress, an object will either move (e.g. slide or sink), (9) (change shape), or do both. In a column in a building, for example, an applied stress will tend to cause the column to (10) (squash) slightly – though this deformation will be very slight, and invisible to the eye. In engineering, a change in shape due to the effects of stress, such as compression (decreasing in length) or (11) (increasing in length), is called (12) .