Question #1

-The risks that Apache faces are:

1. Systematic risk: It is the type of risk that affects the whole economy. Any change in business cycle will have effect on the oil and gas industry and ultimately Apache Corporation.
2. Price risk of oil and gas due to price volatility: If the price change is dramatic, Apache may not be as well prepared as the large oil companies. If the price takes a slump, Apache needs to cut production and capital expenditures.
3. Basis risk while trading oil and gas futures: The company entering the contract is responsible for delivering commodities to specific points. Apaches exposure to basis risk can be costly if it finds itself unable to fulfill the contract requirements.
4. Competitive threats: Major oil companies are better capitalized and have better credit availability than some of the smaller independent companies in the industry, so they can better withstand oil and gas price volatility and support their operations.

Question #2

**Quantification of volatility of commodity price**

* Risk exposure = prob(risk occurring) X total actual loss/cost of risk occurrence

Given the equation above, as Apache hedged against the oil & gas price drop, the probability of risk of having actual cost from any price drop is zero. Also, with the hedging program, there is no actual loss of risk occurrence. With our assumption of the probability of risk occurring being zero, the lost amount of sales from price increase, which is total actual loss of risk occurrence in the equation does not make difference on risk exposure. Therefore, Apache’s hedging strategy makes the volatility of commodity price to zero.

**Effects of changes in oil and gas prices on equity value**

* While Apache has hedged the volatility of oil and gas price with futures, it would still have some impact on equity value. First, there would be lost revenue if the price goes beyond strike price. Assuming that Apache locked in the price at $50 and the sales price hits $60, the equity holders would not get the benefit from high sales price and lose potential incremental revenue of $10. We can say that the opposite scenario could happen (which is price drop) and the hedging prevents decrease in sales, but the shareholder would still be unhappy about opportunity cost.

Question #3

**Supply: Low controllability on supply**

* Unlike the oil industry, whose supply is controlled by OPEC, the natural gas industry has no institutions to control the supply to stabilize its price. As a result, the gas price is more volatile than the oil price when facing demand fluctuation.

**Demand: More volatile demand (higher cyclicality)**

* Unlike oil that is mainly used for transportation fuel, natural gas has been a main source of heating fuels in the United States for its cleanliness and efficiency. It is natural for the demand for natural gas to be seasonal, high in winter and low in the rest of seasons. It is also difficult to predict the weather and produce appropriate amounts of natural gas for the future, making it more volatile in the market.

**Storage: More difficult to pile up inventories**

* As natural gas is highly explosive, it is more difficult and costly to store large amounts as inventories than oil. This leads to a lower inventory level than that of oil, and eventually makes the gas industry cannot have enough buffer to absorb the volatile demand. As a result, the gas price is more volatile than that of the oil.

Question #4

If Apache's managers do not have a specific skill in predicting future oil and gas prices, there are several benefits.

1. Hedging could lower the probability of financial distress and associated deadweight costs, minimizing risk of underinvestment.
2. Hedging could contribute to the firm’s credibility in the acquisition process by increasing firm’s financial flexibility, and giving Apache a big advantage in the acquisitions market.
3. Also Apaches reduction in risk and overall conservative financial practices allows the firm to maintain adequate coverage of fixed charges and capital expenditures needed to replace production.

Question #5

There are risks of operational hedging and financial hedging and basis risk. For instance, in Oil and Gas Producers' Hedges in Place for Years 2000 and 2001, Apache Corp, total effect on cash flow per share is -3%. This exhibit indicates that Apache should hedge properly. Only part of risks when hedging can be mitigated.

1. First, for operational hedging, when Apache cuts back investments when facing low price, it has the risk of losing valuable investment. Finding a balance in operational hedging can help to mitigate this risk.
2. Second, for financial hedging, since Apache has option-based hedging practices, it faces risks of options contracts. It must guarantee a minimum price for oil at maturity – still have some upside potential. In regard to it is a right not an obligation, the flexibility has value. It has to pay a premium today for it. To mitigate this hedging risk, Apache should spend an adequate amount of money to pay the option premium.
3. Third, there is basic risk. Simplest way to mitigate your exposure to basis risk is to enter into supply (in the case of a consumer) or marketing (in the case of a producer) agreements that reference a "primary" index (i.e. NYMEX natural gas futures, ICE Brent crude oil, etc) or one of the numerous, liquid (actively traded) regional indices.