

Answer **ALL** of the following questions:

1. Define the engineering terms: objective, goal and constraint (**6 marks**)
2. The great pyramid stands 137m above the bedrock has a mass of approximately 7 billion kilograms ($7 \times 10^9 \text{kg}$). Constructed of limestone, basalt and granite blocks, each with an approximate mass of 3,000 kg, the building is aligned to within a mean error of less than 15mm. Making reasonable estimates for quarrying, transport, surveying and construction of this building, estimate the total number of engineering hours required to construct it using modern building techniques and labour rates. Estimate the labor cost of construction and time to completion. Provide your workings and comment on your results. (**10 marks**)
3. Construct an objective tree of an egg cup (a cup specifically designed to hold a boiled egg for consumption). (**10 marks**)
4. An engineer is developing computer software to provide web pages over the internet. Discuss the options for intellectual property protection for this initiative. (**9 marks**)
5. Conduct a pair-wise analysis to rank the significance of the following features in the design of a camera phone (call clarity, call cost, convenience, durability, image quality, image frame rate, portability, reception range). (**5 marks**)
6. Construct a Duncker diagram to describe the present and desired states for Canadian domestic air transport. Include general, functional and specific solutions in your analysis (**10 marks**)