**Benha University Energy & Sustainable**

**Shoubra Faculty of Engineering Energy Engineering**

 **Bioenergy 3rdyear (2019-2020)**

 **Energy and EnergyTypes Sheet (1)**

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1). What other forms of energy can be produced from chemical energy?

2). Name three examples of other fuels that contain chemical energy.

3) Why is the process of photosynthesis so valuable?

4) Primary energy is the energy extracted or captured directly from the environment. What are the various types?

5) Write a short report on the higher heating value , lower heating value , Net heating value , The gross heating value

6) Why is Bioenergy considered a renewable form of energy?

7) What are the main sources of biomass for bioenergy?

8) An average daily traveling distance is about 40 miles/day. A car has a city-mileage

of 20 miles/gal. If the car is replaced with a new car with a city-mileage of

30 miles/gal, estimate the amount of fuel, energy, conserved with the new car per year.

Assume: The gasoline is incompressible with ρ = 0.75 kg/l.

 Lower heating value = 44000 kJ/kg .

US gallon = 3.785 l

9) An average car consumes about 2 gallons (US gallon = 3.785 l) a day, and the capacity of the fuel tank is about 15 gallon. Therefore, a car needs to be refueled once every week. The density of gasoline ranges from 0.72 to 0.78 kg/l. The lower heating value of gasoline is about 44,000 kJ/kg. Assume

that the average density of gasoline is 0.75 kg/l. If the car was able to use 0.2 kg of nuclear fuel of uranium-235, estimate the time in years for refueling. Assume : Complete fission energy of U-235 = 6.73 9 1010 kJ/kg .

10) Estimate the gross heating values in kJ/kg for the biomass redwood from: (a) ultimate analysis, (b) fixed carbon, (c) dry ash content, and (d) carbon (C), hydrogen (H), and oxygen (O) compositions .

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