

Question	Answer(s)					Notes Lecturer only
	A	B	C	D	E	
1) Which oil plant species has the highest oil yield per hectare? (Mark only one!) A: Soybean B: Oil palm C: Castor bean D: Jatropha E: Peanut	<input type="radio"/>					
2) How much is the density of vegetable oils? A: <1 kg/l B: >1 kg/l C: <1000 kg/m³ D: >1000 kg/m³ E: <1000 m³/kg	<input type="radio"/>					
3) Which parameters determine the quality of straight vegetable oil (SVO) and biodiesel for its use as fuel in engines? A: Heating value B: Density C: Viscosity D: Flash point E: Color	<input type="radio"/>					
4) How much biodiesel is produced from 100 kg of vegetable oil (SVO)? A: ≈1000 kg B: ≈100 kg C: ≈10 kg D: >100 l E: >1000 l	<input type="radio"/>					
5) Which sugar or starch plant species has the highest ethanol yield per hectare? (Mark only one!) A: Wheat B: Sugar cane C: Potato D: Corn (Maize) E: Rye	<input type="radio"/>					
6) How much is the energy yield of sugar cane ethanol per hectare? (Cane yield = 70 t _{FM} /ha; Ethanol prod. rate = 70 kg/t _{FM} ; LHV = 27 MJ/kg _{EtOH}) A: 132300 MJ B: 181 MJ C: 36750 kWh D: 181 GJ E: 1890 MJ	<input type="radio"/>					
7) How much is the energy yield of bagasse per hectare? (Bagasse FM mass = 25% of cane FM mass (see above); LHV _{FM} = 8 MJ/kg _{FM}) A: 175 GJ B: 140 MJ C: 38888 kWh D: 140 GJ E: 38.9 kWh	<input type="radio"/>					
8) Which nutrients remain in relevant quantities in the ash after combustion of biomass? A: N B: P C: K D: Ca E: Mg	<input type="radio"/>					
9) How much heat produces a boiler by the combustion of 3.0 m³ wood chips? (Density = 200 kg _{FM} /m ³ ; LHV = 15 MJ/kg _{FM} ; Boiler efficiency = 90%) A: 2700 MJ B: 8100 MJ C: 9720 MJ D: 2250 kWh E: 2700 kWh	<input type="radio"/>					
10) How is biodiesel produced? A: Fermentation B: Transesterification C: Digestion D: Dehydration E: X	<input type="radio"/>					
11) Which types of biofuels can be produced from (lingo-) cellulosic crops? A: Vegetable oils B: Solid C: Liquid D: Gaseous E: BtL fuels	<input type="radio"/>					
12) Which is the lowest of following heating values? (HHV... Higher Heating Value; LHV...Lower Heating Value; DM...Dry Matter; FM...Fresh Matter) A: HHV_{FM} B: HHV_{DM} C: LHV_{FM} D: LHV_{DM} E: X	<input type="radio"/>					
13) What is a typical value of the electric efficiency of biomass to power conversion via gasification without CHP? A: 20% B: 30% C:40% D: 50% E: 60%	<input type="radio"/>					
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You are to mark (X) the correct answer(s) in the white box(es) with a ballpoint pen.



MULTIPLE CHOICE QUESTIONS Name:

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	A	B	C	D	E	
14) How much is 1 kWh? A: 1000 Ws B: 0.278 MJ C: 3.6 MJ D: 3 600 000 Ws E: 3 600 kJ	<input type="checkbox"/>					
15) How much energy do you need to use a 100 W lamp 10 hours? A: 3.6 MJ B: 1.0 kWh C: 9.8 Nm D: 1.00 kgoe E: 3 600 000 Ws	<input type="checkbox"/>					
16) Which 3 renewable energy sources have (theoretically) the biggest energy potentials worldwide? A: Solar energy B: Biomass C: Hydropower D: Wind E: Geothermal energy	<input type="checkbox"/>					
17) Which renewable energy source currently has the biggest share in global renewable energy consumption? A: Solar energy B: Biomass C: Hydropower D: Wind E: Geothermal energy	<input type="checkbox"/>					
18) How is the energy efficiency defined? (A - B) And what are its units? (C - E) A: Output/Input B: Input/Output C: MJ D: % E: kWh	<input type="checkbox"/>					
19) Which gases are climate affecting greenhouse gases (GHGs) or so called Kyoto gases? A: CO ₂ B: CH ₄ C: CO D: N ₂ O E: NH ₃	<input type="checkbox"/>					
20) How much is the global warming potential (GWP) or the CO ₂ equivalent of carbon dioxide? A: 1 B: < 1 C: 2-10 D: 11-100 E: > 100	<input type="checkbox"/>					
21) What are the 3 main elements (> 1%) in biomass? A: C B: O C: P D: K E: H	<input type="checkbox"/>					
22) Which types of biofuels can be produced from lingo-cellulosic plant species? A: Solid fuels B: Liquid fuels C: Syngas D: Biogas E: BtL fuels	<input type="checkbox"/>					
23) Which combustion emissions are harmful to human health? A: CO B: CO ₂ C: N ₂ O D: NO _x E: Dust (fly ash)	<input type="checkbox"/>					
24) What is biomass? A: Wood B: Algae C: Vegetable oil D: Lignite E: Manure	<input type="checkbox"/>					
25) How much is the annual dry matter yield of eucalyptus, if 300 m ³ solid wood are harvested every 6 years? (Moisture = 50%; Density = 800 kg _{FM} /m ³) A: 10 B: 20 C: 30 D: 40 E: 50 t _{DM} /(ha y)	<input type="checkbox"/>					
26) Which elements of any type of fuel cause greenhouse gas (GHG) emissions during combustion? A: C B: O C: N D: P E: K	<input type="checkbox"/>					
27) What does the greenhouse gas (GHG) emissions of energy crops depend on? A: Species B: Fertilization C: Technology D: Transport E: Combustion	<input type="checkbox"/>					
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28) What is an anaerobic process? A: without oxygen B: without hydrogen C: without sulfur D: without carbon dioxide E: with oxygen	<input type="checkbox"/>					
29) At which temperature range are mesophilic conditions? A: 15-20 °C B: 20-25 °C C: 35-40 °C D: 40-45 °C E: 50-55 °C	<input type="checkbox"/>					
30) The temperature range from 20-25° C is called? A: thermophilic B mesophilic C: psychrophilic D: hot E: cold	<input type="checkbox"/>					
31) At which temperature range the thermophilic conditions? A: 20 -25 °C B: 35 - 40 °C C: 45 -50 °C D: 50 -55 °C E: 70 °C	<input type="checkbox"/>					
32) What is an acceptable PH value for methanogenic archaea? A: 5.5 B: 6.0 C: 7.0 D: 7.5 E: 9.0	<input type="checkbox"/>					
33) What is the ideal PH value of hydrolization? A: 5.5 B: 6.0 C: 7.0 D: 7.5 E: 9.0	<input type="checkbox"/>					
34) Which useful energies are provided by a CHP? A: electricity B: heat C:light D: radio waves E: sound	<input type="checkbox"/>					
35) What is synonymous to combined heat and power? A: cogeneration B: CHP C: diesel engine D: gas-otto engine E: generator	<input type="checkbox"/>					
36) Which of the following engines can be part of a CHP? A: diesel engine B: fuel cell C: gas-otto engine D: micro turbine E: stirling engine	<input type="checkbox"/>					
37) At which value of the ratio CH ₄ /CO ₂ should you be alerted? A: 0.5 B: 0.9 C: 1.1 D: 1.5 E: 2.0	<input type="checkbox"/>					
Page 3 score	-	-	-	-	-	
Overall score	-	-	-	-	-	
Percent of max. attainable score	-	-	-	-	-	
Final grade	-	-	-	-	-	

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