

ENE 101 Introduction to Energy Engineering

Worksheet for the final exam

- 1) The "efficiency" of a light bulb is the ratio of the:
 - a) heat plus electricity produced to the electrical input
 - b) voltage output of the bulb to the power input
 - c) energy into the bulb to the energy out of the bulb
 - d) light output to the electrical energy input

- 2) The reason that you would use a ramp to carry a weight to the top of a platform, rather than lifting it up a ladder, is because the
 - a) force exerted would be less
 - b) work done would be less
 - c) energy spent would be less
 - d) gain in potential energy would be more

- 3) When a car is braked to a stop, its kinetic energy is transformed into
 - a) stopping energy
 - b) potential energy
 - c) heat energy
 - d) energy of motion

- 4) Which of the following is a unit of power?
 - a) Btu
 - b) kilowatt
 - c) kilowatt-hour
 - d) Joule
 - e) horsepower per hour

- 5) Which is/are not a renewable energy source?
 - a) Hydrogen Energy
 - b) Wind Energy
 - c) Geothermal Energy
 - d) Nuclear energy

- 6) Which is true about the nature of energy
 - a) Energy can be generated from entropy
 - b) Energy is free and available to be used anywhere
 - c) Heat energy can be converted to electricity without loss
 - d) Energy can be created from matter

- 7) Before industrial age which energy source is used for transportation
 - a) Wind power
 - b) Oil
 - c) Solar power
 - d) Coal

- 8) Which energy conversion is true for the corresponding device
 - a) Wind turbine : mechanical → electric
 - b) Photovoltaic cell : heat → electric
 - c) Diesel engine : chemical → electric
 - d) Nuclear power plant : chemical → electric

- 9) Which is not a byproduct of burning natural gas?
 - a) Carbon monoxide
 - b) Nitrogen oxides
 - c) Sulfur Dioxide
 - d) Mercury

- 10) Which is not a sign of global warming?
- Sea ice shrinking
 - Tinning /depletion of ozone layer
 - Sea level rising
 - Increase of storm and flood damage
- 11) Which of the renewable energy source is not a result of sun light?
- Wind
 - Geothermal
 - Hydropower
 - Biomass
- 12) How much energy do you spend if you climb 100m up a mountain in 20 minutes? Assume that your weight is 70 kg.
- 69 kJ
 - 100 kJ
 - 2333kJ
 - 0.5 kWh
 - 59 kWh
- 13) Which of the following is a unit of energy?
- Watt
 - Joule/second
 - kWh
 - horse-power
 - BTU*h
- 14) For a modern fossil fuel electric generating plant, 10,000 BTU's of chemical energy input into the power plant will result in about how many BTU's of waste heat dumped into the environment
- 0 BTU
 - 1000 BTU
 - 4000 BTU
 - 6000 BTU
 - 10000 BTU
- 15) Power is defined as _____.
- the energy used times the time
 - the work done times the distance of motion
 - the energy used divided by the work
 - the rate of converting energy
 - the ability to do work
- 16) The cost of running a set of eight light bulb with a rated power of 100W for 6 hours, with the cost of electricity at 9 cents per kWh is approximately:
- 5 cents
 - 24 cents
 - 43 cents
 - 54 cents
 - 72 cents
- 17) The energy conversion efficiency of a car illumination system is represented by 3 step process. If the conversion efficiencies are 40 % for the first step (diesel motor), 75% for the second (generator), and 10 % for the third (bulb), what is the overall efficiency (step one to end) of light energy generation of a car?
- 1%
 - 3 %
 - 5%
 - 30%
 - 100%
- 18) What is energy? Please briefly explain different forms of energies. Give examples for the energy and power units for electricity and heat measurements.
- 19) Compare the conventional energy sources with the renewable energy sources in terms of their advantages and disadvantages.
- 20) Please explain how energy affects the climate change. Provide possible solutions and/or trends which can reduce carbon emission for a better environment (climate protection).
- 21) What is energy conversion? What is energy conversion efficiency? Briefly explain with an example.
- 22) Can we supply world energy demand only by use of renewable energy sources? If yes, what we would be required to achieve this goal? Which renewable technology is more promising?
-

- 23) Which is not a part of VAWT (Vertical axis wind turbine)
- a) Brake b) Yaw system c) Controller d) Gear box e) Generator
- 24) What is the cost of running an ideal natural gas burner for a month to heat your home with a rated power of 2000W for 10 hours per day? The cost of natural gas is 0,15 TL per kWh.
- a) 10 TL b) 90 TL c) 170 TL d) 200 TL e) 220 TL
- 25) What is the typical output water temperature for flat plate solar thermal collectors?
- a) 30 °C b) 70 °C c) 100 °C d) 150 °C e) 300 °C
- 26) What is the main reason of using transparent glass glazing for the flat plate collectors?
- a) To increase the incoming radiation
b) To reduce radiative and convective heat transfer to the environment
c) To prevent dust/soil
d) To transmit long wavelength radiation away from the absorber plate
e) To produce electricity from light
- 27) Which is/are true for the photovoltaic solar panels.
- a) Directly generates electricity from sunlight
b) Has glazing to prevent heat loss
c) Not working efficiently in cold environment.
d) The most common type is produced from Silicon material
- 28) Which is not a type of a light concentrator used in solar collectors?
- a) Evacuated tube b) Parabolic through c) Parabolic dish
d) Solar tower e) Linear Fresnel reflector
- 29) What is the primary fuel in nuclear reactors?
- a) neutrino b) positron c) Uranium 238 d) Heavy water e) Uranium 235
- 30) Define:
- a) the coefficient of performance(COP) of refrigeration,
b) efficiency of automotive transmission
c) efficiency of the internal combustion engine.
d) Efficiency of alternator
- 31) Explain the drag and lift forces for the wind turbines. Which is dominant for the modern wind turbines?
- 32) Explain the purpose of a Yaw System for wind turbines.
- 33) What is the amount of wind power flowing through 1 m² area if the wind is blowing with a speed of 5 m/s. (density of air = $\rho = 1.225 \text{ kg/m}^3$)
- 34) What is the purpose of the control rods in nuclear power plants?
- 35) Which is not a type of geothermal power plant:
- a) Dry steam plant b) Flash steam plant c) Binary cycle power plant d) Stirling engine plant