001. What are the two primary processes under bio-chemical conversion? **C**

A Photosynthesis and respiration
B Photosynthesis and photovoltaic
C Anaerobic digestion and fermentation
D Anaerobic digestion and photosynthesis

002. What is anaerobic digestion? **B**

A Produces biogas by heating the biomass
B Produces biogas using micro-organisms operating in anaerobic conditions
C Produces biogas by subjecting the biomass to high pressures
D Produces biogas using micro-organisms operating in aerobic conditions

003. Which of the following is not a biomass resource? **D**

A Animal wastes
B Forestry residue
C Agricultural residue
D Sunlight

004. Which of the following can be classified under solid biomass? **A**

A Agricultural residues
B Waste water
C Industrial effluents into rivers
D Plastic

005. Which of the following found in municipal waste can be used as biomass? **B**

A Agricultural residue
B Kitchen waste
C Residential garbage
D Plastic covers

006. Which of the following products of anaerobic digestion consists of organic humus and nutrients? **D**

A Biogas
B Chlorine
C Top soil
D Bio-fertilizer

007. Which of the following is best suited to decompose lignin? **C**

A Anerobic digestion
B Fermentation
C Thermo-chemical conversion techniques
D Bio-chemical conversion techniques

008. Which of the following are considered as contaminant gases in biogas? **C**

A Chlorine
B Fluorine
C Nitrogen, hydrogen and carbon monoxide
D Methane gas and carbon dioxide

009. What are the two main products of anaerobic digestion? **A**

A Biogas and bio-fertilizer
B Waste water
C Producer gas
D Syngas

010. Which of the following organic compounds are present in biogas? **B**

A Butane gas and carbon dioxide
B Methane gas and carbon dioxide
C Nitrogen
D Sodium

011. Which of the following best indicates photosynthesis? **B**

A Carbon dioxide + water oxygen + glucose
B $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$ (in the presence of sunlight)
C Carbon dioxide + water glucose + oxygen (in the presence of sunlight)
D Oxygen + glucose carbon dioxide + water

012. Which of the following are photoautotrophs? **A**

A Cyanobacteria, algae, plants
B Archaebacteria
C Deer
D Tiger

013. Which of the following is produced apart from acetates in acetogenesis step in anaerobic digestion? **C**

A Carbon monoxide
B Charcoal
C Carbon dioxide
D Acetone

014. Which of the following are types of pyrolysis? **A**

A Flash and ablative
B Intermediate and anaerobic digestion
C Anaerobic digestion and fermentation
D Fermentation and intermediate

015. What occurs in the hydrolysis step of anaerobic digestion? **D**

A Large polymers combine with water molecules
B Large polymers break down to form water molecules
C Small polymers combine to form large polymers with the help of water molecules
D Large polymers break down into amino acids, fatty acids and simple sugars

016. What is cellulose made up of? **A**

A Polysaccharide
B Steel
C Carbon nanofibre
D Silicon

017. Hemicellulose is a source of biomass accounting from 20% to 40% by _____ **C**

A volume
B moles
C weight
D molarity

018. Moisture content can be calculated on two bases, namely _____ **C**

A light and heavy
B weighted and even
C wet and dry
D light and dry

019. Conversion of usable sunlight energy into chemical energy is associated with _____ **B**

A Red pigmentation
B Green pigmentation
C Orange pigmentation
D Fruits

020. What is higher heating value? **A**

A Amount of energy available in the fuel + energy contained in water vapour in the exhaust gases
B Total amount of energy available in the fuel - energy contained in water vapour in the exhaust gases
C Total amount of energy available in the fuel * energy contained in water vapour in the exhaust gases
D Total amount of energy available in the fuel

021. In a bio-chemical process, the solid residue represents _____ present in biomass. **C**

A the quantity of biodegradable carbon
B the quantity of biodegradable potassium
C the quantity of non-biodegradable carbon
D the quantity of biodegradable sodium

022. Which of the following is most impacted by the bulk-density of the biomass as-produced? **D**

A Calorific value
B Storage of the fuel after processing
C Heating value
D Transportation and fuel storage costs

023. Which of the following is a problem for using biomass as a source of energy? **D**

A Less moisture content in the atmosphere during time of harvesting
B Low calorific value
C Low intrinsic silica content
D High moisture content in the surroundings

024. Why does burning biomass not add to greenhouse gas emissions? **D**

A Because it is a clean source
B Because it absorbs greenhouse gases to burn
C Because it releases the same amount of greenhouses gas as burning fossil fuel does
D Because it releases greenhouse gas that was captured and converted into other forms during its growth

025. What are the two types of moisture content in biomass? **A**

A Intrinsic and extrinsic
B Higher heating value and lower heating value
C Lower heating value and extrinsic
D Higher heating value and intrinsic

026. What is the increase in temperature per kilometer starting from the crust? **B**

A 15 degree Celsius
B 17 - 30 degree Celsius
C 100 degree Celsius
D 50 - 87 degree Celsius

027. What is the earths core made up of? **C**

A Gamma rays
B Nitrogen
C Iron
D Gold

028. How is the heat inside earth restored? **A**

A Radioactive decay of elements B Sun restores the heat
C Hot steam is pumped into earth D Cosmic rays

029. How does geothermal energy work? **C**

A Uses water from the earth B Uses potential energy
C Uses heat from the core of earth D Uses heat from atmosphere

030. Which of the following do heat pumps use in geothermal energy? **D**

A Earths variable temperature B Variable electricity
C Constant electricity D Earths constant temperature

031. Which of the following is the major drawback of geothermal energy? **D**

A Low initial cost B Low carbon dioxide production
C High carbon dioxide production D Extremely location specific

032. Which of the following gases is released by a geothermal site and power plant? **B**

A Carbon dioxide B Sulphur
C Iron D Steel

033. Which of the following is the most probably location of geothermal site? **B**

A Grasslands B Volcanoes
C Coasts D River beds

034. Who initiated electricity generation from geothermal energy? **B**

A Indians B Italians
C Americans D Africans

035. Which of the following is used to locate a geothermal site? **A**

A Drilling wells B Reflection
C Seismograph D SONAR

036. Which of the following affect the usage of hydrothermal resources? **A**

A Temperature and depth of the source B Temperature and location of the site
C Location of the site and depth of the source D Type of water and steam

037. Which temperature range is most suitable for directly using the hydrothermal resource? Note that F stands for Fahrenheit. **B**

A 100 - 150 degree F B 50 - 60 degree F
C -100 - -90 degree F D -100 - 0 degree F

038. What is/are the ingredient in hydrothermal plants? **C**

A Water B Hot water
C Hot water and steam D Steam and water

039. What are the types of geothermal energy resources? **A**

A Hydrothermal, geo-pressurised brines, hot dry rocks, magma B Hydrothermal, geo-pressurised brines, hot dry rocks, sun
C Biomass, geo-pressurised brines, hot dry rocks D Wind, magma, geopressurised brines, hydrothermal

040. What are the forms of geothermal energy? **B**

A Liquid and solid B Liquid and vapour
C Solid and Bose-Einstein condensate D Plasma and liquid

041. Dry steam is _____ dominated. **B**

A liquid B vapour
C solid D plasma

042. Which of the following is also called as a flash steam plant? **D**

A Low temperature hydrothermal resource B Dry steam
C Hydrogen D Hot water

043. Which of the following is a type of high temperature geothermal resource? **A**

A Dry steam B Dry water
C Wet steam D Water

044. Which of the following best indicates the electricity generation from dry steam? **A**

A Drilling well steam pipes generator B Steam drilling well pipes generator
C Steam pipes drilling well generator D Generator steam pipes drilling well

045. What are geopressurised resources? **A**

A Increased pressure in the geothermal reservoir B Increased temperature in the geothermal reservoir
C Decreased temperature in the geothermal reservoir D Decreased pressure in the geothermal reservoir

046. What is the similarity between enhanced geothermal system and hot dry rock? **D**

A Magma B Presence of steam
C Presence of fluid D Lack of fluid permeability

047. Deep hydrothermal systems are found at a depth of _____ **B**

A 1km B 2.5 - 5km
C 10km D 1 - 2km

048. What is the difference between enhanced geothermal system and hot dry rock? **C**

A Lack of fluid permeability B Fluid permeability
C Presence of fluid D Presence of rocks

049. What is hot dry rock geothermal resource made of? **A**

A Granite B Soil
C Solid carbon dioxide D Liquid nitrogen

050. Which of the following fracture creation techniques is/are used in hot dry rock geothermal resource? **B**

A Condensation and hydrofracking B Hydrofracking and hydroshearing
C Hydroshearing and distillation D Hydrofracking and combustion

051. Which of the following gases are released by a geothermal power plant? **B**

A Carbon B Sulphur
C Sulphate D Argon

052. Why do binary power plants emit less amounts of pollutants? **C**

A Because they release steam into the atmosphere B Because they release steam into a local water body
C Because they inject water back into the ground without any atmospheric exposition D Because they inject water back into the ground after atmospheric exposition

053. Which of the following is a problem with a geothermal resource? **A**

A Noise pollution B Low greenhouse gas emission
C Polluting water D Reversing damage to wildlife habitat

054. What are deep hydrothermal systems? **C**

A Hot dry rock B Magma
C Permeable and fluid saturated region D Impermeable and fluid saturated region

055. Which of the following is responsible for the volcanic geothermal heat? **D**

A Water B Hot dry rock
C Carbon dioxide D Supercritical water

056. Which of the following are geothermal provinces in India? **D**

A Telangana B Coimbatore
C Manipur D Godavari

057. What is tidal power? **A**

A Energy from tides B Energy from water
C Energy from moon D Energy from sun

058. What is the estimated potential for geothermal energy in India? **C**

A 1000MW B 1MW
C 10000MW D 100MW

059. Which of the following organisations deals with geothermal energy locations in India? **A**

A Geological Survey of India B Geological Society of India
C Forestry Department D Ministry of external affairs

060. Which of the following is the most promising geothermal locations in India? **B**

A Sohana
B Puga valley
C Gurgaon
D Patna

061. Which of the following best describes the working of a tidal barrage for an incoming tide? **C**

A Incoming tides generator barrage basin
B Incoming tides basin generator barrage
C Incoming tides barrage basin generator
D Generator barrage basin incoming tides

062. Which of the following best describes the working of tidal barrage for outgoing tides? **D**

A Generator basin ocean outgoing tide
B Generator ocean basin outgoing tide
C Ocean generator basin outgoing tide
D Outgoing tide generator basin ocean

063. Tidal barrage is similar to _____ **B**

A wind plant
B dam
C wind turbines
D coal plant

064. What is/are the cause(s) of tides? **C**

A Gravitational pull of moon
B Gravitational pull of moon and sun
C Gravitational pull of sun and moon and rotation of earth
D Gravitational pull of sun

065. In terms of predictability, tidal energy _____ solar and wind. **A**

A is more predictable than
B is less predictable than
C has similar predictability like
D cannot be predicted unlike

066. What is the temperature difference used in ocean thermal energy conversion? Note that F denotes Fahrenheit **B**

A 10 degree F
B A minimum of 77 degree F
C Between 50 and 60 degree F
D A minimum of 100 degree F

067. Why is ocean thermal energy conversion a renewable resource? **B**

A Because the temperature gradient lasts for a short period of time
B Because the upwelling of cold water from the deep ocean is replaced by down welling of surface waters
C Because ocean water is available in plenty
D Because of suns heat

068. What is ocean thermal energy conversion? **A**

A Harnessing the temperature differences between surface waters and deep ocean waters
B Harnessing the temperature differences between the coastal waters and deep ocean waters
C Harnessing the heat energy from the underwater volcanoes
D Harnessing the heat energy between surface water vapour and atmospheric gases

069. What are the three ways to harness tidal energy? **D**

A Tidal streams, tidal barrages and wind
B Tidal barrages, wind and sun
C Tidal lagoons, river streams and geothermal reservoirs
D Tidal lagoons, tidal streams and tidal barrages

070. What is a tidal stream? **B**

A A river streams
B A fast-flowing body of water due to tides
C A fast-flowing body of water deposited into ocean
D A fast-flowing body of water due to winds

071. Open cycle ocean thermal energy conversion systems use _____ as the working fluid. **C**

A vapour from rivers
B water from rivers
C vapour from seawater
D seawater

072. What is the byproduct of an ocean thermal energy conversion system? **D**

A Electricity B Clean water
C Water vapour D Cold water

073. _____ turbine is used in closed cycle ocean thermal energy conversion. **B**

A Horizontal B Low-pressure
C High-pressure D Vertical

074. Which of the following are types of systems used in ocean thermal energy conversion? **C**

A Horizontal and vertical B Vertical and open cycle
C Open cycle and closed cycle D Horizontal and closed cycle

075. Which of the following is used as working fluid in closed cycle oceanic thermal energy conversion systems? **D**

A Thermohaline circulation B Temperature gradient
C Greenhouse gases D Refrigerants

076. Which of the following best describes the open-cycle OTEC? **B**

A Warm surface seawater heat exchanger working fluid turbine
B Warm surface seawater low-pressure container turbine/generator
C Deep seawater heat exchanger working fluid turbine
D Deep seawater low-pressure container turbine/generator

077. Why does an open-cycle OTEC use low-pressure container? **C**

A To solidify the warm surface seawater
B To evaporate the deep seawater
C To boil and evaporate the warm surface seawater
D To solidify the warm surface seawater

078. What is the warm surface seawater pumped through in a closed-cycle ocean thermal energy conversion (OTEC) system? **B**

A Heat compressor B Heat exchanger
C Fluid compressor D Turbine

079. Which of the following best describes the working of an ocean thermal energy conversion plant? **B**

A Oceanic water evaporator turbine/generator electricity
B Warm surface oceanic water evaporator containing working fluid turbine/generator electricity
C Cold surface oceanic water electricity evaporator containing working fluid turbine/generator
D Cold deep oceanic water electricity evaporator containing working fluid turbine/generator

080. What type of working fluids do closed-cycle ocean thermal energy conversion (OTEC) systems use? **A**

A Low boiling point fluids at atmospheric pressure
B High boiling point fluids at atmospheric pressure
C Low boiling point fluids at 100 bar
D High boiling point fluids at 100 bar

081. Which of the following is a good choice for working fluid? **A**

A CFCs B Steam
C Surface seawater D Deep seawater

082. As the vapour pressure of working fluid increases the size of turbine _____ **B**

A increases B decreases
C does not change D first increases then decreases

083. Which of the following best describes hybrid ocean thermal energy conversion? **C**

A Warm surface seawater low-pressure container turbine/generator
B Deep seawater vacuum chamber flash-evaporated steam vapourises ammonia turbine
C Warm surface seawater vacuum chamber flash-evaporated steam vapourises ammonia turbine
D Deep seawater low-pressure container turbine/generator

084. Why does open-cycle OTEC produce desalinized fresh water? **A**

A Because the vapourised surface
B Because of the working fluid

seawater leaves all the salts and contaminants in the low-pressure container

C Because the warm surface seawater is mixed with deep ocean water
D Because of thermohaline circulation

085. Where is the desalinized fresh water used? **B**

A Sent back into ocean
B Used for irrigation and aquaculture
C Used to generate electricity
D Used to generate tides

086. The fuel cell is considered a battery in which _____ is continuously replaced. **C**

A fuel only
B oxidizer
C both fuel and oxidizer
D none of the mentioned

087. The type of reactions in a fuel cell is not determined by _____ **D**

A fuel and oxidizer combination
B composition of electrolyte
C materials of anode and cathode
D catalytic effects of reaction container

088. For which of these devices does negative charge carriers flow from anode to cathode in the external circuit? **D**

A MHD generator
B Thermionic generator
C Thermoelectric generator
D Fuel cell

089. Fuel cell converts chemical energy to electrical energy using a reaction that _____ **A**

A eliminates combustion of fuel
B requires combustion of fuel
C requires no ignition of fuel
D fuel is not required

090. Fuel cell performance is not limited by _____ **B**

A First law of Thermodynamics
B Second law of Thermodynamics
C Third law of Thermodynamics
D All three laws are applicable

091. Which of these fuel cell operates at temperature below 100.C? **C**

A phosphoric fuel cell
B solid polymer electrolyte fuel cell
C molten carbon fuel cell
D hydrogen-oxygen fuel cell

092. Which of these fuel cells operates at high temperatures and pressures? **C**

A high temperature solid oxide fuel cell
B alkaline fuel cell
C molten carbon fuel cell
D phosphoric acid fuel cell

093. Which of these should not be a properties of fuel cell electrodes? **D**

A good electrical conductors
B highly resistant to corrosive environment
C should perform charge separation
D take part in chemical reactions

094. What is the voltage output of hydrogen-oxygen fuel cell?(in V) **A**

A -1.23
B -1.45
C -1.01
D -.93

095. Which of these gases or liquids are not used as source of hydrogen in fuel cells? **D**

A C_2H_6
B C_2H_2
C C_6H_6
D C_2H_5OH

096. Air pollution in an MHD-steam power plant is caused due to the formation of which of the following compounds? **A**

A oxides and hydroxides
B chlorides and hydroxides
C oxides and carbonates
D carbonates and bicarbonates

097. In closed cycle MHD-steam power plant, which of the following gas is seeded in the MHD duct? **A**

A helium
B xenon
C sodium vapour
D chlorine

098. The air at the entrance of MHD duct is seeded with potasiumupto _____ **D**

A 7%
B 5%
C 3%
D 1%

099. Which of these is the most promising power generation system? **A**

A magnetohydrodynamic
B thermoelectric
C hydrogen
D fuel cell

100. Which of these is a non-conventional type of power generation without prime movers? **D**

A hydro power
B thermal
C nuclear
D thermoelectric