



# BRAINWARE UNIVERSITY

**Term End Examination 2021 - 22**  
**Programme – Diploma in Mechanical Engineering**  
**Course Name – Renewable Energy**  
**Course Code - DME606B**  
**( Semester VI )**

**Time allotted : 1 Hrs.15 Min.**

**Full Marks : 60**

[The figure in the margin indicates full marks.]

**Group-A**

(Multiple Choice Type Question)

1 x 60=60

*Choose the correct alternative from the following :*

- (1) Which of the following best describes world energy consumption?
 

a) Total energy produced and used by humanity	b) Total energy consumed by humanity
c) Total energy consumed by humans in the biological pyramid	d) Total energy produced by humans in the biological pyramid
- (2) Which of the following is NOT included in world energy consumption?
 

a) Solar energy	b) Energy from food
c) Energy from wind	d) Energy from fossil fuels
- (3) World energy consumption is measured \_\_\_\_\_
 

a) quarterly	b) half-yearly
c) yearly	d) every decade
- (4) Which of the following energy sources is majorly used?
 

a) Wind energy	b) Nuclear energy
c) Hydrogen energy	d) Fossil fuels
- (5) Which of the following is perceived to contribute towards world population growth?
 

a) Uganda	b) USA
c) UK	d) Germany
- (6) Why is there a demand for renewable sources of energy?
 

a) Because they emit greenhouse gases	b) Because of low or zero carbon footprint
c) Because of the decreasing global temperatures	d) Because they are more efficient
- (7) As the population grows, the demand for energy \_\_\_\_\_
 

a) decreases	b) remains the same
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- c) increases  
d) becomes volatile
- (8) Which of the following countries will experience a major increment in energy demand?  
a) USA  
b) France  
c) UK  
d) China
- (9) Despite significant investments in renewable sector, why are fossil fuels still used?  
a) Because of logistic, structural and operational issues  
b) Because people do not trust the renewable sector  
c) Because fossil fuels are cheap  
d) Because global warming is a hoax
- (10) What is total primary energy supply?  
a) Total energy produced and used by humanity  
b) Total energy consumed by humanity  
c) Sum of energy production minus storage changes  
d) Sum of energy production including storage changes
- (11) What is the unit of total primary energy supply?  
a) Watts  
b) Joules  
c) Newtons  
d) Watt-hours
- (12) What was the growth in energy demand in the year 2018 as stated by IEA?  
a) 0.023  
b) 0.013  
c) 1%  
d) 0.005
- (13) Which of the following leads the energy production in low-carbon sources?  
a) Photovoltaics  
b) Wind energy  
c) Solar thermal power systems  
d) Nuclear energy
- (14) According to EIA, what is the globally projected increase in transportation energy between 2018 and 2050?  
a) Less than 10%  
b) Between 10 and 20%  
c) Greater than 100%  
d) Between 30 and 50%
- (15) Which of the following best describes the reason for projected increase in transportation energy in developing countries?  
a) Energy demand per capita increases and hence the net energy required in every process increases  
b) Energy demand per capita decreases and hence the net energy required in every process increases  
c) Energy demand per capita decreases and hence the net energy required in every process decreases  
d) Energy demand per capita increases and hence the net energy required in every process decreases
- (16) Which of the following is the most usable form of energy for future?  
a) Solar  
b) Electricity  
c) Thermal  
d) Nuclear
- (17) Which of the following sources are amongst the fastest growing energy sources?  
a) Solar and wastewater  
b) Wind and hydro  
c) Hydro and solar  
d) Hydro and solar
- (18) What is an energy policy?  
a) A method to address issues of energy development  
b) A free and liberal methodology towards energy development  
c) A manner in which governments decide to stop energy development  
d) A manner in which governments decide to address issues related to energy development

- (19) What is the main aim of implementing eco-energy policies?
- a) To tackle global warming and climate change      b) To reduce energy consumption  
c) To manage energy production and consumption at the cost of degrading the environment      d) To prevent illegal energy production
- (20) Which of the following is the 7th goal of the eight millennium goals of United Nations?
- a) To eradicate extreme poverty and hunger      b) To ensure environment sustainability  
c) To reduce child mortality      d) To develop a global partnership for development
- (21) What is sun's declination angle during earth's motion from autumnal equinox to winter solstice?
- a) Greater than 90 degrees      b) Less than 0 degrees  
c) Greater than 0 degrees      d) Between 60 and 90 degrees
- (22) What is the sun's declination during earth's motion from vernal equinox to summer solstice?
- a) Greater than 50 degrees      b) Between 0 and 30 degrees  
c) Greater than 0 degrees      d) Less than 0 degrees
- (23) How is latitude of a location on earth defined?
- a) Angle between line joining the location to earth's center and earth's equatorial plane      b) Angle between line joining the location to earth's center and the meridian plane  
c) Angle subtended by sun on earth      d) Angle between sun's rays extended to earth's center and earth's equatorial plane
- (24) The lines joining North and South pole of earth are called \_\_\_\_\_
- a) latitudes      b) longitudes  
c) equator      d) semicircle lines
- (25) When does the autumnal equinox occur?
- a) January      b) August  
c) September      d) December
- (26) Solar radiation spectrum is close to \_\_\_\_\_
- a) that of a black body      b) that of a white body  
c) that of Jupiter      d) that of phase response
- (27) Which of the following indicates the position of any point on earth?
- a) Rectangular co-ordinate system      b) Latitudes, longitudes  
c) Radial co-ordinate system      d) Spherical co-ordinate system
- (28) What is the range of sun's declination angle throughout the year?
- a) Between 0 and 90 degrees      b) Between 0 and 23.5 degrees  
c) Between -23.5 and 23.5 degrees      d) Between -23.5 and 0 degrees
- (29) What the hour angle?
- a) Angle between ray of the sun when extended to the earth's center and the equatorial plane      b) Angle between line joining the location to earth's center and earth's equatorial plane  
c) Angle through which the turns to bring the meridian of a point in line with sun's rays      d) Angle through which the turns to bring the meridian of a point directly in line with sun's rays
- (30) Altitude angle is the \_\_\_\_\_

- a) vertical angle between projection of sun's rays on the horizontal plane of earth's surface
- b) horizontal angle between projection of sun's rays on the horizontal plane of earth's surface
- c) vertical angle between projection of sun's rays on the vertical plane normal to earth's surface
- d) horizontal angle between projection of sun's rays on the vertical plane normal to earth's surface
- (31) What is solar noon?
- a) Time of the day at which sun's rays are perpendicular to a given line of longitude
- b) Time of the day at which sun's rays are parallel to a given line of longitude
- c) Time of the day at which sun's rays are perpendicular earth's surface
- d) Time of the day at which sun's rays are parallel to earth's surface
- (32) How does the solar noon vary with every 15 degrees of longitude east of a given longitude?
- a) Solar noon occurs one hour late with every 15 degrees of longitude east of a given longitude
- b) Solar noon occurs one hour earlier with every 15 degrees of longitude east of a given longitude
- c) Solar noon occurs does not vary with longitude
- d) Solar noon occurs half hour late with every 15 degrees of longitude east of a given longitude
- (33) What is a solar day?
- a) One complete revolution of sun around moon
- b) One complete revolution of earth around sun
- c) One complete revolution of moon around earth
- d) One complete revolution of sun around earth
- (34) What is a sidereal day?
- a) Time taken by earth to rotate about its axis for distant stars to appear fixed
- b) Time taken by earth to rotate about its axis for sun to appear fixed
- c) Time taken by earth to rotate about its axis for distant stars to be moved by 1 degree
- d) Time taken by earth to rotate about its axis for distant stars to be moved by 0.5 degrees
- (35) Solar day is \_\_\_\_\_ sidereal day.
- a) 4 min shorter than
- b) 4 min longer than
- c) 10 min shorter than
- d) 10 min longer than
- (36) One sidereal day is \_\_\_\_\_ solar hours and \_\_\_\_\_ solar minutes long.
- a) 26, 57
- b) 24, 59
- c) 23, 56
- d) 24, 60
- (37) Which of the following solar time duration is not constant throughout the year?
- a) Mean solar day
- b) Sidereal day
- c) Local true solar time
- d) Apparent solar day
- (38) What is local true solar time?
- a) Equivalent of earth's solar time on other planets
- b) Solar time on every location of earth
- c) Solar time on the Greenwich meridian
- d) Solar time on the equator
- (39) What is the relationship between insolation and cloud cover in sky?
- a) Inverse
- b) Directly proportional
- c) Square
- d) Exponential
- (40) Which does Angstrom-Savinov formula tell?
- a) Relationship between local solar radiation and global cloudiness
- b) Relationship between local solar radiation and local cloudiness

- c) Relationship between global solar radiation and mean cloudiness
- d) Relationship between global solar radiation and global cloudiness
- (41) What is a pitch drive motor?
- a) A motor that senses wind direction
- b) A motor to control the angle of blades
- c) A motor to ensure nacelle faces in the direction of the wind
- d) A motor to rotate the blades
- (42) What is a yaw drive?
- a) A device used to support and stabilize other components
- b) A device used to house various energy conversion components
- c) A motor to ensure that nacelle faces the wind
- d) A device used to track wind direction
- (43) What are wind energy conversion systems designed for?
- a) To convert wind energy to mechanical energy
- b) To convert wind energy to potential energy
- c) To convert wind energy to electrical energy
- d) To convert mechanical energy to wind energy
- (44) Which of the following is a part of a general wind energy conversion system?
- a) VAWT and HAWT
- b) Differential
- c) Parallel shaft and planetary shaft
- d) Manual transmission
- (45) What are parallel shaft gears?
- a) Motor shaft and the speed controller shaft are on perpendicular planes
- b) Motor shaft and the speed controller shaft are on skewed planes
- c) Motor shaft and the speed controller shaft are on diagonal planes
- d) Motor shaft and the speed controller shaft are on parallel planes
- (46) What is a planetary shaft gearbox?
- a) Input shaft and output shaft are aligned
- b) Motor shaft and the speed controller shaft are on perpendicular planes
- c) Motor shaft and the speed controller shaft are on parallel planes
- d) Input shaft and output shaft are parallel
- (47) Power generation contains \_\_\_\_\_
- a) mechanical systems
- b) kinetic systems
- c) electromagnetic and electrical subsystems
- d) nuclear systems
- (48) What is a fixed speed WECS?
- a) WECS operating at differential speeds
- b) WECS operating at non-differential speeds
- c) WECS operating at variable speeds
- d) WECS operating at constant speed
- (49) Fixed speed WECS are equipped \_\_\_\_\_ generators.
- a) squirrel-cage induction
- b) squirrel induction
- c) nduction squirrel
- d) doubly-fed induction
- (50) Which of the following is a reason for storing wind energy?
- a) Wind power generation is not correlated to the demand cycle
- b) Wind power generation is correlated to the demand cycle
- c) Wind is a renewable resource
- d) Wind power is guaranteed to be available during peak demands
- (51) What is an example of storing wind power electro-chemically?
- a) Electro-hydrogen generation
- b) Pumped storage
- c) Batteries
- d) Electric grid
- (52) \_\_\_\_\_ is an example of storing wind energy chemically.

- a) Flywheels  
c) Batteries
- b) Pumped storage  
d) Electro-hydrogen generation
- (53) Which of the following technologies are used to convert biomass into useful energy forms?
- a) Bio-chemical process  
c) Doping
- b) Galvanization  
d) Photoelectric effect
- (54) What are the four main types of thermo-chemical processes?
- a) Galvanization, photovoltaic effect, chemo-mechanical effect,  
c) Pyrolysis, gasification, combustion, doping
- b) Pyrolysis, gasification, combustion, hydrothermal processing  
d) Photovoltaic effect, gasification, combustion, hydrothermal processing
- (55) What are the two primary processes under bio-chemical conversion?
- a) Photosynthesis and respiration  
c) Anaerobic digestion and fermentation
- b) Photosynthesis and photovoltaic  
d) Anaerobic digestion and photosynthesis
- (56) Which of the following is an example of physio-chemical conversion technique to convert biomass into usable forms of energy?
- a) Pyrolysis  
c) Anaerobic Digestion
- b) Gasification  
d) Extraction with esterification
- (57) Which of the following is a product of pyrolysis of biomass?
- a) Producer gas  
c) Agricultural residue
- b) Steel  
d) Sodium
- (58) Pyrolysis occurs in the presence of \_\_\_\_\_ oxygen.
- a) large amounts of  
c) extremely large amount of
- b) absence of  
d) low amounts of
- (59) Which of the following best indicates the process of gasification?
- a) Biomass → carbon dioxide and water → producer gas and charcoal → carbon monoxide and hydrogen  
c) Biomass → producer gas and charcoal → carbon dioxide and water → carbon monoxide and hydrogen
- b) Biomass → carbon monoxide and hydrogen → carbon dioxide and water → producer gas and charcoal  
d) Producer gas and charcoal → carbon dioxide and water → carbon monoxide and hydrogen → biomass
- (60) Which of the following is best suited for hydrothermal processing?
- a) Forestry byproducts  
c) Corn
- b) Wheat  
d) Sewage sludge