Important objective questions of **ENGG-243**
Renewable Energy and Green Technology

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1. **Pyranometer:** It is used to measure total radiation (direct and diffuse) in terms of energy per unit time per unit area on a horizontal surface.
2. **Pyrheliometer:** It is used for measuring direct beam radiation. Solar energy is a very large, inexhaustible source of energy.
3. **Solar constant:** The rate at which energy reaches the earth's surface from the sun, usually taken to be 1,367 w/m^2.
4. **Inverter:** A device that converts direct current electricity to alternating current either for stand-alone systems or to supply power to an electricity grid.
5. **Photon:** A particle of light that acts as an individual unit of energy.
6. **Zenith angle:** The angle between the direction of interest (of the sun, for example) and the zenith (directly overhead).
7. **Langley:** Unit of solar irradiance. 1 Langley = 85.93 kwh/m^2.
8. At most about **75%** of the solar energy actually reaches the earth's surface.
9. **Anemometer:** Measures the wind speed and transmits wind speed data to the controller.
10. **Wind vane:** Measures wind direction.
11. **Insolation:** it the solar radiation that reaches the earths surface per square meter per minute.
12. **Deenbandhu plant** is modification and advance version of **Janta fixed dome type biogas plant**.
13. **Janta biogas** plant is **semicontinous flow** plant.
14. **Carbonisation:** also known as **pyrolysis** which is defined as breakdown of complex substances into simpler ones by heating in absence of air.

15. **Sun** is the source of all energy sources.
16. The calorific value of **natural gas is 50kJ/kg.**
17. The biogas consists of **CH_4 and CO_2** gases as chief constituents.
18. Amount of energy converted into work which is obtained from system is known as **energy efficiency.**
19. **Pyrolysis** is the basic **thermochemical process** for converting solid biomass to a more useful liquid fuels.
20. **Charcoal production** is a form of pyrolysis with **limited** available oxygen.
21. Pyrolysis process is mainly for production of solid fuel **char,** liquid fuel **tar** and gaseous fuel **hydrocarbonic gases**.
22. The digestion of organic matter in absence of air is known as **anaerobic digestion**.
23. The transformation of wood to charcoal is partially complete at **400-500^{o}C.**
24. Gasifiers are classified according to the **air introduction** in the fuel column.
25. Gasification process is carried out in **4** different stages.
26. Actual combustion of char, pyrolysed gases and tars takes place in **oxidation** zone.
27. Gasifier converts **solid fuel into gaseous fuel.**
28. Combustible mixture of producer gas is **H_2 and CO_2.**
29. Air ratio required for gasification is **2.38 kg wood/kg air.**
30. Principal production in reduction zone is **CO.**
31. Calorific value of producer gas is **5506 KJ/Nm^3**
32. Gasifier found the most suitable for engine application is **downdraft gasifier.**

33. Density of briquettes normally varies between **1200-1400 kg/m^3 for** high pressure processes.

34. In the densification **volumetric efficiency** can be increased.

35. The PH range suitable for biogas production is **6.6-7.5.**

36. In the case of cattle dung the C/N ratio is usually around **25:1**.

37. **HRT** is the number of days the feed material is required to remain in the digester to begin gas production.

38. The optimum level of total solid for cattle dung slurry is in the range of **8-10%.**

39. **Janata and Deenbandhu models** are fixed dome type biogas plants.

40. The gas is available at a constant pressure in **KVIC type biogas plant**.

41. Calorific value of methane (biogas) is: **4713kcal/m^3**

42. Constant gas pressure available in **floating drum type biogas plant.**

43. Heart of biogas plant is **digester.**

44. Constituents of biogas is **CH_4 and CO_2.**

45. The gas available at a pressure of about 10 cm of water column in **KVIC model.**

46. Liquid flat plate collectors are generally used for obtaining hot water at temperature less than **100^oC.**

47. In dish type solar cooker, temperature achieved at the bottom of the vessel is around **350-400^oC.**

48. Dish type solar cooker is having thermal efficiency of around **40%.**

49. Insulation is provided to minimize **heat losses.**

50. In solar water distillation the water is evaporated because of **partial difference.**

51. A 100 liter solar water heater can saves about **2000 units of electricity annually.**

52. The required collector area for 50 litre hot water demand at $50^{o}C$ is about **$1m^{2.}$**

53. The capacity of solar water heating system can be boosted by **increasing collector area.**

54. Orientation of solar appliance is **south facing.**

55. Energy required for distilling 1 liter of brackish water **2260KJ.**

56. **Solar still** is a device used for converting brackish water into potable by **desalination principle.**

57. Solar photovoltaic technology is the direct conversion of **sun light into electricity.**

58. Solar cells are **semiconductor devices** that converts sunlight to direct current electricity.

59. A typical silicon PV cell produces about **0.5-0.6 Volt DC** under open circuit, no load conditions.

60. Wind is result of uneven heating of the **earth planet**

61. The power in the wind is proportional to the cube of its **velocity.**

62. **In horizontal axis** wind machine rotor weight is less.

63. Wind speed 5-6 km/hr is suitable to run **wind pump.**

64. The average capital cost of wind farm project works out to **Rs 3.5 to 4 crore.**

65. Power for lifting the water from wind mill= **$0.5A\varrho V^{3}C_{p}$**

66. The Water collected at high elevation contains **potential energy** which through downward moment of water converted **to kinetic energy.**

67. The efficiency of hydro-electric power plant depends on effectiveness of

water turbine.

68. The Pelton wheel is used where **small flow** of water is available.
69. The Francis turbine is used where a **large flow and high head** of water is involved.
70. A typical windmill starts lifting water at **12kmph wind speed** and yield about **30-35 m^3 of water** every day.
71. Enlist the methods of ethanol production**: 1) dry milling 2) wet milling**
72. The floating type biogas plant is **KVIC biogas plant**
73. The PH range of **6.8-7.8** is best for the fermentation and gas formation in biogas plant
74. 1 kg of dry cattle produce **1m^3** biogas
75. The formula formula for measuring output of solar still is= **ESA/2.3**
76. Enlist the zones of solar pond: **upper converting zone, non-converting zone, lower bottom converting zone**
77. The energy required to evaporation of water is (latent heat) **2260 KJ/Kg**
78. The effective conversion efficiency of solar cell is **10-15%**
79. Maximum temperature generated in solar box type cooker is **140^oC**
80. Single PV cell produce **0.5-0.6 V** DC current
81. Parabolic solar cooker used **unionized aluminium sheet** reflecting material
82. Minimum speed required to run wind pump is **5-6 km/hr**
83. Properties of biodiesel: **specific gravity 0.88, viscosity 7.5, center index 49, net heating value 33,300 kg/lit**
84. Write any two tree species which are used for biodiesel production: **Jatropha and Karanj**
85. KVIC (full form)=**Khadi and Village Industry Commission**

86. OTEC (full form)=**Ocean Thermal Energy Commission**

87. **Turbines** are used to convert wind energy to electrical energy

88. The temperature attained in parabolic solar cooker is **upto 400^{o}C**

89. Define pyrolysis: **the process of conversion of complex organic polysaccharides substances to simple inorganic mono saccharides**

90. **Sodium methylate** catalyst is used during biodiesel production.

91. What type of energy is wind energy: **renewable energy**

92. Wind energy is harnessed as **mechanical energy** with the help of windmill or turbine.

93. Wind is beneficial resource of energy as it doesn't cause **pollution**

94. Black painted panels which are hanged at roofs to trap heat and energy from sun, are **solar heater**

95. Ocean thermal energy is due to **temperature difference at different levels in ocean**

96. The power generated in wind mill is depends **on wind velocity**

97. Which part of solar cooker is responsible for the green house effect: **glass cover**

98. The source of energy of the sun is **nuclear fusion**

99. The efficiency of the solar cooker can be increased by placing a **plane mirror**

100. A solar cell is made up of silicon

101. A solar cell converts solar energy into electrical energy

102. The temperature difference between the upper layers and the deeper layers of the ocean should be 20oC to install an OTEC power plant.

103. Which part of flat plate collectors is coated in black?: Absorber plate

104. The function of a solar collector is to convert Solar Energy to thermal energy

105. Reflecting mirrors used for exploiting solar energy are called **Heliostats**

106. The output of solar cell is of the order of **1W.**

107. Flat plate collector absorbs **direct and diffuse both radiations**

108. Temperature attained by a flat-plate collector is of the Order of about **90^0C**

109. The voltage of a single solar cell is **0.5 V**

110. The value of Solar Constant is **1367 W/m^2**

111. In the paraboloid dish concept, the concentrator tracks the sun by rotating about **2 axis**

112. Beam radiations are measured with **Pyrheliometer**

113. How many types are flat plate collectors divided depending on type of heat transfer fluid: **2 (two)**

114. Which part of flat plate collectors is coated in black**?: Absorber plate**

115. Horizontal axis and vertical axis are the types of: **Wind mills**

116. A fuel cell, in order to produce electricity, burns: **hydrogen**

117. Fuel cells are: **Hydrogen battery**

118. Lignite, bituminous and anthracite are different ranks of: **coal**

119. What are photovoltaic: Technologies which converts **solar radiation directly into electricity**

120. The region where the electrons and holes diffused across the junction is called **Depletion region**

121. Theoretical maximum efficiency of wind power is about: **59%**