**TU/CDOE**

**TEZPUR UNIVERSITY**

**SEMESTER END EXAMINATION (AUTUMN) 2020**

**DRE 103: BIOMASS ENERGY**

Time: **3 Hours** Total Marks: **70**

*The figures in the right-hand margin indicate marks for the individual question.*

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| 1. | Write the major energy product from the following biomass conversion processes:   1. Anaerobic digestion 2. Bio-photolysis 3. Briquetting 4. Carbonization 5. Combustion 6. Fermentation 7. Gasification 8. Transesterification 9. Pyrolysis 10. Liquefaction | 1x10=10 |
| 2. | Choose the correct answer and justify why?   1. Charcoal yield from biomass is a slow/fast pyrolysis process 2. Energy density at the point of production in case of biomass is lower/higher than coal. | 7x2=14 |
| 3. | Fill in the blank with appropriate word(s).    a) The best solar energy-converting machine available in nature is -------------------------------.  b) Energy density at the point of production for biomass is -----------than coal.  c) Biomass is more reactive than coal due to the presence of ----------------------.  d) Biomass is the general term for organic material ---------------- from growing plants or from animal manure.  e) High ----------------- content is the main drawback of biomass than coal to use as fuel.  f) The source of renewable organic  carbon in nature is ----------------  g) During alkali catalyzed biodiesel production, the requirement of methanol is three moles of -------------------.  h) Biogas production from organic  waste is ----------------process.  i) Treating hemicelluloses with concentrated inorganic acid produces --------------------------- instead of pentose sugar required for ethanol production.  j) Energy loss in C3 plant occurs due to -  ---------------------- | 1x10=10    **P.T.O.** |
| 4. | Write short notes on **any four** of the  following:   1. First generation biofuel. 2. Raw materials for ethanol production 3. Aerobic and anaerobic fermentable products of yeast on sugar. 4. Main obstacle to widespread use of biodiesel. 5. Acid hydrolysis of Cellulosic materials 6. Different types of biomass gasifier | 4x5=20 |
| 5 | Answer the following:   1. What are the major reasons to shift towards alternative fuels like   biodiesel and bioethanol? Discuss the common feedstock used for production of biodiesel and bioethanol. | 5+5=10 |
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|  | 1. With the help of neat sketch discuss the transesterification process used for biodiesel production. | 6 |

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