**TU/ CODL**

**TEZPUR UNIVERSITY**

**SEMESTER END EXAMINATION (AUTUMN ) 2019**

**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 | What do you mean by biomass & biomass energy? Why is biomass considered as renewable energy source? | 3+2=5 |
| 2 | Choose the correct answer from the underlined options given in bold and justify:   1. The cheapest raw materials for producing ethanol from biomass is **saccharine/starchy/cellulosic** materials. 2. In presence of catalyst at high temperature, Syn gas is converted to **methanol/ethanol/butanol**. 3. During alkali catalyzed biodiesel production, the requirement of methanol is **three times/ three moles** of the vegetable oil. 4. In densification, the bulk density of fuel is **increased/decreased** by a factor of 2 or 3. 5. Biogas production from organic waste is an **aerobic/anaerobic** process. | 3x5=15 |
| 3. | 1. Discuss alkali catalysed transesterification of biodiesel production from vegetable oil. What are the methods for purifying biodiesel after production? 2. Name some oil seeds available in North Eastern region of India that can be used as non-edible vegetable oil sources for biodiesel production. 3. Give the schematic representation with the help of flow chart for producing ethanol from different types of biomass raw materials and discuss their salient features on converting them to fermentable sugars. | 15  **P.T.O.**  5  2+8=10 |
| 4 | 1. What do you mean by densification of biomass? What is its major advantage? 2. What is the product of pyrolysis of biomass conversion? | 3+3=6  4 |
| 5. | Write briefly on **any two** of the following:   1. Importance of solid biofuel in domestic energy sector 2. Vegetable oil Hydrogenation 3. Biorefinery 4. Product of treating hemicelluloses with concentrated inorganic acid   \*\*\* | 2x5=10 |