**TU/ CODL**

**TEZPUR UNIVERSITY**

**SEMESTER END EXAMINATION (SPRING) 2019**

**DRE 105: NEW ENERGY RESOURCES**

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

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

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1. Fill in the blanks with appropriate answer(s). 1x5=5

1. Natural gas is \_\_\_\_\_\_\_\_\_\_\_\_ (primary/secondary) source of energy.
2. The full form of “UNFCCC” is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. A superconductor is an element or metallic alloy, which loses all electrical resistance at \_\_\_\_\_\_\_\_oC
4. Super capacitors have \_\_\_\_\_\_ (higher/ lower) energy densities than lead acid batteries.
5. Bio-ethanol is a substitute for \_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. State TRUE or FALSE for the following statements and correct the false statement(s), if any. 2×5=10

1. Oxides of sulphur and nitrogen stemming from a process are secondary air pollutants.
2. Fuel cells use only gaseous fuels for generating electricity.
3. Power density of a storage device refers to its stored energy per unit volume.
4. Super conducting magnetic energy storage (SMES) system stores only reactive power from the distribution grid and cannot store active power.
5. The best way to generate electrical power from hydrogen is a hydrogen fired steam turbine coupled to a generator.

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| 3. | Define: “Energy Conservation” and “Energy Management”. Illustrate the role of new energy resources in energy conservation strategies. 4+6=10 | |
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| 4. | What are the critical factors which affect the performance of an ocean thermal energy conversion system? Briefly discuss the working principles of different types of ocean thermal energy conversion system. 3+7=10 | |
| 5 | Illustrate the major classifications of batteries. Explain the necessary condition for transferring maximum power from an electrochemical battery to a load of *R* Ω with the help of a neat diagram. Also, estimate the maximum power that can be transferred from a 12 V lead acid battery, if its internal resistance is 0.03 Ω. 4+4+2=10 | |

6. Explain the following, citing examples wherever necessary. 5x5=25

1. Global warming and its mitigation
2. Distinctive features of MHD systems
3. Wave energy converters
4. Challenges in using hydrogen as source of energy
5. Implications of ozone layer depletion

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