

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)**

**CLASS:MTech  
BRANCH:ESE**

**SEMESTER : II  
SESSION : SP/22**

**SUBJECT: CE574 RENEWABLE ENERGY RESOURCES**

**TIME:2 to 4pm  
Date: 02<sup>ND</sup> May 2022**

**FULL MARKS: 50**

**INSTRUCTIONS:**

- 1. Attempt all questions.**
  - 2. The missing data, if any, may be assumed suitably.**
  - 3. Please show all workout of the problems rather than only writing the answers.**
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|---|---|
| Q1. Discuss about the energy supply scenario of India   | 5 |
| Q2. Alkaline fuel cells work on the combined effect of oxidation and reduction. Explain how.  | 4 |
| Q3. Discuss, how the temperature of a Blackbody determines the radiation wavelength w.r.t radiation optics laws.  | 5 |
| Q4. Deduce the empirical equation for estimating the availability of solar radiation  | 3 |
| Q5. Describe chemical storage of solar energy based on photochemical reactions.   | 5 |
| Q6. With the help of a diagram, explain the working of a low temperature solar power plant.   | 5 |
| Q7. Provided the air density is $1.226 \text{ J/Kg.K/m}^3$ and wind speed $10\text{m/s}$ , calculate the power density in wind stream and total power produced by a turbine of $140 \text{ m}$ diameter and efficiency $30\%$ . | 3 |
| Q8. Enlist the equations used for calculation of wind energy generation based on wind data and wind energy generator  | 3 |
| Q9. Describe the working of a geothermal power plant where the geothermal fluid temperature is less than $100^{\circ}\text{C}$ .  | 5 |
| Q10. Illustrate the arrangement and working of a Double basin with linked basin operation for tidal energy.   | 5 |
| Q11. A progressive sea wave has a width of $120\text{m}$ with a period of $4 \text{ sec}$ . Calculate the wavelength, wave area, and wave velocity.   | 3 |
| Q12. Enlist the factors affecting Biogas production.  | 4 |