

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Course: B. Tech.

Branch : Electrical

Semester : IV

Subject Code & Name: BTEEPE405C Advanced Renewable Energy Sources

Max Marks: 60

Date:27/08/2022

Duration: 3.45 Hrs.

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

Q. 1 Solve Any Two of the following.

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- A) Discuss renewable and conventional forms of energy. Highlight their merits and demerits. **(Understand)** **6**
- B) Explain the construction and working of a hydrogen-oxygen fuel cell. **(Understand)** **6**
- C) Discuss and differentiate between ‘Decentralized’ and ‘Dispersed Generations’. **(Understand)** **6**

Q.2 Solve Any Two of the following.

- A) Enlist different modes of wind power generation and explain standalone mode in brief. **(Remember)** **6**
- B) Draw wind power generation curve and explain the terms cut-in speed, rated speed and cut-out speed. **(Remember)** **6**
- C) A wind mill with multi blade rotors lifts $3.03 \text{ m}^3/\text{h}$ of water through a head of 28 m when the wind speed is 3.3 m/s. Calculate the power coefficient for a rotor diameter of 4.5 m. Assume, transmission efficiency=0.95 and pump efficiency=0.70, density of water is 996, density of air is $1.2 \text{ Kg} / \text{m}^3$. **(Evaluate)** **6**

Q. 3 Solve Any Two of the following.

- A) Draw equivalent circuit of a solar cell and deduce the relation $V_{oc}=AKT/q.\ln[(I_{sc}/I_0) +1]$, where the symbols have their usual significance. **(Remember)** **6**
- B) Explain the current-voltage characteristics of solar cell. Also define the fill factor. **(Understand)** **6**
- C) Discuss the standalone type of PV system. **(Understand)** **6**

Q.4 Solve Any Two of the following.

- A) With a neat diagram, discuss the working of Deenbandhu biogas plant. **(Understand) 6**
- B) Explain the following terms related to biochemical energy conversion (i) **(Remember) 6**
Gasification (ii) Pyrolysis (iii) Liquefaction
- C) With a neat diagram discuss the biomass gasifiers. **(Understand) 6**

Q. 5 Solve Any Two of the following.

- A) Differentiate between Battery and Flywheel. **(Understand) 6**
- B) Explain working of Lead Acid battery with a neat diagram. **(Remember) 6**
- C) Explain superconducting magnetic storage system with a block diagram. **(Remember) 6**

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