

International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Mid-term Examination Autumn-2019
 Course Code: EEE- 4843
 Time: 1 hour 30 minutes

Program: B.Sc. Engg. (EEE)
 Course Title: Renewable Energy Systems
 Full Marks: 30

[Answer any **three** questions from the followings; figures in the right margin indicate full marks.]

- 1(a).** What is the energy scenario of the world? Why renewable energy is becoming more important now a days? **4**
- 1(b).** Do you think that wind energy and oil are sustainable energy sources? Give your appropriate arguments in favor of your opinion. **4**
- 1(c).** What are the environmental benefits of Renewable energy? **2**
- 2(a).** How we can measure the solar radiation easily? Describe the working principle of Photovoltaic Pyranometer. Also, describe the usages of a Thermopile Pyranometer. **5**
- 2(b).** Distinguish between active and passive solar design. What do you mean by two-axis tracking for PV system? **2**
- 2(c).** Estimate the diffuse solar radiation on a solar panel installed in Dhaka city (Latitude: 23.77°). Also consider that, the solar noon in Dhaka on June 10, and the collector faces 19.5°. the clear sky beam insolation was found to 850 W/m². You may use following equations where symbols have their usual meanings.
- $$C = 0.095 + 0.04 \sin\left[\frac{360}{365} (n - 100)\right]$$
- 3(a).** Write short notes on “Dish type solar collector”, “Flat plate collector”, and “Evacuated tube collectors” mention their working principle, advantages, and application. **4**
- 3(b).** In case of a Flat plate collector, derive the “Hottel-Whillier-Bliss” equation. **3**
- 3(c).** Design a low temperature solar thermal power plant. Mention the range of temperature for the low, medium, and high temperature cycle solar thermal system. **3**
- 4(a).** Do you think that Biomass energy and natural gas are sustainable energy sources? Give your logical arguments in favor of your opinion. **3**
- 4(b).** What do you mean by heat removal factor and collector efficiency factor? Also, Draw the “annual insolation VS collector tilt angle” graph. **3**
- 4(c).** “Large hydro is considered as a conventional energy source but Micro-hydro is considered as a non-conventional energy source” – Justify the statement. **2**
- 4(d).** Do you think that RE technologies can assist in the achievement of sustainable development goals of a country? Explain. **2**