International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Assessment of Autumn-2020	**Program: B.Sc. Engg. (EEE)**
Course Code: EEE- 4843	Course Title: Renewable Energy System
Time: **5 hours** (Writing - **4 hours 30 minutes** + **30 minutes** submission time)	Full Marks: **50** (**Written** 30 + **Viva**/**Viva-Quiz**-20)

[Answer **each of the** questions from the followings; Figures in the right margin indicate full marks. **Answer script must be submitted through online method within 5 hours from starting time. Also, write down the Q. Set on the front page of your answer script]**

Question SET Selection Process:

****Please show the ***Calculation of Question SET Selection*** at the 1st page of answer sheet. ***

LDI*=x=Last digit of student ID*

[For Question ***SET*** Selection: *(Last digit of Student ID=x)+(the Digit before last digit of Student ID=y)=**Z** .* If **Z** is ***even*** your Question **SET-A** and If **Z** is ***odd*** your Question **SET-B** *If the value of* **Z=0**, *answer* ***Question SET-B***.

Example: for St. ID =ET 1510**15**; St. last digit of ID=1=***x***; and the digit before last digit of ID is =5=**y**; So, **Z**=*(x+y)*=(1+5)=**6**. Here, 6 is an ***even*** number. So you have to Answer ***Question SET*-A**.]

Q. SET-B

SL.	Question	Course Outcome	Bloom's Level	Marks
1(a).	How can you select the PV system configuration? BPDP is planning to install a 1 MW Grid Connected Solar Power Plant at Regional Training Centre (RTC), Rajshahi. What will be the power system dynamic performance due to this grid connection? Describe with proper justification.	**CO2**	**Ap**	**03**
1(b).	Design a PV system including WP rating and battery Ah capacity for a Solar Home System (SHS) in Chittagong city. Data given are as follows: Five 15 W fluorescent lamp for 7 hours per day, two 25 W LED TV for 4 hours per day, one microwave oven of 1 kW for 1 hour per day, one computer of 250 W for 3 hours per day, two Refrigerators of 100 W for 12 hours per day, Deep discharge (75%) battery is used, Continuous cloud for 5 days. Also, Consider PV module (80 Wp) efficiency is ***E%*** and terminal voltage is 12 V. ***Here**, the value of **'E'** is **10 times of the summation of last two digits of your roll number**.*	**CO2**	**E**	**03**
2(a).	**Describe** the necessities of Electrical Energy Storage (EES) in power systems. **Which** EES is suitable for renewable energy integration- give a **clarification** for your selection.	**CO2**	**An**	**03**
2(b).	**What** type of EES can be selected for the designing of 1(b)? Give proper **clarification**.	**CO2**	**An**	**01**
2(c).	**Design** a solar PV system where power requirement is 0.3kW where system voltage is 28V and Vmax = 0.542V, Imax = 0.1143A.	**CO2**	**E**	**02**

3(a).	Suppose that you are working as a PDB engineer. You have given an assignment to setup a 1MW grid connected wind farm. **What** parameters you should **consider** and what type of wind turbine(WT) you will select? Give and narrate some specific logics for WT selection.	**CO3**	**An**	**03**
3(b).	A 30-m, three bladed wind turbine produces ***P*** kW at a wind speed of 14 m/s. Air density is the standard 1.225 kg/m^3. Under these conditions: i. At what rpm does the rotor turn when it operates with a TSR of 4.0? ii. What is the tip speed of the rotor? iii. If the generator needs to turn at 1500 rpm, what gear ratio is needed to match the rotor speed to the generator speed? iv. What is the efficiency of the complete wind turbine (blades, gear box, generator) under these conditions? ***Here**, the value of **'P'** is **100 times of the summation of last two digits of your roll number**.*	**CO3**	**E**	**03**
4(a).	Is there any **possibility** to harness wave energy from Bay of Bengal**? Suggest** a suitable technology and describe it with net sketch.	**CO3**	**Ap**	**03**
4(b).	Suppose that a NEG Micon 700/48 (700-kW generator, 48-m rotor) wind turbine is mounted on a 50-m tower in an area with ***v***-m/s average winds at 10m height. Assuming standard air density, Rayleigh statistics, Class 1 surface roughness, and an overall efficiency of 35%, estimate the annual energy (kWh/yr) delivered. ***Here**, the value of **'v'** is the **summation of last two digits of your roll number**.*	**CO3**	**E**	**03**
5(a).	**Describe** the Biomass Energy potential in Bangladesh and select a suitable place for Biomass Energy plant. **Suggest** and describe an appropriate types of Biomass Energy plant for your suggested area with net sketch.	**CO1**	**R,An**	**04**
5(b).	**How** Fuel-Cell generate electrical power? **How** Fuel-Cell technology can be used in renewable energy systems to address the global warming.	**CO1**	**An**	**02**
6.	Viva/Viva-Quiz: The time of viva/viva-quiz will be declared in google classroom and other online platform.	**CO1**	**R,U, An**	**20**