Name: **Enrolment No:**	

UPES, Dehradun

End Semester Examination, May 2024

Course: Energy Sector Structure and Functioning **Semester: II**

Program: BBA Green Energy & Sustainability **Time : 03 hrs.**

Course Code: OGET1001 **Max. Marks: 100**

Instructions:

SECTION A

10Qx2M=20Marks

S. No.		Marks	CO
Q 1	Complete the Abbreviations a. MNRE b. CEA	**2**	**CO1**
Q2.	What is Primary Energy resources? Name any two.	**2**	**CO1**
Q3	What is Secondary Energy? Give example.	**2**	**CO1**
Q4	Name different types of Solar Energy. Name two.	**2**	**CO1**
Q5	What is the full form of CERC and ROE?	**2**	**CO1**
Q6	Name four major Renewable energy.	**2**	**CO1**
Q7	What is Installed Renewable Energy Generation capacity in India at present? Give details.	**2**	**CO1**
Q8	Name Minister for New and Renewable Energy in India.	**2**	**CO1**
Q9	Explain Fossil and Non-Fossil Fuels.	**2**	**CO1**
Q10	What is overall Installed Generation Capacity in India at present? Give Fuel-wise.	**2**	**CO1**
SECTION B **4Qx5M= 20 Marks**			
Q 11	Name all five RLDCs with their Headquarters.	**5**	**CO2**
Q 12	What are the characteristics of Renewable Energy? Explain with five examples.	**5**	**CO2**
Q 13	What do you mean by Sustainability and Sustainable Development? Explain.	**5**	**CO2**
Q 14	Differentiate between Commercial Energy and Non-Commercial Energy with examples.	**5**	**CO2**

SECTION-C **3Qx10M=30 Marks**			
Q 15	How growth and development of power sector happened in India? Explain future of energy in India.	**10**	**CO3**
Q 16	"World is under Energy Transition which is going to affect Indian Energy Sector and Transportation in drastically manner" – Critically evaluate this statement. OR Discuss and critically evaluate current and future power scenario with challenges and opportunities.	**10**	**CO3**
Q 17	Calculate first year tariff of Solar PV Plant with 50 MW capacity as per CERC norms.	**10**	**CO3**
SECTION-D **2Qx15M= 30 Marks**			
	The Union Ministry of New and Renewable Energy (MNRE) announced August 12, 2021 that the country has achieved the milestone of installing 100 gigawatts (GW) of renewable energy capacity. This excluded large hydroelectricity capacities installed in the country, the ministry added. The press release for the announcement said: While 100 GW has been installed, 50 GW is under installation and 27 GW is under tendering. India has also enhanced its ambition to install 450 GW of renewable energy capacity by 2030. If large hydro is included the installed RE capacity increases to 146 GW at present as we have currently 46GW of large Hydro. The achievement is indeed a landmark in India's green portfolio but is still not an encouraging sign of the country attaining its 2022 target of 175 GW installation. In 2015-16, the Centre had announced it would install 175 GW of renewable energy (excluding large hydro) by 2022. This means, the country has 19 months to install the remaining 75 GW it had intended, considering the government was referring to the financial year of 2022-23. Looking at the past performance, the sector will have to make unprecedented progress in these months to achieve the target, according to energy experts. An analysis of monthly installed capacity in the first six months of 2021, after the first wave of the novel coronavirus disease (COVID-19) pandemic, explains this apprehension. Between January and June, only 1GW of renewable energy capacity was installed in a month on an average, according to data by the Central Electricity Authority (CEA) under the Union Ministry of Power. Moreover, the target set for installed solar energy capacity is 100 GW by March 2023 — 40 GW rooftop solar and 60 GW ground-mounted utility scale. The country has managed to install only 43.94 GW till July 31, 2021, the CEA data suggests. The rooftop solar installation has been particularly dismal at 7GW till December 2020, according to Bridge to India, a renewable energy consultancy. India has to quadruple its monthly installation rate to achieve its target within the stipulated time.		

	The capacity addition has been concentrated in Karnataka (15.6 GW), Tamil Nadu (15.5 GW) Gujarat (14 GW), Rajasthan (11.4 GW), Maharastra (10.4 GW) till July 31, 2021, according to CEA. Installation in the eastern (1.7 GW) and north-eastern (0.4 GW) regions has been scanty, and in the islands (38 megawatts) has been negligible. "The country has also enhanced its ambition to install 450 GW of renewable energy capacity by 2030," read the press note by the ministry. Predictions by experts, however, are comparatively modest. "The capacity predicted at our end is 150 GW by 2025 and 400 GW by 2030," said Samrat Sengupta, programme director of climate change & renewable energy department at the Centre for Science and Environment, a Delhi-based non-profit. Some long-term policies for the solar sector introduced recently may act as dampeners, he noted. The basic Customs duty on imported solar cells and modules effective April 1, 2022 and the mandatory registration for manufacturers of the same under the Approved List of Models and Manufacturers, are some of them, he added. Development in the wind energy industry slowed down in the last five years as solar energy gained a competitive advantage after changes in the feed-in tariff policy, said Sengupta. By 2025, renewable energy capacity development may be bolstered by the entry of competitive storage technology players in the Indian marker, predicted the researcher. ---------- **Attempt both questions :- (30 marks = 2X 15 Marks)**		
Q18	**Analyse the progress of India for achieving targets of Renewable Energy till 2030 as per facts given in passage and also known to you.**	**15**	**CO4**
Q19	**Give your suggestions for Renewable Energy growth and development in India in the coming decade for meeting target of emission reduction as per Paris Agreement.**	**15**	**CO4**

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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: Energy Sector Structure and Functioning **Semester: II**
Program: BBA Green Energy & Sustainability **Time : 03 hrs.**
Course Code: OGET1010 **Max. Marks: 100**
Instructions:

SECTION A
10Qx2M=20Marks

S. No.		Marks	CO
Q 1	Complete the Abbreviations a. CUF b. CERC	**2**	**CO1**
Q2.	Give 2 examples of Secondary Energy resources.	**2**	**CO1**
Q3	Name any 2 Green Energy Resources.	**2**	**CO1**
Q4	Name full form of PNGRB and APTEL	**2**	**CO1**
Q5	What are any three Ministries/Department involved for Energy Sector in India?	**2**	**CO1**
Q6	Name any 2 RLDC in India with their Headquarters.	**2**	**CO1**
Q7	What do you mean by Commercial Energy? Give one example.	**2**	**CO1**
Q8	What is India's target for Renewable Energy in 2030?	**2**	**CO1**
Q9	1 Barrel of crude oil is equal to how many Liters?	**2**	**CO1**
Q10	How much is total installed capacity of India at present?	**2**	**CO1**

SECTION B
4Qx5M= 20 Marks

Q 11	Why Green Energy is preferred globally? Explain with five reasons.	**5**	**CO2**
Q 12	What are the differences in Primary, Secondary and Tertiary Energy?	**5**	**CO2**
Q 13	Differentiate among Micro, Mini & Small Hydro Power Plants.	**5**	**CO2**
Q 14	Explain Sustainable Energy and Sustainability.	**5**	**CO2**

SECTION-C **3Qx10M=30 Marks**			
Q 15	What is Renewable Energy? How it is different from Non-Renewable Energy? Give three examples of both.	**10**	**CO3**
Q 16	Describe and analyze Power Scenario of India including Renewable Energy for present and expected in future in 2030.	**10**	**CO3**
Q 17	Explain Value-Chain for Power sector. Critically analyze role of anyone of them.	**10**	**CO3**
SECTION-D **2Qx15M= 30 Marks**			
	Go through the below case study. Questions are given after the case: In the village of Aharkandhi in northeastern Bangladesh, life has changed since homeowners began installing solar panels on their roofs. At night, families gather at the local grocery store to watch TV, which boosts business. Children study longer than before. This is due in part to a World Bank-financed electrification project to promote off-grid electricity in rural communities. This year, the project became the first renewable energy program in Bangladesh to be issued carbon credits for lowering greenhouse gas emissions and the world's first Programme of Activities for solar home systems under the UNFCCC's Clean Development Mechanism (CDM) to generate carbon credits. With access to electricity, people are finding new ways to increase their income, and the word is spreading quickly across villages. Mujib, a shopkeeper, saw his income increase by 1,000 Tk per month (about US$13), and his evening business grew after his solar home system was installed. After Hajra installed solar panels, she was able to power five lights so her children could study, a TV, and a mobile phone charger that allows her to keep in touch with her husband, a laborer. Previously, she used kerosene, and she remembers the fumes that filled her house. This is one of the fastest growing renewable energy programs in the world – to date, more than 3.5 million solar home systems have been installed in rural Bangladesh, creating 70,000 direct jobs. **Bolstering financing through carbon credits** Solar power is helping to green Bangladesh's energy mix. Renewable energy accounts for less than 1 percent of the country's energy generated, but the government aims to have 10 percent of its national grid powered by renewable		

energy by 2020. Adding solar panels to rural homes is an important part of the country's sustainable development strategy.

In addition to providing energy, the solar home systems are reducing greenhouse gas emissions and earning carbon credits by reducing the use of kerosene lamps for lighting and diesel generators that had been used to charge batteries.The program is projected to deliver 1.1 million Certified Emission Reductions, or carbon credits, by 2016, issued under the CDM. The carbon credits are sold to the World Bank's Community Development Carbon Fund, generating a revenue stream that is shared by the companies involved in financing, installing and servicing the solar panels to expand the program.

It is also the first solar home system Programme of Activities under the UN's Clean Development Mechanism to generate carbon credits. As an approved Programme of Activities, it is able to combine 13 similar projects under one countrywide umbrella program, lowering transaction costs and creating the possibility to add similar projects in the future in a simplified process.

The sun provides light in rural Bangladesh

Benefits of solar panels abound. Communities are reporting a significant increase in the quality of life thanks to better, safer, and cheaper lighting and the ability to power electrical appliances, cell phones, TVs, and radios. Remote and poor families can now hear weather forecasts on the radio and watch the news on small TVs, which becomes more than just a luxury in a country that frequently faces severe weather.

Night lights are improving safety in the dark, especially for women and children. Replacing conventional kerosene lamps and their toxic fumes help reduce indoor air pollution, fire hazards, and health risks such as respiratory diseases. And the solar panel industry is booming, including employing Bangladeshi women.

Solar panel subsidies help the poor

The solar panels are subsidized by the Infrastructure Development Company, Ltd. (IDCOL), a state-owned financial institution that provides families with grants and credits to pay for part of the cost and provide electricity in a country where only 60 percent of the population and about 42 percent of rural households haves access to electricity. Around 13 million rural households still live without power. Even those connected to the grid experience blackouts during peak hours because the electricity supply can't keep up with demand.

Installing solar panels has become a reliable and increasingly financially viable solution for more Bangladeshis. A 20 watt-peak system costs about US$150, which is paid by the users over three years and provides enough electricity to

	power two lights and one mobile charger. Bangladeshis even in the most rural areas rely on cell phones. Overcoming the affordability barrier has been crucial in allowing for a widespread adoption of solar home systems. The cost of solar panels has come down over time, and today there is a growing trend for very small, 10 watt-peak panels, allowing poorer households gain access to electricity. The Bangladesh program is one of the most successful solar home system programs in the world. It's a model that is bringing cheaper and more reliable electricity to remote areas of the country and has potential to go beyond Bangladesh to be scaled up in other developing countries.		
Q18	Explain given case in your own language.	**15**	**CO4**
Q19	Will this above model applicable to Indian rural areas. Critically explain?	**15**	**CO4**