Name:

Enrolment No:

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2024

Course: BBA GES **Semester: III**
Program: Regulatory Framework in GES **Time: 03 hrs.**
Course Code: OGET2004 **Max. Marks: 100**

Instructions:

SECTION A
10Qx2M=20Marks (Answer All Question)

S. No.		Marks	CO
Q 1	Name 4 stakeholders/institution/organizations of Indian Energy Sector	**2**	**CO1**
Q 2	How does policy differ with regulation	**2**	**CO1**
Q 3	What is core area of NTPC and NHPC	**2**	**CO1**
Q 4	What is Open Access in Energy Sector	**2**	**CO1**
Q 5	What is Captive and Group Captive Power Generation	**2**	**CO1**
Q 6	Define Solar Purchase Obligation (SPO)	**2**	**CO1**
Q 7	Define Renewable Energy Certificate (RECs)	**2**	**CO1**
Q 8	What is the function of State Electricity Regulatory Commission (SERCs)	**2**	**CO1**
Q 9	What is current share of **Hydro, Solar, Wind** in overall energy mix in India	**2**	**CO1**
Q 10	What are the targets of PM Surya Ghar Yojna	**2**	**CO1**
	SECTION B **4Qx5M= 20 Marks**		
Q 1	What are the salient features of the Electricity Act 2022 (Draft)	**5**	**CO2**
Q 2	Describe PM Surya Ghar Yojna	**5**	**CO2**
Q 3	Capex vs RESCO, which could be better option for UPES. As UPES does not own expertise in Renewable energy field. Mention the reason behind your answer also.	**5**	**CO2**
Q 4	What are the objectives of National Framework for Promoting Energy Storage Systems in India	**5**	**CO2**
	SECTION-C **3Qx10M=30 Marks**		
Q 1	Why energy storage is crucial as Renewable energy share is continuously increasing in overall energy mix of the country in India	**10**	**CO3**
Q 2	Describe Financial/fiscal incentives GoI. is providing in Energy Storage Segment	**10**	**CO3**

Q 3	Describe energy sale options a RE power producer in India can opt	**10**	**CO3**
	SECTION-D **2Qx15M= 30 Marks**		
	India is taking all steps necessary to achieve energy transition. India has set a target to achieve 50 percent cumulative installed capacity from non-fossil fuel-based energy resources by 2030 and has pledged to reduce the emission intensity of its GDP by 45 percent by 2030, based on 2005 levels. India has launched several initiatives such as National Solar Mission and National Mission for Enhanced Energy Efficiency to achieve its goal of increasing non-fossil fuel-based capacity and promoting energy efficiency. Additionally, India is investing in new technologies, such as electric vehicles, to reduce its carbon footprint. India's energy mix is set India's energy mix is set to undergo a transition from fossil fuel sources to non-fossil fuel-based sources dominated by Renewable Energy (RE) in the future keeping energy security in view. However, the incorporation of a significant amount of variable and intermittent RE into the energy mix presents a challenge for maintaining grid stability and uninterrupted power supply. Conventional energy sources such as coal, hydro (with storage), nuclear can be stockpiled and generation or energy output from these power plants can be controlled. However, the same is not the case with Renewable Energy (RE) sources such as Solar, Wind & Run of the River Hydro (without pondage) are to be used instantly, and in case they are not utilized they will be lost forever. The challenge with RE sources arises due to their varying nature with time, climate, season or geographic location. The variability associated with the RE sources leads to issues as grid balancing creating a need for flexibility. In this context, Energy Storage Systems (ESS) can be used for storing energy available from RE sources to be used at other times of the day. Storage of energy will help in bringing down the variability of generation in RE sources, improving grid stability, enabling energy/ peak shifting, providing ancillary support services and enabling larger renewable energy integration. Storage Systems will also benefit consumers by bringing down peak deficits, peak tariffs, reduction of carbon emissions, deferral of transmission and distribution capex, and energy arbitrage. For energy transition, shifting from fossil fuel-based capacity to Renewable Energy capacity- it is necessary that Renewable Energy becomes dispatchable, and available 24x7. This is possible only with Energy Storage. Therefore, to achieve twin objectives of ensuring energy transition and energy security, it is crucial to create an ecosystem for		**CO4**

	development of ESS that is independent of technology, based on requirements, and financially feasible, to guarantee affordable, clean, stable, flexible, and secure power for everyone Accordingly, a National Framework on ESS is necessary to encourage the adoption of Energy Storage for ensuring an environmentally sustainable and financially viable power sector. (7.45 GW PSP and 8.68 GW BESS) in year 2026-27, with a storage capacity of 82.32 GWh (47.6 GWh from PSP and 34.72 GWh from BESS). The energy storage capacity required for 2029-30 is likely to be 60.63 GW (18.98 GW PSP and 41.65 GW BESS) with storage of 336.4 GWh (128.15 GWh from PSP and 208.25 GWh from BESS). By the year 2031-32, this requirement is expected to increase to 73.93 GW (26.69 GW PSP and 47.24 GW BESS) with a storage capacity of 411.4 GWh (175.18 GWh from PSP and 236.22 GWh from BESS). To develop this storage capacity during 2022-27 the estimated fund requirement for PSP and BESS would be Rs. 54,203 Cr. and Rs. 56,647 Cr. respectively. Further, for the period 2027-2032 estimated fund requirement for PSP and BESS would be Rs. 75,240 Cr. and Rs. 2,92,637 Cr., respectively. The CEA has projected that by the year 2047, the requirement of energy storage is expected to increase to 320 GW (90GW PSP and 230 GW BESS) with a storage capacity of 2,380 GWh (540 GWh from PSP and 1,840 GWh from BESS) due to the addition of a larger amount of renewable energy considering the net zero emissions targets set for 2070.		
Q1	Elaborate the challenges with increasing Renewable energy in the overall energy mix of the country	**15**	**CO4**
Q 2	Elaborate on the importance of Energy Storage: Need, Targets of GoI., Financing required in future.	**15**	**CO4**