Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 140904 **Date: 12/06/2017**

Subject Name: Energy Systems

Time: 10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Draw the typical layout of thermal power plant and describe the function of main components.	**07**
	(b)	Discuss the essential factors to be considered for the site selection of hydro power plant.	**07**
Q.2	**(a)**	Explain "Pumped Storage Hydro Electric power plant" with neat sketch.	**07**
	(b)	Explain function of main components of a Nuclear Reactor with neat sketch.	**07**
		OR	
	(b)	Why Electrostatic Dust Collectors (ESP) is provided? Explain the operation of it with necessary diagram.	**07**
Q.3	**(a)**	Define following with diagram for solar – earth system 1) Solar azimuth angle 2) Zenith angle 3)Declination angle 4) Hour angle 5) Angle of incidence.	**07**
	(b)	Explain Grid connected Wind Energy Conversion System.	**07**
		OR	
Q.3	**(a)**	Wind at 1 bar and 20° C has a velocity of 12 m/s. Assume R=287 Nm/KgK. Calculate: (1) Total power density in wind stream. (2) Maximum power density (3) Total power produced if rotor diameter is 60 m and it runs at 50 rpm. (4) The torque and the axial thrust produced at maximum efficiency.	**07**
	(b)	State types of Solar Dryers and explain any one solar dryer with neat sketch.	**07**
Q.4	**(a)**	Draw the schematic arrangement of Diesel power plant and explain plant operation.	**07**
	(b)	What is Solar Collector? State various types of solar collector. Explain any one of them.	**07**
		OR	
Q.4	**(a)**	Explain Anderson cycle Ocean Thermal Energy Conversion (OTEC) system. State advantages and disadvantages of OTEC.	**07**
	(b)	Explain combined cycle power plant with necessary diagram.	**07**
Q.5	**(a)**	Define fuel cell. Explain the principle and operation of fuel cell technology.	**07**
	(b)	Explain Bio fuel technology. Explain biomass conversion process.	**07**
		OR	
Q.5	**(a)**	Explain the comparison between Steam, Hydro, Nuclear and Gas power station with reference to efficiency, maintenance, fuel cost, reliability and life.	**07**
	(b)	Explain Hydrogen storage systems.	**07**

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