

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII(NEW) EXAMINATION – SUMMER 2019****Subject Code:2181916****Date:09/05/2019****Subject Name:Energy Conservation And Management****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.

		MARKS
Q.1	(a) Calculate the pipe bores required for the suction and pressure lines of a pump delivering 40 L/min using a maximum flow velocity in the suction line of 1.2 m/s and a maximum flow velocity in the pressure line of 3.5 m/s.	03
	(b) Write brief note on “future scenario of energy in India.”	04
	(c) Define following terms: Energy Management, Energy conservation, energy pricing, energy tariff, energy intensity, long term energy scenario, Sectorial energy consumption	07
Q.2	(a) What are the features and notifications made under Energy conservation Act 2001?	03
	(b) What is the role of an ESCO? Discuss it in detail.	04
	(c) Define the following terms: (i) SPP (ii) Present value of money (iii) ROI (iv) NPV (v) IRR (vi) Sensitivity analysis (vii) Risk analysis.	07
	OR	
	(c) Calculate indirect efficiency of boiler for the following data Fuel firing rate = 5599.17 kg/hr Steam generation rate = 21937.5 kg/hr, steam pressure = 42 bars, Steam temperature = 377°C, Feed water temperature = 96°C, percentage of CO ₂ in Flue gas = 14, percentage of CO in flue gas = 0.55 Average flue gas temperature = 190 °C, Ambient temperature = 31°C, humidity in ambient air = 0.0204 kg / kg dry air, surface temperature of boiler = 70°C ,wind velocity around the boiler = 3.5 m/s ,total surface area of boiler = 90 m ² , GCV of Bottom ash = 3349 kJ/kg, GCV of fly ash = 1894.6 kJ/kg, Ratio of bottom ash to fly ash = 90:10, Fuel Analysis (in %) Ash content in fuel = 8.63, Moisture in coal = 31.6, Carbon content = 41.65,Hydrogen content = 2.0413, Nitrogen content = 1.6, Oxygen content = 14.48, GCV of Coal = 14,648 kJ/kg	07
Q.3	(a) List various energy audit instruments used during detailed energy audit in thermal power plant.	03
	(b) Explain selection of fluids for tube and the shell side in heat exchanger from energy conservation point of view.	04
	(c) Write brief note on tri-generation.	07
	OR	
Q.3	(a) Write brief note on National action plan on climate change.	03
	(b) Explain Internal rate of return technique with example	04
	(c) What are the benefits of monitoring & targeting system? Differentiate between (1) Energy monitoring & targeting (2) Internal & external benchmarking.	07

- Q.4** (a) List various sources of waste heat and potential of energy generation out waste heat. **03**
- (b) Write brief note on networking and pinch analysis of heat exchangers. **04**
- (c) Explain selection procedure of optimum steam traps for condensate and flash steam recovery system in textile industry from energy conservation point of view. **07**
- OR**
- Q.4** (a) Explain recent trends on selection of refractories from energy conservation point of view. **03**
- (b) Explain how performance evaluation of furnace is done from energy conservation point of view. **04**
- (c) Write brief note on Energy Management Information Systems. **07**
- Q.5** (a) Discuss the effect of following parameters on the performance of Boiler **03**
- (1) Excess air
- (2) Blow down
- (3) Waste heat utilization
- (b) List various energy conservation opportunities in a refrigeration system. **04**
- (c) Explain the terms Kyoto Protocol, Conference of Parties (COP), Clean Development Mechanism (CDM), and Prototype Carbon Fund (PCF). **07**
- OR**
- Q.5** (a) Explain typical ice bank system and energy savings derived out of it. **03**
- (b) Explain performance assessment of window and split room air conditioners. **04**
- (c) Discuss the effect of climate change on environment in detail due to effect of various energy uses. **07**
