UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, April/May 2018

Course: Energy Conversion – Thermal System **Semester: II**
Program: M.Tech – Renewable Energy Engineering
Time: 03 hrs. **Max. Marks: 100**
Instructions: All questions are compulsory.

SECTION A (5 x 4 marks)			
Q#		**Marks**	**CO**
Q 1	Briefly describe about storage & handling of liquid fuels	4	CO1
Q 2	Describe the salient features of FBC boilers and advantages of FBC boiler	4	CO2
Q 3	Discuss the types of Re-Heating Furnace	4	CO3
Q 4	Describe the Economic Thickness of Insulation and factors affecting it	4	CO4
Q 5	Briefly explain the waste heat recovery options available with furnaces	4	CO5
SECTION B (4 x 10 marks)			
Q 6	The measured CO_2 is 8% in an oil fired boiler flue gas. Theoretical CO_2 content for the fuel fired is 16%. Estimate the % excess air level.	10	CO1
Q 7	Explain the features of a good steam distribution system	10	CO2
Q 8	Compare the Pusher type furnace, walking beam furnace and walking hearth furnace.	10	CO3
Q 9	State the criteria of selection of Refractories	10	CO4
	OR		
	Explain the techniques for economic operation of Furnaces	10	CO5
SECTION-C (2 x 20 marks)			
Q 10	Steam pipeline 100 mm diameter is not insulated for 100 metre length supplying steam at 10 kg/cm2 to the equipment. Find out the fuel savings, if it is properly insulated with 65 mm insulating material. Some more data are: Boiler efficiency – 80%, Fuel Oil cost - Rs.15000/tonne, Surface temperature without insulation – 170oC, Surface temperature after insulation – 65oC Ambient temperature – 25oC	20	CO4
Q 11	Compare the losses made by a typical boiler and Furnace considered for checking the performance by Indirect method	20	CO2,3
	OR		
	Explain the Thermal energy conservation opportunities in a thermal power plant	20	CO5