Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End semester Examination, Dec 2019

Course: Biomass Conversion Technologies (EPEC 7021) **Semester: I**
Programme: M.Tech REE **Time: 03 hrs.**
Max. Marks: 100
Instructions:

S. No.	**SECTION A** ***(Answer all the questions.)***	**Marks**	**CO**
Q 1.	What is a biomass? Discuss its resources and environmental benefits in detail.	**5**	**CO1**
Q 2.	Explain the biomass gasification? Discuss gasifier classification, advantages and applications.	**5**	**CO1**
Q 3.	Give the characteristics and composition of Bio-gas.	**5**	**CO3**
Q 4.	What do you mean by pyrolysis? What are its types? Discuss any one in detail.	**5**	**CO3**
	SECTION B ***(Attempt all questions. All questions carry equal marks)***		
Q 5.	What do you mean by briquetting of a biomass? How it is different from pelletization? Discuss various process involved in the briquetting of a biomass?	**10**	**CO3**
Q 6.	Explain the significance of light reaction and Calvin cycle in photosynthesis.	**10**	**CO2**
Q 7.	The ultimate analysis of a fuel oil is given to be: carbon 83.7%, hydrogen 12.7%, Sulphur 0.7%, nitrogen 1.7% and oxygen 1.2%. With 30% excess air and assuming complete combustion, find (a) the total volume of combustion products at 200^{o}C and 1.013 bar, and (b) the dry flue gas analysis based on CO_2, O_2 and N_2.	**10**	**CO3**
Q 8.	What are the methods of producing the alcohol from Biomass?	**10**	**CO4**
	SECTION-C ***(Attempt all questions. All questions carry equal marks)*** **(2x20=40 Marks)**		
Q 10.	What are the different available pathways to convert biomass to other forms of fuels? Explain. (Or) Explain the operational parameters of a downdraft biomass gasifier. What are the advantages associated with downdraft over other gasifier designs?	**20**	**CO3**
Q 11.	Explain the materials and methods involved in making biodiesel with its applications.	**20**	**CO4**