Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, Dec.2023

Course: Bio Energy Resource Management **Semester: V**
Program: BBA GES **Time 03 hrs.**
Course Code: OGET 3007 **Max. Marks: 100**

SECTION A

Each Question will carry 2 Marks.
Instruction: Complete the statement / Select the correct answer(s)

S. No.	**Question: Describe the followings in brief**	**CO**
Q 1	Kinematic Energy	**CO1**
Q2	Useful Energy	**CO2**
Q3	Flex-Fuel	**CO2**
Q4	Decarbonization	**CO2**
Q5	Primary Energy	**CO3**
Q6	Dual-Fuel	**CO3**
Q7	Biofuel	**CO2**
Q8	Auto LPG	**CO2**
Q9	CBG	**CO1**
Q10	LNG	**CO3**

SECTION B

Each question will carry 5 marks.
Instruction: Write short / brief notes

Q 11	Write True/False & REASON against each statement as applicable: a) CBG & CNG can be used in the same automobile. b) Bio energy is primary energy. c) Plastic can be used for creating Bio Disel. d) Calorific value of Cow dung cake is more than Coal.	**CO2**

	e) BTU is the S.I unit of Energy.	
Q 12	Define the S.I Units of the following: a. Pressure b. Density c. Force d. Electricity e. Mass flow	**CO2**
Q 13	Explain feasibility of 12% Ethanol blend fuel launch by 1st April 2021 in India? Is the decision practical? Elaborate the impact?	**CO2**
Q 14	Give 5 organizations who are establishing Biogas plants in India. Give examples of their projects with capacity.	**CO3**

Section C

Each Question carries 10 Marks.
Instruction: Write long answer.

Q 15	Compare the ideal coefficients of performance of the same heat pump installed in Mumbai and Bengaluru. M: T_{hot} = 70°F, T_{cold} = 40°F B: T_{hot} = 70°F, T_{cold} = 15°F M: T_{hot} = 294°K, T_{cold} = 277°K B: T_{hot} = 294°K, T_{cold} = 263°K	**CO4**
Q16	Draw the CBG plant schematic diagram and analyze the scenario with CNG consumption in Indian market.	**CO3**
Q17	**Fill In the Blanks:**	**CO2**

Fuel	unit	tonnes of coal equivalent	tonnes of oil equivalent	barrels of oil equivalent	GJ (*)
coal	tonne	1	0.7	………..	29.3
firewood (**) (air-dried)	tonne	0.46	0.32	…………	……..
kerosene (jet fuel)	tonne	1.47	………	………..	………
natural gas	1000 m^3	1.19	0.83	……….	……..
gasoline	barrel	0.18	0.12	……….	5.2
gasoil/diesel	barrel	0.2	0.14	……….	5.7

(*) Note that GJ/tonne is the same as MJ/kg.

(**) Note that the energy equivalent of wood can vary a factor 3 depending on the moisture conten

Section D Each Question carries 15 Marks. Instruction: Write long answer.			
		COAL-TO-GAS PLANT CONVERSIONS The majority of the world's energy needs are met by fossil fuels such as coal, petroleum, and natural gas. Petroleum and other fossil fuels, such as shale and bituminous sands, require distillation and refinement to become usable fuels. These fuels come in three different forms: solid, liquid, and gas. The finite nature of global fossil fuel resources, high prices, and, most importantly, their negative environmental impact highlight the need for alternative fuel development. For many fossil-fuel-based industrial systems, increased use of renewable and alternative fuels can help to extend fossil fuel supplies while also addressing air pollution issues caused by conventional fuels. Other fuels, such as gas, oil, liquid waste materials, solid waste materials, and petroleum coke, have all been successfully used to fire cement-making kilns, either alone or in varying configurations. In addition, the cement industry is under increasing pressure to reduce emissions. Cement manufacturing emits a lot of carbon dioxide (CO_2) and nitrogen oxides (NO_x) (NO_x). Alleviating environmental issues and realigning carbon emissions atmospheric carbon dioxide, as the United Nations Framework Convention on Climate Change (UNFCCC) aims, will necessitate substantial drops in worldwide energy-related carbon dioxide emissions. As a result, new or improved low-carbon energy technology will need to be developed and disseminated. The emerging world is gradually turning towards creating a more sustainable environment by incessant efforts of switching from non – renewable to renewable sources. Nowadays, the ever-faster energy consumption has become the greatest challenge in building a sustainable world. Considering the phenomena, the governments across the world are putting all the forces towards switching the source of energy generation from renewable to non-renewables. The transformation from Coal to natural gas energy consumption is one of the endeavors, capturing worldwide attention these days. Observing the significance of the matter, the chapter attempts to contemplate the issue by formulating case studies in different parts of the globe. This chapter reviews in detail some of the main alternative fuels used in cement production in various countries. It focuses on the different types of alternative fuels used, the environmental and socioeconomic benefits of using them, the challenges of switching from conventional to alternative fuels, the combustion characteristics of the alternative fuels in question, and their impact on cement production and quality. Cement is widely regarded as one of the most important construction materials on the planet. Cement production is a high-energy process that uses about 3.3 GJ of thermal energy per ton of clinker produced. Electrical energy consumption per tonne of cement is between 90 and 120 kWh (Giddings, et al, 2000; European Commission [EC] 2001). Coal has traditionally been the primary fuel used in the cement industry. The first case is an attempt to demonstrate the U.S. cement industry's Coal -To- Gas plant conversion scenario. The present case study illustrates the key features of U.S. energy generation from Coal to natural gas, the current mechanism of generation backing with strong shreds of evidence, the major structural challenges in implementing the plan, and the possible alternatives available as different solutions. Exploring the possible alternatives, the chapter enlightens the best possible solutions, correlating with some relevant facts. Finally, the study would demonstrate the main learning from the case, which would assist the stakeholders' participating in the research and knowledge production in the concerned field. Moreover, "Our results tangibly demonstrate that meaningful assessment of the administrative and social	**CO4**

	impacts of coproduced knowledge is feasible and can be accomplished in a short period". Coal has so far been one of the leading sources of energy generation all over the world. Though being available in abundance, its non-renewable nature limits its future availability in the same amount. So, it is clear that if the current source of energy production is not diversified with another sustainable alternative, the future generation will face an unexpected dearth of electricity. Apart from this, Coal is one of the greatest CO_2 producing substances, leading to GHG formation during the burning process. The U.S. has also been witnessed Coal as the largest energy producer in the country. According to a report, in the U.S., approx. Coal produced 38% of the total power generation. Due to being widely available with a relatively lower cost of energy production, Coal in the form of fuel had been the first choice for the past decades. For instance, it is considered the best resource for steam-electric production, having the advantage of achieving economies of scale. In the steam power plant, water is moved through a horizontal tube that burns the Coal for steam production. The steam then moved into a turbine-driven generator which ultimately produces electricity. - Energy production from Coal In the United States, coal power plants typically produce energy through different generating units. The pulverized Coal is obtained through crushing and grinding, which is then sieved and dried with heated air. The dried powder is moved to the furnace, where steam is produced by burning the pulverized Coal. The more steam is pressurized, the more it generates a high temperature. The pressure and temperature of steam have been varied from critical units to ultra-supercritical over time. The process starts with the pulverization of Coal which is then added to the boiler to heat the water. The water then turns into steam through vaporization. The produced steam then moved with great force into the turbine, which converts the steam into electricity. Finally, the generated power is transmitted to the electricity grid, channelled to different consumption points. Likewise, Coal is used as the prime source of energy production in various other plants. Q18. Analyze the strategy work with respect to Coal to Gas conversion process. Q19. Evaluate and critically analyze the PSUs of Indian thermal power plant organizations like NTPC that how they will convert coal based power plants to Natural Gas based power plants and role of CBG in that.	