BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BE **SEMESTER : V**
BRANCH: CHEMICAL ENGG. **SESSION : MO/18**

SUBJECT: CL5003-ENERGY ENGINEERING

TIME: 03:00 **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1	(a)	What are the laws of energy conservation?	[2]
	(b)	Define heat pipe and Describe working principle with neat diagram.	[4]
	(c)	What energy alternatives are available to alleviate energy crisis? Why use of non-conventional energy sources has not gained momentum?	[6]
Q.2	(a)	Explain the different properties of solid fuels.	[2]
	(b)	Briefly discuss the vertical and horizontal gas retorts and also Explain proximate analysis of coal.	[4]
	(c)	Describe with neat diagram coal liquefaction process (indirect and direct process).	[6]
Q.3	(a)	Describe the properties of liquid fuels and its importance in comparison with solid or liquid fuels.	[2]
	(b)	What is Petroleum Crude? Give the composition and refining, naming different petroleum products recovered from it.	[4]
	(c)	Describe cracking, alkylation and isomerization reactions and explain their uses.	[6]
Q.4	(a)	List the main differentiate between LPG and CNG and give their main composition.	[2]
	(b)	Describe the physico-chemical properties of gaseous fuels.	[4]
	(c)	Describe working and give important reaction of producer gas with the help of neat diagram and its advantage over other fuels.	[6]
Q.5	(a)	What is the extended application of nuclear power in today's world?	[2]
	(b)	List out the various type of nuclear reactor with neat diagram.	[4]
	(c)	Explain the principle and working of a LMFBR with neat diagram and its application.	[6]
Q.6	(a)	Discuss the classification of various wind energy conversion system (WECS).	[2]
	(b)	Explain electricity generation by Ocean thermal energy conversion. A tidal power plant of the simple basin type, has area of $30 \times 10^6 m^2$. The tide has a range of 12m. The turbine, however, stop operating when the head on it falls below 3m. Calculate the energy generation filling (or empting) process in kWh if the turbine efficiency is 0.73.	[4]
	(c)	Discuss the construction and working of fixed dome digester biogas plant and Discuss its merits and demerits.	[6]
Q.7	(a)	Explain the working of solar distillation.	[2]
	(b)	What are fuel cells? Describe the ceramic fuel cell with neat diagram and applications in chemical process industries.	[4]
	(c)	Describe the working of production of hydrogen energy by steam reforming with neat diagram and its application in chemical industries.	[6]

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