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

CLASS: BTECH **SEMESTER: VII**
BRANCH: ALL **SESSION: MO/2022**

SUBJECT: SR511 FUNDAMENTALS OF FUELS AND COMBUSTION

TIME: 2 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

				CO	BL
Q1	(a)	What is working principal for an OTEC power plant? What are the challenges associated?	[2]	1	L2
Q1	(b)	Describe how tidal energy can be harnessed for power generation. Use diagrams.	[3]	1	L2
Q2	(a)	What are the components in a nuclear reactor? Describe with the help of a diagram.	[2]	1	L2
Q2	(b)	Describe how different stages of coke formation leads to the different types of coke.	[3]	2	L2
Q3	(a)	What are the different types of sulphur in coal? How is sulphur in coal determined?	[2]	1	L2
Q3	(b)	The following data are available for Chanch coal of the Raniganj coalfield,	[3]	1	L4

Proximate Analysis, percent air-dried				Ultimate Analysis, percent dmmf				Calorific value Kcal/kg
Moisture	Ash	VM	FC	C	H	S	N	
2.3	14	29.1	54.6	84.52	6.27	0.64	3.37	6890

(a) Calculate calorific value using CFRI and Dulong's formula and compare the computed value with the experimental.

(b) Calculate the volatile matter, and fixed carbon on dmmf basis.

Q4	(a)	Differentiate between carburetted water gas and blue water gas?	[2]	2	L3
Q4	(b)	Illustrate and explain the complete process of fractional distillation of petroleum crude with proper schematic diagram.	[3]	2	L3
Q5	(a)	What are the major physical parameters that affect the growth of algae?	[2]	2	L3
Q5	(b)	Why is bio-diesel a preferred renewable fuel in the diesel engine? Describe the chemicals reaction process behind bio-diesel preparation. What are the applications of the byproduct glycerin obtained from bio-diesel production?	[3]	2	L3

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