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GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, June – 2021

(Sixth Semester)

BCHPC6030 - FUEL AND ENERGY TECHNOLOGY

(Chemical Engineering)

Time: 2 hrs Maximum: 50 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) (1 x 10 = 10 Marks)

Q.1. Answer *ALL* questions	[CO#]	[PO#]
a. Calorific Value of coal can be determined from the _____of complete combustion at 298K and 1 atm. pressure. (i) heat of formation of products (ii) Heat of reaction of reactants (iii) Latent heat of vaporization (iv) Latent heat of by products	1	1
b. Nitrogen content of almost all coals is in the range of _____ wt % (i) 20 - 30% (ii) 10- 95 % (iii) 1-2 % (iv) 10- 20%	1	1
c. Oil shale is an organic-rich fine-grained sedimentary rock containing _____ from which liquid hydrocarbons can be produced, called shale oil. (i) alkenes (ii)kerogen (ii) Cyclic napthenes (iii) mercaptans	2	1
d. _____are cyclic saturated hydrocarbons with the general formula, like olefins, of C_nH_{2n},also known as cyclo-alkanes. (i) Alkanes (ii)Naphthenes (ii) Paraffins (iii) Aromatics	2	1
e. The compounds in crude petroleum oil are essentially hydrocarbons or substituted hydrocarbons in which the major elements are carbon at _____ and hydrogen at _____ respectively with traces of non hydrocarbon element (i) 10%–14% and 85%–90% (ii) 2 %-3 % and 97% -98% (iv) 85%–90% and 10%–14% (v) 0.5% - 1% and 99.5% - 99%	2	1
f. Which of the following compound is present in natural gas? (i) Fumic acid (ii) Methane (iii) Benzoic acid (iv) Sulphuric oxide	3	1
g. In a nuclear reactor, the chain reaction is constantly managed by means of control rods which are made from a material capable of _____. (i) Reducing pressure (ii) Monitoring the fusion reaction (iii) Fission induction (iv)absorbing neutrons	4	1
h. During nuclear reaction, When fission occurs, the release of energy drives the lighter elements or fission products and the surplus neutrons away from one another at _____ (i) Low pressure (ii)high velocity (ii) Low velocity (iii) High temperature	4	1
i. In nuclear reactor, the moderator is used	4	1

(i)to reduce the energy of the neutrons (ii)to remove the heat from the fuel elements
(iii)to penetrate between the fuel rods (iv)to maintain the proper neutron balance.

j. The liquid graphite reactor has a graphite block core similar to that of 4 1
(i) Pressurized heavy water reactor (ii)a gas cooled reactor
(ii) Water reactor (iii) Radiation reactor

PART – B: (Short Answer Questions) (2 x 5 = 10 Marks)

Q.2. Answer ***ALL*** questions	[CO#]	[PO#]
a. What is proximate analysis of coal?	1	1
b. What is coal petrography?	1	1
c. Define smoke point.	2	1
d. What is the composition of coke oven gas?	3	1
e. What are the advantages of nuclear fuel?	4	1

PART – C: (Long Answer Questions) (6 x 5 = 30 Marks)

Answer ***ANY FIVE*** questions	Marks	[CO#]	[PO#]
3. What are the types of coal?	(6)	1	1
4. Write the significance of coal composition.	(6)	1	1
5. Draw single stage and two stage electrical desalting process .	(6)	2	1
6. Explain crude atmospheric distillation process	(6)	2	1
7. Write the chemistry involved in the Fischer-Tropsch process	(6)	3	1
8. What are the different forms of water gas and state its uses.	(6)	3	1
9. What is the purpose of coolant and steam generator in nuclear reactor.	(6)	4	1
10. Discuss nuclear reactor principles	(6)	4	1

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