Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **B.TECH**
PEMN5301

5th Semester Regular / Back Examination 2015-16
FUEL TECHNOLOGY
BRANCH(S): MM, MME
Time: 3 Hours
Max marks: 70
Q.CODE: T613

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) What do you mean by 3 "Ts" for combustion? Explain its effect.
b) How do you differentiate between fixed carbon and total carbon of coal?
c) A coal has following proximate analysis on air dry basis:-
Moisture=1.5%,Ash=15.5%,VM=28%,Fixed carbon=55%
Calculated volatile matter on (dry ash free) and (dry mineral matter free) basis.
d) Differentiate between sensible heat and latent heat.
e) Differentiate between Gross Calorific value and Net calorific value. When will both be same?
f) Name the different petro graphic constituents of coal?
g) How do Oxygen and Hydrogen in coal affect its calorific value?.
h) Write down the advantages and disadvantages of gaseous fuel.
i) What is Hilt's law?
j) Write down two renewale and non renewale sources of energy.

Q2 **a)** Write down the physico-chemical changes during wood carbonization and its characteristics. **(5)**
b) Describe about washability curve and main objective of the coal washing. **(5)**

Q3 **a)** Write down the reaction, properties and characteristics of blast furnace gas. **(5)**
b) Describe about wind energy and its application. **(5)**

Q4 **a)** Differentiate between beehive coke oven and byproduct coke oven. **(5)**
b) Write down advantages and disadvantages of pulverised coal

Q5 **a)** What is activated carbon and how it is used in metallurgy **(5)**
b) Explain the working principle of bomb calorimeter with suitable diagram. **(5)**

Q6 **a)** What is the effect of coal type and process variables of carbonization on coke properties? **(5)**

b) Differentiate between LTC & HCT **(5)**

Q7 The flue gas from an industrial furnace have the following composition by volume **(10)**

CO_2=11.73%, CO=0.2%, H_2=0.09%, O_2=6.81%, N_2=81.17%

Calculate the % of excess air employed in the combustion, if the loss of carbon in clinker and ash is 1% of the fuel used and the fuel has the following composition by weight:

C=74%, H_2=5%, O_2=5%, N_2=1%, S=1%, H_2O=9% and ash=5%.

Q8 Write short notes on (any two) **(5 x 2)**

a) Coke reactive index(CRI)

b) Blending of coal

c) BOF gas

d) Ferro-coke and Formed coke