



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY :: PUTTUR
(AUTONOMOUS)**

Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK

Subject with Code : FCE(16ME8804)

Course & Specialization: M.Tech – Th. Engg

Year & Sem: I-M.Tech & I-Sem

Regulation: R16

UNIT –I			
1	(a)	What are the basic coal ingredients? How they affect the furnace design	5 M
	(b)	What are the properties of liquid fuel and discuss	5 M
2	(a)	Explain briefly about origin of coal	5 M
	(b)	Give the detailed classification of liquid fuels	5 M
3	(a)	What is the need of analyzing the coal? Name different analyzing methods of coal	5 M
	(b)	Explain in brief about proximate and ultimate analysis of coal	5 M
4	(a)	Name the different types fuels available and classify them in detail	5 M
	(b)	Write about gasification and liquefaction system	5 M
5	(a)	Explain the terms conventional and non-conventional with reference to fuels	5 M
	(b)	Explain the fundamental characteristics of the fuels	5 M
6	(a)	Classify the coal and explain Lignite and Bituminous coal	5 M
	(b)	Write short notes on alternate fuels alcohols and bio gas	5 M
7	(a)	Describe in detailed way about the classification and properties of solid fuels	5 M
	(b)	Differentiate between calorific values of solid, liquids and gases	5 M
8	(a)	Write a short note on coal gas	5 M
	(b)	Explain polymerization and Isomerization	5 M
9	(a)	Name different type of nuclear fuels? Explain nuclear reactor with suitable diagram	5 M
	(b)	Discuss in brief about coal gas and blast furnace gas	5 M
10	(a)	Write short notes on : (i) Liquefaction (ii) Gasification (iii) Carbonization of coal	5 M
	(b)	With a neat diagram explain the working of any one nuclear reactor	5 M
UNIT –II			
1	(a)	What do you understand by homogeneous reaction? How does it is different from heterogeneous reaction?	5 M

	(b)	What are the parameters effect the reaction rate	5 M
2	(a)	Explain collision theory	5 M
	(b)	Define reaction order and molecularity and explain zero order reaction.	5 M
3		Write short notes on the following (i) Complex reactions (ii) Molecularity (iii) First order equations	3+3+4 M
4	(a)	Discuss combustion chemistry equations	5 M
	(b)	Explain first and second order equations of chemical reactions	5 M
5	(a)	Define and explain complex reaction	5 M
	(b)	Discuss about the oxidation behavior of hydrocarbons	5 M
6	(a)	Write the parameters on which the reaction rate depends	5 M
	(b)	Explain in detail the third order reaction with an example	5 M
7	(a)	Explain in brief about the reaction mechanism	5 M
	(b)	How does the collision theory effects the reaction rate	5 M
8		Name the different methods of determining order of reaction and explain them in brief	10 M
9	(a)	What is the difference between molecularity and order of reaction	5 M
	(b)	Define the term chain reaction with an example	5 M
10	(a)	Briefly write about theories of reaction kinematics	5 M
	(b)	Oxygen plays an important role in the combustion. Justify	5 M
		UNIT –III	
1	(a)	What do you mean by combustion? Why is important even today	5 M
	(b)	What is heating value of the fuel? How it effects the performance	5 M
2	(a)	How does adiabatic flame temperature vary with an increase in temperature	5 M
	(b)	Write the parameters on which the flame propagation depends	5 M
3	(a)	Explain briefly about enthalpy of formation	5 M
	(b)	How the adiabatic flame temperature can be estimated	5 M
4	(a)	What do you mean by diffusion flame. How it different from premixed flame	5 M
	(b)	State the assumptions to be considered for laminar flame theory	5 M
5	(a)	Explain with neat sketch, the structure of laminar premixed flame	5 M
	(b)	What are the assumptions made in laminar flame theory	5 M
6	(a)	How does adiabatic flame temperature vary with an increase in temperature? Why is it so?	5 M
	(b)	Explain the flame stabilization by burner rim	5 M
7	(a)	What is the effect of chemical and physical variables on burning velocity	5 M

	(b)	The fuel consists of the following percentage analysis by mass C-82%; H ₂ - 12%; O ₂ – 2%; S-1%; N ₂ -2%. Determine stoichiometric mass of air required to completely burn the fuel and also determine the products of combustion by mass as percentage	5 M
8	(a)	How does the temperature and pressure in the chamber affects the burning velocity	5 M
	(b)	Discuss the factors affecting laminar burning velocities	5 M
9	(a)	Discuss higher heating value (HHV) and lower heating values (LHV)	5 M
	(b)	A fuel is of following composition by weight. C-65%, H ₂ – 5% and ash-30%. This fuel is burnt with 30% of excess air. Determine the percentage of CO ₂ in the exhaust gases.	5 M
10	(a)	Explain in detail about the measurement of burning velocity	5 M
	(b)	The gasoline (C ₈ H ₁₈) is burnt with dry air. The volumetric analysis of products on dry basis is CO ₂ = 10.02%; O ₂ = 5.62%; CO= 0.88% and N ₂ = 83.48%. Determine (i) Air Fuel ratio (ii) Equivalence ratio and (iii) Stoichiometric air used	5 M
UNIT –IV			
1	(a)	Explain in brief about (i) Droplet combustion (ii) Fluidized bed combustion system	5 M
	(b)	Write the parameters which affects the combustion	5 M
2	(a)	What is the lifetime of a droplet during its burning? Derive an expression for droplet lifetime	5 M
	(b)	Explain the working of pulverized fuel furnace with a neat sketch	5 M
3	(a)	What is the purpose of flue gas analysis? Explain it clearly	5 M
	(b)	Define combustion stoichiometry and explain	5 M
4		What are the emissions emitted by the combustion? Explain the formation and effect of NOX, CO and HC emissions.	10 M
5	(a)	How does ozone layer influenced by the emissions from the combustion sources	5 M
	(b)	Explain the effect of air pollution on environment and human health	5 M
6	(a)	What are the major effects of green-house effect on the earth atmosphere	5 M
	(b)	Write short notes on Kinematics of liquid fuel combustion	5 M
7	(a)	Discuss the effects of CO, HC, NOX and Smoke emission on human life	5 M
	(b)	Explain the combustion phenomenon of coal in detail	5 M
8	(a)	What do you understand by dew point of products? Explain	5 M
	(b)	Explain about the spray phenomenon of combustion	5 M
9	(a)	What is purpose of furnace? Name different types of furnaces and explain the working of any one.	5 M
	(b)	What is the importance of flue gas analysis	5 M

10		Write short notes on the following	
		(i) Kinematics of liquid fuel combustion	3 M
		(ii) Fluidized bed system	3 M
		(iii) Emissions	4 M
UNIT –V			
1.	(a)	What are the factors affecting the burners	5 M
	(b)	Explain the working of oil burners with a neat sketch	5 M
2	(a)	Mention the factors affecting the combustion	5 M
	(b)	With a neat diagram describe the working of vaporizing burner	5 M
3	(a)	Classify the burners based on the flame structure	5 M
	(b)	Illuminate the working of atomizing burners with a neat sketch	5 M
4	(a)	Name the different combustion equipment of coal and explain any one of that with a neat figure	5 M
	(b)	Explain the flame stabilization by burner rim	5 M
5	(a)	What are the factors to be consider while designing burners	5 M
	(b)	Explain the working of gas burners with a neat sketch	5 M
6	(a)	Mention the importance of the burners	5 M
	(b)	With a neat sketch explain the working of atmospheric burner	5 M
7	(a)	Explain the design procedure of burners	5 M
	(b)	Write the working of air aspiration gas burners with a neat sketch	5 M
8	(a)	How the flame structure effects the design of burners	5 M
	(b)	Write the importance of burners in the combustion	5 M
9	(a)	What are the differences between oil burners and Gas burners	5 M
	(b)	Mention the importance of air in burners	5 M
10		Answer all the following questions	
	(i)	Gas burner	3 M
	(ii)	factors affecting the burners	4 M
	(iii)	Oil burners	3 M

Prepared by: Dr. S. Sunil Kumar Reddy