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INDIAN INSTITUTE OF INFORMATION TECHNOLOGY UNA [HP]

An Institute of National Importance under MoE

Saloh, Una (HP) – 177 209

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AY 2021-22
SCHOOL OF COMPUTING
CURRICULUM: IIITUGCSE20
Cycle Test – II
28-03-2022

Degree	B. Tech.	**Branch**	CSE
Semester	First		
Subject Code & Name	CYC102: Engineering Chemistry		
Time: 60 Minutes	**Answer All Questions**		**Maximum: 20 Marks**

S.No.	Question	Marks
1.a	What are the steps involved in the conversion of polyacrylonitrile (PAN) to carbon fibre ?	(1)
1.b	Explain the process of Otto-Hoffmann by-product oven for the manufacture of metallurgical coke. How does it follow the regenerative principle of heat economy?	(2)
1.c	The coal has the following analysis: C = 54 %; H = 6.5 %; O = 3%; N = 1.8%; moisture = 17.3; and remaining is ash. This coal, on the combustion with excess of air, gave 50 kg of dry flue gases per Kg of coal burnt. Calculate the percentage of excess air used for the combustion.	(2)
2.a	What is the difference between Fire point and Flash point of lubricating oils?	(1)
2.b	Explain the Orsat's process for flue gas analysis. What is the significance of flue gas analysis?	(2)
2.c	A sample of coal was analyzed as follows: 1.5g of coal was weighed into silica crucible. After heating for one hour at 100 ℃, the residue weighed 1.415g. The crucible was then covered with a vented lid and strongly heated for exactly seven minutes at 950 ± 20 ℃. The residue weighed 0.528g. The crucible was then heated without the cover, until a constant weight was obtained. The residue was found to weigh 0.254g. Calculate the percentage results of above analysis. Identify the type of analysis. Why is the analysis so-named?	(2)
3.a	Explain with the help of diagram how the garbage bags are formed by blown film extrusion process?	(1)
3.b	What are conducting polymers? Explain with the help of mechanism the effect of n-doping on polyacetylene.	(2)
3.c	Explain the conductivity behavior of polyaniline. Also give the brief account of its synthesis.	(2)

4.a	Derive the equation for the gross calorific value using Bomb calorimeter.	(1)

4.b	A sample of coal was found to have the following percentage composition by weight: C = 85%, H = 5%, O = 6 %, N = 4%, ash = 5 % and moisture = 3%
	   (i) Calculate the minimum amount of air needed in complete combustion of 1 Kg of coal.
	   (ii) Calculate the weight of air required if 20% excess air supplied.
	   (iii) Gross and net calorific value of coal sample using Dulong's formula.
		(2)

4.c	The composition of a gas was found to be:H_2 = 14%; CH_4 = 2%; CO = 22%; CO_2 = 5%; N_2 = 55% and O_2 = 2% by volume. Find the air required for the perfect combustion of 1 m^3 of this gas. If 60% excess air is used, find the volume analysis of the dry products of combustion.	(2)
	****GOOD LUCK*****	