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

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

SUBJECT: CE420 AIR POLLUTION AND CONTROL

TIME: 3:00 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Distinguish between: (i) Primary and secondary air pollutants, (ii) Stationary and mobile sources of air pollutants.	[2]	1	1
Q.1(b)	What are the harmful effects of the following on human beings? (i) Sulfur dioxide (ii) Hydrocarbons.	[3]	1	2
Q.1(c)	A power plant burns 20 tonnes of coal per hour, and the average sulfur content of the coal is 4.5 percent. What is the approximate emission of SO_2 in tonnes per day?	[5]	1	3
Q.2(a)	What do you mean by Representative sample and its importance in stack sampling?	[2]	1	1
Q.2(b)	What are the devices used for sampling gases and vapors? Describe anyone in detail.	[3]	1	2
Q.2(c)	Define Air Pollution index. What are the parameters generally used for calculating Air Pollution Index? Distinguish between short-term indices and long-term indices.	[5]	1	2
Q.3(a)	Explain the following atmospheric conditions: (i) super-adiabatic (ii) sub-adiabatic (iii) Neutral (iv) inversion.	[2]	2	1
Q.3(b)	With the help of neat sketches, explain the working of any one of the following: (i) wind speed recorder or (ii) wind direction recorder.	[3]	2	2
Q.3(c)	Determine the effective height of a stack, given the following data: • Physical stack is 230 m tall, with a 1.85-m inside diameter. • Wind velocity is 6.5 m/s. • Air temperature is 7°C. • Barometric pressure is 1000 millibars. • Stack gas velocity is 12.3 m/s. • Stack gas temperature is 190°C.	[5]	2	3
Q.4(a)	With line diagram, explain the working of gravitational settling chamber for removal of particulate matter from the carrier gas. Also, discuss its demerits.	[5]	3	1
Q.4(b)	For controlling emission of gaseous pollutants such as CO and HC, combustion is commonly used technique. When combustion of such gases is preferred? Explain the process of Incineration and discuss its merits over combustion process.	[5]	4	2
Q.5(a)	A plate-type electrostatic precipitator is used for the removal of fly ash in a power plant. The spacing between plates is 0.15 m and the plates are 2 m high and 2 m long. The unit handles 0.278 m^3/s. The migration velocity of fly ash is 0.1 m^3/s. Find the efficiency of collection.	[5]	4	3
Q.5(b)	Briefly discuss the method of exhaust gas recirculation in control of vehicular pollution. Discuss few other emission control methods that can be employed in automotive vehicles.	[5]	5	2

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