Register Number:……..

KUMARAGURU
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**B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023**

(Regulation 2018)

Seventh Semester

**CIVIL ENGINEERING**

U18CEE0006: Air and Noise Pollution Control

**COURSE OUTCOMES**

**CO1:** Categorize the various sources, types and nature of air pollutants and their effects on living and Non-living beings.
**CO2:** Perform quantitative measurements of the dispersion of pollutants in the atmosphere.
**CO3:** Understand the sources and effects of Indoor Pollution and its Control measure.
**CO4:** Determine the principle involved in the pollutant removal and their control measures.
**CO5:** To learn about the effects and the sources of noise pollution and its Legislation.

**Time: Three Hours** **Maximum Marks: 100**

**Answer all the Questions:-**
**PART A (10 x 2 = 20 Marks)**
**(Answer not more than 40 words)**

| | | | |
|---|---|---|---|
| 1. | Differentiate Primary and secondary air pollutants with suitable example. | CO1 | [$K_2$] |
| 2. | Calculate AQI Index for 24hours average.<br>P.M10 =70 µg/m3<br>Ammonia =300 µg/m3<br>PM2.5 =70 µg/m3<br>SO2 =40 µg/m3. | CO1 | [$K_3$] |
| 3. | What are the effects on human health due to air pollution? | CO2 | [$K_1$] |
| 4. | Determine the effective height of a stack, with the following given data: Physical stack is 180 m tall with 0.95 m inside diameter Wind velocity is 2.75 m/sec Air temperature is 20°C Barometric pressure is 1000 millibars Stack gas velocity is 11.12 m/sec Stack gas temperature is 160 °. | CO2 | [$K_3$] |
| 5. | Define SICK BUILDING SYNDROME and give its symptoms. | CO3 | [$K_1$] |
| 6. | Distinguish between catalytic combustion and Catalytic oxidation. | CO3 | [$K_2$] |
| 7. | Mention any two controlling equipment for particulate pollutants and gaseous pollutants. | CO4 | [$K_2$] |
| 8. | Define Volatile Organic Compound and Give example. | CO4 | [$K_2$] |
| 9. | Give the new five norms proposed by Central Control Board (CPCB) for Noise Pollution violation. | CO5 | [$K_2$] |
| 10. | Define “Hearing Threshold Level”(HTL) and mention its limit. | CO5 | [$K_2$] |

**Answer any FIVE Questions:-**
**PART B (5 x 16 = 80 Marks)**
**(Answer not more than 400 words)**

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|---|---|---|---|---|---|
| 11. | a) | What are the major effects of air pollution on Animals? | 8 | CO1 | [$K_3$] |
| | b) | What is meant by air sampling? Explain adsorption and absorption sampling techniques. | 8 | CO1 | [$K_3$] |
| 12. | a) | A stack in an urban area is emitting 80 g/s of NO. It has an effective stack height of 100 m. The wind speed is 4 m/s at 10 m. It is a clear summer day with the sun nearly overhead. Estimate the ground level concentration at a) 2 km downwind on the centerline and 0.1 km off the centerline. Take $\sigma_y$ =290 $\sigma_z$ = 220. | 8 | CO2 | [$K_3$] |
| | b) | Enlist the plume behavior in ambient air and explain with respect to stability of atmospheric condition. | 8 | CO2 | [$K_2$] |
| 13. | a) | Write the CPCB one day Standard value for $NO_2$, P.M $_{2.5}$, $PM_{10}$,$CO_2$ and $SO_2$ | 8 | CO2 | [$K_2$] |
| | b) | A plate type electrostatic precipitator in a cement plant for removing dust particle consist of 10 equal channels. The spacing between the plates is 0.15m and the plates are 2m high and 2m long. The unit handles 1000,$m^3$/hr. What is the efficiency of the equipment. | 8 | CO3 | [$K_3$] |
| 14. | a) | State the major indoor air pollutants and explain their ill effects. | 8 | CO3 | [$K_2$] |
| | b) | Discuss how to control the Indoor air pollution? | 8 | CO3 | [$K_2$] |
| 15. | a) | The cyclone separate with a diameter of 1.0m handles 3.0 $m^3$/s of standard air carrying particle with a density of 2000kg/$m^3$.Using $N_e$ =6,determine the collection efficiency as a function of particle diameter.<br>Assume velocity = 24m/s and width of inlet =0.25m,<br>viscosity-1.81x10-$^5$ kg $m^{-1}s^{-1}$. | 8 | CO4 | [$K_3$] |
| | b) | A multi tray settling chamber having 8 trays, including the bottom surface, handles 6$m^3$/s of air 20°C. The trays are spaced 0.25m apart and the chamber is to be 1 m wide and 4m long. What is the minimum particle size of density 2000kg/$m^3$ that can be collected with 100% efficiency? | 8 | CO4 | [$K_3$] |
| 16. | a) | Explain the Noise pollution control acts and legislation in INDIA. | 8 | CO5 | [$K_2$] |
| | b) | What are the sources of noise? How noises become a pollution problem? Discuss in detail "Control of noise pollution". | 8 | CO5 | [$K_2$] |

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