Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 51038

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Fifth/Seventh Semester

Aeronautical Engineering

OCE 551 – AIR POLLUTION AND CONTROL ENGINEERING

(Common to : Aerospace Engineering/ Agriculture Engineering/ Automobile Engineering/ Biomedical Engineering/ Computer Science and Engineering/ Computer and Communication Engineering/ Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Electronics and Telecommunication Engineering/Environmental Engineering/Geoinformatics Engineering/ Industrial Engineering/Industrial Engineering and Management/ Instrumentation and Control Engineering/Manufacturing Engineering/Marine Engineering/ Material Science and Engineering/Mechanical Engineering/ Mechanical Engineering (Sandwich)/Mechanical and Automation Engineering/ Mechatronics Engineering/Medical Electronics/Petrochemical Engineering/ Production Engineering/ Robotics and Automation/Artificial Intelligence and Data Science/Bio Technology/Chemical Engineering/Chemical and Electrochemical Engineering/Computer Science and Business System/Fashion Technology/ Food Technology/Handloom and Textile Technology/Information Technology/ Petrochemical Technology/ Petroleum Engineering/ Pharmaceutical Technology/ Textile Chemistry/Textile Technology)

(Regulations – 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Name the air pollutants, which are the constituent of atmospheric air.

2. Define "emission standards".

3. What is inversion? State its significance on air pollution.

4. What do you mean by dispersion models?

5. List the types of scrubbers.

6. State the limitations of electrostatic precipitators.

7. List the effects of gaseous pollutants on environment.

8. List the gaseous pollutants discharged by automobiles.

9. What are the sources of indoor air pollutants?

10. What is meant by sick building syndrome?

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the structure of atmosphere, referring to the air pollutants, their impacts and their removal. (13)

Or

(b) Explain the effects of air pollutants on human health. (13)

12. (a) Explain the primary and secondary parameters influencing the dispersion of air pollutants in the atmosphere. (6+7)

Or

(b) Describe the different plume patterns and explain about the corresponding atmospheric stability conditions. (6+7)

13. (a) Discuss the factors influencing the selection of equipment for air pollution control. (13)

Or

(b) Describe the construction and working of settling chambers and filter bags employed for particulates removal. Compare their advantages and disadvantages. (10+3)

14. (a) Explain the different mechanisms of controlling the gaseous pollutants. (13)

Or

(b) (i) Describe the biofilters and their application in pollution control. (6)

(ii) Explain the method of controlling the air pollution in automobile exhaust. (7)

15. (a) Explain the different control strategies and preventive measures adopted for noise pollution. (6+7)

Or

(b) Discuss the different noise sources, their noise levels and the effects of each on human being. (5+4+4)

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PART C — (1 × 15 = 15 marks)

16. (a) Determine the plume rise and effective height of a stack from the following data. (15)

     Wind velocity   3 m/sec
     Air temperature   25°C
     Physical Stack height   200 m
     Exit internal diameter   1 m
     Atmospheric pressure   1,000 millibars
     Stack gas velocity   11 m/s
     Stack gas temperature   160°C
     The atmospheric condition   slightly unstable

     Also determine the ground level concentration of SO_2 at a location of 2,000 m downwind and 400 m crosswind positions, when the stack emits SO_2 at the rate of 200 gm/s.

                              Or

    (b) Describe the greenhouse effect and discuss about the pollutants responsible for global warming. (7+8)

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