

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

03000IC306052102

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Regular and Supplementary Examination July 2021



**Course Code: IC306**

**Course Name: INDUSTRIAL INSTRUMENTATION II**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two full questions, each carries 15 marks.*

Marks

- |   |   |      |
|---|---|------|
| 1 | a) Draw the setup of liquid level measurement for non-conducting liquids with equivalent circuit with a capacitive type level sensor. | (4)  |
|   | b) Explain any three Head type flow meters based on the differential pressure measurements.   | (9)  |
|   | c) State Bernoulli's Theorem.   | (2)  |
| 2 | a) Sketch a neat schematic of positive displacement type flowmeter and demonstrate its functions.                                     | (3)  |
|   | b) Differentiate between the nutating disc meter and piston flowmeter, with supporting diagrams.                                      | (10) |
|   | c) List out the advantages and limitations of Oval gear meters.   | (2)  |
| 3 | a) Explain different types of pressure taps used in orifice meter with neat Diagrams.   | (9)  |
|   | b) List out the general features of differential pressure flow meters.  | (2)  |
|   | c) Demonstrate the working principle of a reciprocating piston flowmeter.   | (4)  |

**PART B**

*Answer any two full questions, each carries 15 marks.*

- |   |   |     |
|---|---|-----|
| 4 | a) Elaborate about the device which is used for measuring the velocity and direction of the fluid, with a neat diagram. | (9) |
|   | b) Give the principle of operation of target flowmeters and present the expression for the force.                       | (4) |
|   | c) Define Karman Vortex.  | (2) |

**03000IC306052102**

- 5 a) Give a short note on the sampling technique adopted in flue gas analysis. (5)  
b) List out the methods available for analysis of CO? Explain any two methods. (8)  
c) Give the diagram related to the thermal conductivity bridge for flue gas analysis. (2)
- 6 a) Illustrate the advantage of the turbine flowmeter and demonstrate the working principle of the same with supporting diagrams. (10)  
b) Classify the interferential and electrical type flow meters. (3)  
c) List out the advantages and disadvantages of Ultrasonic flowmeters. (2)

**PART C**

*Answer any two full questions, each carries 20 marks.*

- 7 a) Elaborate the working of ORSAT apparatus with a neat schematic diagram. (10)  
b) How do large combustion plants measure NO<sub>x</sub> and SO<sub>x</sub> emissions directly? Explain. (10)
- 8 a) Design a I/P converter using nozzle/flapper system and explain its working. (10)  
b) Compare and contrast the pneumatic and hydraulic actuators. (10)
- 9 a) Explain the working principle of air lock relay with a neat schematic. (10)  
b) Write a note on different types of control valve noises. (6)  
c) List out the advantages of using valve positioner. (4)

\*\*\*\*