

N.B. : (1) Question No. 1 is **compulsory**.

(2) Attempt any **four** out of remaining **six** questions.

(3) Assume **suitable** data wherever **required** with justification.

(4) Draw neat **circuit** and /or **block diagram** to support your answer.

1. Solve any **four** :-

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| (a) Compare SCADA and Fuzzy Controller. | 5 |
| (b) Explain tuning of pneumatic PID controller. | 5 |
| (c) Discuss instrumentation amplifier. | 5 |
| (d) Compare PLC with Microcontroller. | 5 |
| (e) Discuss in brief adaptive control system mechanism with appropriate example. | 5 |

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| 2. (a) Explain distillation of hydro-carbon in the petroleum industry. | 10 |
| (b) Explain the construction and principle of operation of strain gauge. | 10 |

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| 3. (a) Draw schematic of typical data acquisition system for input of 8 processes variable in the range of 0 to 5 V dc and with ON/OFF control action required for each variable at the output. | 10 |
| (b) Explain any one process along with control diagram in the Food Industry. | 10 |

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| 4. (a) Explain in detail the various methods of flow measurements and discuss any one measurement system used in Chemical Industries. | 10 |
| (b) Discuss in brief the role of integral wind-up and antiwind-up circuits. | 10 |

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| 5. (a) Explain the construction and principle of operation of any two of the following :- | 10 |
| (i) LVDT | |
| (ii) Piezoelectric transducers | |
| (iii) Pitot tube. | |
| (b) What are the reverse acting controllers ? Explain any one in detail. | 10 |

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| 6. (a) Describe various methods to measure temperature above 2000 °C in a system. | 10 |
| (b) Describe 'textile yarn and fabric dyeing' process and 'dye cycle' fully. | 10 |

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| 7. Write detail notes on any two of the following :- | 20 |
| (a) Active filters | |
| (b) Data loggers | |
| (c) Measurement and control of 'pH of liquid' in the system | |
| (d) An influent water treatment plant. | |