Registration No. : | | | | | | | | | | |

Total number of printed pages – 2

B. Tech

PEEI 5403

Eighth Semester Regular / Back Examination – 2015

INDUSTRIAL INSTRUMENTATION

BRANCH (S) : AEIE, CHEM, EC, EIE, ELECTRICAL, ETC, IEE

QUESTION CODE : J 240

Full Marks – 70

Time : 3 Hours

*Answer Question No. 1 which is compulsory and any **five** from the rest.*

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

   (a) List various causes of drift observed in an instrument.

   (b) Give one example each of a Zero-order instrument, a First-order instrument and a Second-order instrument.

   (c) Define MTTF. Write the relationship between MTTF and Reliability.

   (d) How Thermal Conductivity of a pure gas varies with temperature ?

   (e) Define Nyquist rate.

   (f) List various modes used in optical fibre communication system.

   (g) How Channel Capacity and Channel Bandwidth are related ?

   (h) List various sensors/instruments used for Level and Pressure measurement.

   (i) What is Flue gas ? List the gases present in Flue gas.

   (j) Why Hydrazine is used in water system cycle in a power plant ?

2. (a) Distinguish the following : 5

   (i) Threshold and Dead Zone

   (ii) Repeatability and Reproducibility

   (iii) Fidelity and Speed of Response.

   (b) What is the need of statistical analysis of measuring instrument ? Hence, define Mode, Median, Mean and Variance. 5

P.T.O.

3. (a) With suitable diagram briefly explain principle of operation of any ONE Gas Analyzer. 5

(b) Describe basic principle of pH measurement. What is the role of Reference Electrode ? Describe construction of Reference Cell and Measuring Cell. 5

4. (a) Describe methods of Pneumatic Signal Transmission to a short distance and to a long distance. Mention the range of Pneumatic Signal. Write few advantages of using Pneumatic Signal. 5

(b) List various types of Spread Spectrum used in Telemetry system. Describe operations of Transmitter and Receiver of a FHSS (Frequency Hopping Spread Spectrum). 5

5. (a) What is the importance of Modulation in Telemetry ? Briefly describe methods of Modulation of digital data. 5

(b) Briefly describe principle of operation of Voltage Telemetering system and Position Telemetering system. 5

6. (a) With a suitable diagram describe a typical power plant cycle and explain the role of each component. 5

(b) Describe construction and principle of operation of Hall type Pressure sensor. 5

7. (a) What is Intrinsic Safety ? How does a Safety Triangle account for safety in hazardous condition ? 5

(b) With a suitable diagram describe operation of a Zener Barrier Protection system. 5

8. Answer any **two** of the following : 5×2

(a) Explain principle and operation of Spectroscopy in general.

(b) Draw block diagram and explain operation of Wireless I/O system.

(c) Explain principle of operation of Flue gas analysis.
