

MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR
SEMESTER END THEORY EXAMINATION, B. TECH. (D.T.) DEGREE COURSE 2018-19

Semester : V (V Dean)
Course No. : DE- 511

Academic Year : 2018-2019
Course Title : Instrumentation and
Process Control

Credits : 2+1=3

Total Marks : 50

Day & Date : Wednesday, 09/01/2019

Time : 11.00 to 13.00 Hrs.

- Note :** 1) All questions from **Section 'A'** are compulsory.
2) Solve **Any Three** questions from **Section 'B'**.
3) Draw neat and well labelled diagram wherever necessary.

SECTION –‘A’

Q. 1 A) Choose the most appropriate answer from the options given below. (05)

- i) Flow meter consisting of a tube with a short, narrow center section and widened, tapered ends is
 - a) Venturi meter
 - b) Variable area flow meter
 - c) Orifice meter
 - d) Flow nozzle meter
- ii) A mercury barometer measures
 - a) Vacuum
 - b) Absolute pressure
 - c) Atmospheric pressure
 - d) Gauge pressure
- iii) Rotameter is a
 - a) Drag force flow meter
 - b) Variable area flow meter
 - c) Variable head flow meter
 - d) Rotary propeller type flow meter
- iv) The difference between measured variable and setpoint is known as
 - a) Precision
 - b) Drift
 - c) Error
 - d) Accuracy
- v) Which type of controller is frequently used for the control of temperature in HTST pasteurizer?
 - a) PI
 - b) PD
 - c) PID
 - d) ON-OFF

B) Define the following. (05)

- i) Accuracy
- ii) Static characteristic
- iii) Drift
- iv) Hysteresis
- v) Fidelity

Q. 2 A) What do the following abbreviations indicate? (05)

- i) LVDT
- ii) RTD
- iii) PLC
- iv) SCADA
- v) PID

(P.T.O.)

- B) State whether the following statements are True or False. If false, rewrite the statement after making necessary corrections. (05)
- i) Volumetric expansion is the working principle of the bimetallic thermometers.
 - ii) Hair hygrometer is used for measuring of relative humidity.
 - iii) Pt 100 is pressure measuring device.
 - iv) Radiation pyrometer works on the principle of seebeck effect.
 - v) The relative static error is ratio of absolute static error to the true value.

SECTION –‘B’

- Q. 3 A) Describe different types of temperature measuring devices. (05)
B) Give the basic requirements of transducers and classify them. (05)
- Q. 4 A) What are different modes of control and explain ON-OFF control in detail. (05)
B) Explain working principle of rotameter with neat sketch. (05)
- Q. 5 A) Explain dynamic characteristics of measuring instruments. (03)
B) Write the classification of Instruments. (03)
C) Enumerate different pressure measuring devices. (04)
- Q. 6 A) Explain the functions of instruments and measurement systems. (03)
B) Explain the controlling torque and damping torque in indicating instruments. (03)
C) Explain the working principle of LVDT. (04)
- Q. 7 State and explain with neat sketch the elements of a generalized measurement system. (10)
Discuss the elements of Bourdon tube pressure gauge in this context.

Answer key

DE- 511 (2+1=3)

Instrumentation and Process Control

Q. 1 A) Choose the most appropriate answer from the options given below.

- i) a) : Venturi meter
- ii) c) : Atmospheric pressure
- iii) b) : Variable area flow meter
- iv) c) : error
- v) c) : PID

B) Define the following.

- i)
- ii)
- iii) Refer standard text book.
- iv)
- v)

Q. 2 A) What do the following abbreviations indicate.

- i) LVDT : Linear Variable Differential Transformer
- ii) RTD : Resistance Temperature Detector
- iii) PLC : Programmable logic controller
- iv) SCADA : Supervisory Control And Data Acquisition
- v) PID : Proportional Integral Derivative

B) State whether the following statements are True or False. If false, rewrite the statement after making necessary corrections.

- i) False : Volumetric expansion is the working principle of the mercury in glass thermometers.
- ii) True
- iii) False : Pt 100 is temperature measuring device.
- iv) False : Radiation pyrometer works on the principle of Stefan-Boltzman law.
- v) True
