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

Total Number of Pages : 02 **B.Tech**

PCEI4305

6th Semester Back Examination 2017-18
INSTRUMENTATION DEVICES AND SYSTEMS-II
BRANCH : AEIE, EIE, IEE
Time : 3 Hours
Max Marks : 70
Q.CODE : C569

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.
Attempt all parts of a question at a place

Q1 **Answer the following questions :** **(2 x 10)**

a) Distinguish Between modifying input and interfering input of an instrument.
b) Define static error and dynamic error of a measurement system.
c) Why signal conditioning circuits are used in instruments?
d) What is a Relay or a Booster in a pneumatic system?
e) State the classification of a control valves.
f) What is pyrometry?
g) A stepper motor has 10 degrees per step and must rotate at 250 revolutions per minute. Find the required input pulse rate
h) Write the basic principle of operation of a photodiode?
i) Explain the fiber optic sensor with neat block diagram.
j) What is the function of an actuator? Write the principle of operation of a solenoid valve.

Q2 **(a)** What are the different mechanical methods of level measurements? Explain any one of them. **(5)**

(b) Draw an equivalent circuit of piezo-electric crystals, cables, charge amplifier and recorder. Derive its transfer function. **(5)**

Q3 **a)** Derive the second order system operating under critically damped and under damped conditions when excited by a step input. **(5)**

b) Derive the expressions of an undamped natural frequency and damping ratio of a mass-spring-damper model of elastic force sensor. **(5)**

Q4 **a)** Describe the construction of a LVDT and explain the principle of displacement measurement. **(5)**

b) Narrate the construction and principle of pressure measurement using Bellows and diaphragms. **(5)**

Q5 **a)** Derive an expression of the output unbalanced voltage of wheat stone bridge employing one active strain gauge in measuring strain. **(5)**

b) The Resistance-Temperature characteristics of a thermistor are non-linear. Suggest a method of linearization of thermistor. **(5)**

Q6 **(a)** What do you understand by discrete state of process? Explain what is continuous control and discrete control? **(5)**

(b) Write the materials used for making LEDs. Draw the circuit diagram and explain the operation of LED. **(5)**

Q7 **(a)** Describe various methods of "Modulation of Intensity by Transmission Medium" in fibre optic measurement systems. **(5)**

(b) Explain the working of a flapper-nozzle system. Also explain the working principle of a current to pressure converter. **(5)**

Q8 **Write short answer on any TWO :** **(5 x 2)**

a) Doppler shift

b) PLC operation in brief

c) DC Motors

d) Broad band Pyrometers