

GANPAT UNIVERSITY

B. Tech. Semester: VII (Electrical) Engineering

Regular / Remedial Examination Nov-Dec 2016

2EE703: Industrial Instrumentation & Automation

Time: 3 Hours

Total Marks: 70

- Instruction:**
1. Assume suitable data if necessary.
 2. Paper consist two sections. Answers must be written in separate answer sheet.
 3. Figure to the right indicate full marks.
 4. All questions are compulsory.

Section - I

Que. - 1

- (A) Draw the ladder relay logic for the system in which there are three machines. Each machine has its own start and stop pushbutton but only one machine run at a time without intermediate stop. [06]
- (B) Explain OFF DELAY TIMER with suitable example & timing diagram. [04]
- (C) Construct the ladder logic for NOR and X-NOR logic gates. [02]

OR

Que. - 1

- (A) Draw the basic block diagram of PLC and also state the function of each [04]
- (B) Design the ladder logic for the system which consist three process A, B, and C. when process A & B must start and stop for five & three times respectively, then and then process C is started for 3 sec. (Process A & B have its own start [06]
- (C) Construct ladder logic for following Boolean function. [02]
- $$y = (1. \bar{2}) + (\bar{3}. (\bar{4} + 5))$$

Que. - 2

- (A) Explain SCADA based monitoring and controlling of a Gas lift system. [06]
- (B) (1) What does Protocol driver do? [05]
(2) What equipment are needed to send an analog signal from an RTU to an MTU?

OR

Que. - 2

- (A) (1) What are the three main characteristics of processes make them potential candidate for SCADA. [05]
(2) Why is an uninterruptable supply (UPS) needed at an RTU?
- (B) What is Scan Interval? Calculate scan interval for the following SCADA [06]

Que. - 3 Attempt Any Three:

- (A) Explain basic block diagram of smart sensor. State the function of each block. [12]
- (B) Write a short note on: Ultrasonic Sensor
- (C) 1. Define: module Addressing, holding register.
2. Draw Start - stop - jog logic of PLC.
- (D) Explain following instruction
1. LIM instruction
 2. LEQ instruction

Section - II

Que. - 4

- (A) Explain the construction and working of strain gauge. Prove 'Gauge Factor = $1+2\nu$ '. (ν = Poisson's ratio) [06]
- (B) A thermistor has a resistance of 3980Ω at 0°C and 895Ω at 62°C . The resistance temperature relationship is given by $R_T = a R_0 \times e^{b/T}$ with the usual notations. Calculate value of the constants a and b . Also calculate the range of resistance to be measured in case the temperature varies from 40°C to 90°C . [06]

OR

Que. - 4

- (A) Explain different factors influencing the selection of transducers. [06]
- (B) The output of LVDT is connected to a 5V voltmeter through an amplifier whose amplification factor is 250. An output of 2mV appears across the terminal of LVDT when the core moves through the distance of 0.5mm. Calculate the sensitivity of the LVDT and that of the whole setup. The [06]

Que. - 5

- (A) State different methods for measurement of pressure using electrical [06]
- (B) Write short note on the following:- [05]
- Thermocouple vacuum gauge
 - Pirani Gauge

OR

Que. - 5

- (A) Write short note on Thermistor. [06]
- (B) A strain gauge is bonded to a steel beam of 0.25 mm length and having cross sectional area of $0.4 \times 10^{-3} \text{ m}^2$. Its Young's Modulus of elasticity is $207 \times 10^9 \text{ N/m}^2$, nominal resistance is 240Ω and gauge factor is $G_f = 2.2$. When the load is applied, the change in resistance of the strain gauge is 0.013Ω . Calculate the change in the length of the beam and the force applied. [05]

Que. - 6

Attempt Any Three:

- (A) Give classification of transducers and explain them. [12]
- (B) Write short note on DC tachometer generator for the measurement of Angular Velocity.
- (C) Give comparison between RTD, thermistor, thermocouple, and IC temperature transducers.
- (D) Explain digital encoding.

END OF PAPER
ALL THE BEST