Reg. No. :

Question Paper Code: 36602

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Sixth Semester

Instrumentation and Control Engineering

01UIC602 - LOGIC AND DISTRIBUTED CONTROL SYSTEMS

(Common to Electronics and Instrumentation Engineering)

(Regulation 2013)

Duration: 1:15hrs   Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)
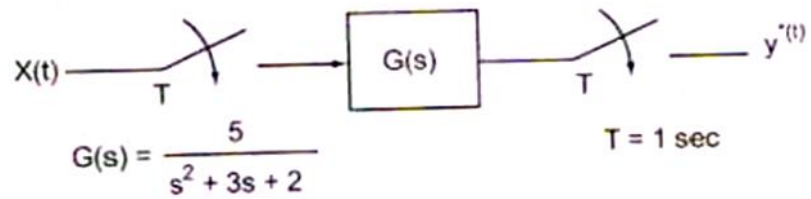
(Answer any six of the following questions)

1. PLCs having less than _____ inputs and outputs are called as small PLC

    (a) 50   (b) 100   (c) 150   (d) 200

2. An example of module addressing is I:1.0/2 here '1' represents

    (a) bit number   (b) word number   (c) slot number   (d) File number

3. A disadvantage of centralized control is

    (a) Installation cost is medium   (b) Medium trained people is enough
    (c) Reprogramming is easy   (d) Single point failure is high

4. If you expect to change control strategy during or after the initial installation has been completed and expansion is also a consideration in future, then _____ control be advantageous.

    (a) Distributed   (b) Direct Digital   (c) Hybrid   (d) Analog

5. Which of the following capabilities is/are typically required of an operator interface in automation?

    (a) Access the state of the process   (b) Control/modify parameters

    (c) Intervene in the process   (d) All the above

6. A Ladder rung with an input and output condition can be most compared to

    (a) An IF-THEN statement   (b) A FOR loop

    (c) A GOTO jump   (d) A COP Instruction

7. The advantages of position algorithm is

    (a) Bump less transfer   (b) Anti reset wind up

    (c) Reference position   (d) Calculate only incremental output

8. The maximum frequency component of g (t) is fm. To recover the signal g (t) exactly from its samples it has to be sampled at rate

    (a) $f_s \geq 2f_m$ (b) $f_s \leq 2f_m$ (c) $f_s = 2f_m$ (d) $f_s < 2f_m$

9. Interoperability means

    (a) Functional blocks are standardized

    (b) Communication layer are standardized

    (c) Field instruments are standardized

    (d) LCU's are standardized

10. In HART protocol, use two individual frequencies of _____ and _____ representing digits 0 & 1 respectively.

    (a) 1200 Hz and 2200 Hz   (b) 2200 Hz and 1200 Hz

    (c) 2300 Hz and 1200 Hz   (d) 1100 Hz and 2100 Hz

<div align="center">PART – B (3 x 8= 24 Marks)</div>

<div align="center">**(Answer any three of the following questions)**</div>

11.   Discuss the power supply used in PLC with neat block diagram.   (8)

12.   Describe the sequencer instructions of PLC with examples.   (8)

13.   Conclude the open loop response of the sampled data system shown in below to a unit step change in input *X(t).*   (8)

36602

$$X(t) \xrightarrow{\quad} \overset{}{\underset{T}{\diagup}} \longrightarrow \boxed{G(s)} \longrightarrow \overset{}{\underset{T}{\diagup}} \longrightarrow y^{*}(t)$$

$$G(s) = \frac{5}{s^2 + 3s + 2}$$

$$T = 1 \text{ sec}$$

14. Describe the architecture of Distributed Control System and its main sub-system.

(8)

15. Illustrate in detail about the theory of operation of HART communication protocol.

(8)

36602

36602