

Code: R7211305

**R07**

B.Tech II Year I Semester (R07) Supplementary Examinations, May 2013

**INSTRUMENTATION AND CONTROL SYSTEM COMPONENTS**

(Electronics and Control Engineering)

Time: 3 hours

Max. Marks: 80

Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Explain in detail about the usage of left chain and friction drives in an industrial environment.  
(b) Enumerate the difference between pivots and bearings.
- 2 (a) Discuss about the pneumatic relays in detail.  
(b) Explain briefly the operation of safety relief and pilot valves.
- 3 (a) What is the difference between a switch and a relay?  
(b) Discuss in detail about the importance of pulse transformers.
- 4 (a) A 3- $\phi$  variable stepper motor has following parameters:  
Average phase-winding resistance =  $1.5 \Omega$   
Average phase-winding inductance =  $25 \text{ mH}$   
Rated winding current =  $2 \text{ A}$   
Design a simple unipolar drive circuit, such that the electrical time constant is  $3 \text{ msec}$ , at phase turn on and  $2 \text{ msec}$  at turn off. The stepping rate is  $300 \text{ steps/sec}$ .  
(b) Define step angle. What are the applications of stepper motors?
- 5 (a) Based on the characteristics, distinguish between BJT and FET.  
(b) Briefly explain the construction and working principle of a varactor diode.
- 6 Draw and explain the functional diagram of a 555 timer. Also discuss briefly the different modes of operation of a 555 timer.
- 7 (a) Describe the working principle of LED with neat sketch.  
(b) Explain the working of an opto-couple in detail.
- 8 Write short notes on the following:  
(a) PIN diodes.  
(b) Optical filters.  
(c) Diffraction grating.

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