

II B.Tech I Semester Supplementary Examinations, May 2005
INSTRUMENTATION COMPONENTS
(Common to Electronics & Instrumentation Engineering and Electronics & Control Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Derive the expression for n of a spiral gear.
(b) Describe in detail a system which uses spiral gear.
2. (a) How do diaphragms fit in as control components.
(b) Explain in detail about the construction and working principles of diaphragm.
3. (a) In what way a pulse transformer is different from normal transformer.
(b) A square waveform is given as input to a pulse transfer, sketch the O/P waveform.
(c) Mention a few uses of pulse transformer.
4. (a) With a neat diagram explain the working of $3-\theta$ stepper motor.
(b) A three- phase variable stepper motor has the following parameters.
Average Phase winding Resistance = 1 ohm
Average phase winding Inductance = 30mH
Rated winding current = 3A.
Design a simple uni polar drive circuit, such that the electrical time constant is 2 mSec at Phase turn-on and 1 mSec. At turn-off. The stepping rate is 300 steps per second.
5. (a) Explain the construction and working principle of DIAC.
(b) Draw the circuit symbol and also explain its V-I characteristics.
6. (a) With a typical connection diagram explain the circuit operation of the adjustable positive voltage regulator LM317.
(b) Design an adjustable voltage regulator using LM317 to satisfy the following condition: Output voltage $V_0 = 5$ to 12V Output current $I_0 = 1A$, Adjustment pincurrent (I_{adj}) for LM317 = 100 μA .
7. (a) What is the essential difference between principle of operation of normal p-n diode and a LED.
(b) Describe the working principle of light emitting diode with neat diagram.
(c) Draw the schematic representation of an optocoupler and explain its working principle.
8. (a) Discuss the spectral transmittance characteristics of an absorption filter.

- (b) What are the parameters to be observed in the design of grating.
- (c) Give two types of mounting of grating and explain the importance of mount in the grating.

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